

# Habitat Usage by Birds at the Lake Alice Wildlife Management Area Chazy, New York

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## ABSTRACT

The Lake Alice Wildlife Management Area (LAWMA) in northern Clinton County, New York is a popular location for birding enthusiasts. However, this study is the first comprehensive survey of bird species within major habitat types at LAWMA in more than 20 years. Birds were identified by sight and sound in four habitats at LAWMA between June 2 and July 22, 2003. Relative abundance and diversity were calculated for bird species in the forest habitat, and the forest-field, forest-wetland and wetland-field ecotones. Thirty-one residential species were observed during the summer, with between 14 and 21 species per habitat type. The highest diversity indices were in the forest ecotones. Recommendations were made for habitat management projects to enhance bird species richness at LAWMA and increase the populations of bird species that are either threatened or of special concern status in New York.

*Key Words: Lake Alice Wildlife Management Area, forest birds, wetland birds, grassland birds, ecotone, species diversity, habitat management*

## INTRODUCTION

The Lake Alice Wildlife Management Area (LAWMA) is located in Chazy, New York and is one of the premier birding areas in Clinton County (Mitchell and Krueger, 1997). The LAWMA is 590 ha, managed by Region 5 of the New York State Department of Environmental Conservation (DEC). The forests, fields, wetlands and open water at LAWMA provide a wide variety of habitats for bird nesting and feeding. Species lists from the 1980-1985 New York State Breeding Bird Survey (BBS) map units that included LAWMA show 92 species for Block 6197C, 91 species for Block 6197D, 53 species for Block 6196A, and 41 species for Block 6196B (NYS DEC, 2004). While the area encompassed by these four sampling blocks (5 km by 5 km) is larger than LAWMA, it is likely that most of the 105 different species recorded for these blocks were present within the borders of LAWMA during that five-year period.

Other than the current BBS, there have been no comprehensive bird studies at Lake Alice for at least 20 years. Usage of LAWMA by migratory waterfowl in the fall season was documented by Hynes (1975) and Nack (1977). Tucker (1976) and Thayer and Sanborn (1977) evaluated spring waterfowl usage of LAWMA. An analysis of LAWMA for ruffed grouse (*Bonasa umbellus*) and woodcock (*Philohela minor*) habitat was completed by Yando (1977). The objective of this study was to inventory bird species, by habitat type, at LAWMA during the 2003 breeding season.

## METHODS

### Study Area

The Lake Alice Wildlife Management Area (LAWMA) is located in Chazy, New York. The center of the lake is approximately N 44° 47', W 73° 48'. LAWMA is 560 ha, consisting of five general habitat types: open water (30 ha); marsh (50 ha); mixed deciduous-coniferous forest (395 ha); open field (85 ha); and at least 13 constructed potholes (Adams, pers. comm.).

### **Bird Counts**

A census of bird species at LAWMA was conducted by a team of two people between June 2 and July 22, 2003. A total of 13 listening posts (LPs) were established to sample birds utilizing four major habitat types at Lake Alice: two LPs in the forest-field habitat; four LPs in the forest habitat; three LPs in the forest-wetland habitat; and four in the wetland-field habitat. The forest at Lake Alice is predominantly hardwood, with a mixture of white pine (*Pinus strobus*) and hemlock (*Tsuga canadensis*.) The wetlands are dominated by cattail (*Typha latifolia*) and shrubs such as dogwoods (*Cornus spp.*) and tag alder (*Alnus rugosa*). Some of the open fields have not been mowed for several years. All of the fields are dominated by grasses, but one field also had an abundance of willows (*Salix spp.*).

Birds were identified by sight and song in mornings (6:00am-noon) and evenings (4:00pm-midnight). The number of birds observed (by sight or song) was recorded on data sheets, by species, for each ten minute sampling interval at each of the LPs. By the end of the study, the same amount of observation time was devoted to each LP.

### **Data Analysis**

Bird species observed five or more times at a given LP were assumed to be residents. Birds observed fewer than five times were considered transients and were not included in the analyses. The total number of bird counts and relative abundance (percent of total bird counts for each species) were calculated to compare the bird community in each habitat type. Habitat-specific species (those observed in only one habitat) were also determined. Species diversity was determined for each habitat type using Simpson's index. Simpson's index =  $N(N-1) / [\sum n_i(n_i-1)]$ , (where N = total number of bird counts for all species; n = number of bird counts for a species) (Cox, 2002).

## **RESULTS**

Fifty-six bird species were identified during the summer, 2003 census at Lake Alice (Table 1). Of the 56 bird species, 31 were considered residents at LAWMA and 25 were transients. The habitat type with the largest number of residential species was the forest-wetland ecotone, with 21 species (Figure 1, Table 2). The habitat type with the fewest residential species was the forest, with 14 species (Figure 1, Table 3). The forest-field ecotone habitat type had 15 residential species (Figure 1, Table 4) and the field-wetland ecotone had 19 species (Figure 1, Table 5).

The habitat types with the highest diversity were the forest-wetland and forest-field ecotones with a Simpson's index of 11.8 and 11.4, respectively. The forest habitat had a diversity index of 9.8 and the field-wetland had a diversity index of 5.6. The field-wetland ecotone habitat type had four 4 habitat-specific species, the highest of all habitat types. Habitat-specific species were those species observed exclusively in only one of the four habitat types. The forest habitat had three habitat-specific species while the forest-wetland and forest-field ecotones each had only one habitat-specific species (Table 6).

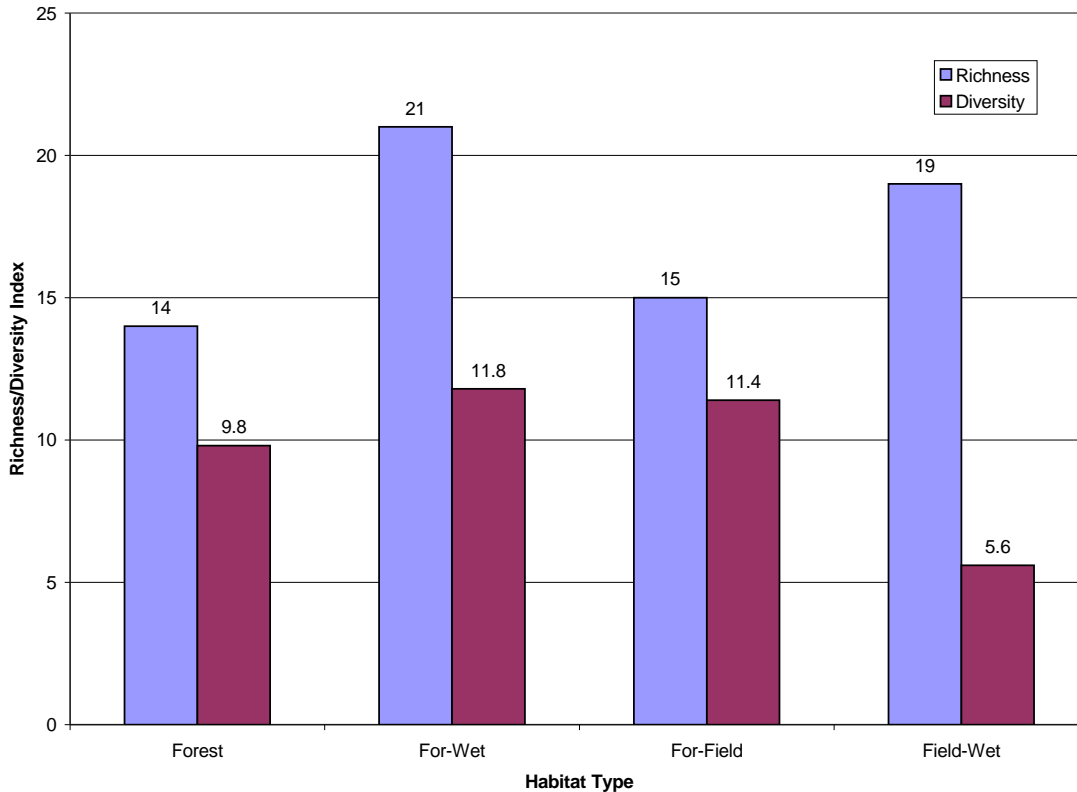


Figure 1. Species richness and diversity of residential birds at LAWMA, summer 2003.

Table 1. Bird species identified at the Lake Alice Wildlife Management Area, summer 2003.<sup>1</sup>

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<b>American Crow</b>	<i>Corvus brachyrhynchos</i>
<b>American Goldfinch</b>	<i>Carduelis tristis</i>
American Kestrel	<i>Falco sparverius</i>
American Redstart	<i>Setophaga ruticilla</i>
<b>American Robin</b>	<i>Turdus migratorius</i>
Baltimore Oriole	<i>Icterus galbula</i>
<b>Barn Swallow</b>	<i>Hirundo rustica</i>
<b>Black-capped Chickadee</b>	<i>Poecile atricapilla</i>
<b>Blue Jay</b>	<i>Cyanocitta cristata</i>
Blue-headed Vireo	<i>Vireo solitarius</i>
<b>Bobolink</b>	<i>Dolichonyx oryzivourus</i>
Broad-winged Hawk	<i>Buteo platypterus</i>
Brown Thrasher	<i>Toxostoma rufum</i>
Brown-headed Cowbird	<i>Molothrus ater</i>
<b>Canada Goose</b>	<i>Branta canadensis</i>
<b>Cedar Waxwing</b>	<i>Bombycilla cedrorum</i>

Table 1 , continued

<b>Chipping Sparrow</b>	<i>Spizella passerina</i>
<b>Common Grackle</b>	<i>Quiscalus quiscula</i>
<b>Common Yellowthroat</b>	<i>Geothlypis trichas</i>
Dark-eyed Junco	<i>Junco hyemalis</i>
Downy Woodpecker	<i>Picoides pubescens</i>
<b>Eastern Kingbird</b>	<i>Tyrannus tyrannus</i>
<b>Eastern Wood Pewee</b>	<i>Contopus virens</i>
<b>European Starling</b>	<i>Sturnus vulgaris</i>
<b>Gray Catbird</b>	<i>Dumetella carolinensis</i>
Great Blue Heron	<i>Ardea herodias</i>
Great Crested Flycatcher	<i>Myiarchus crinitus</i>
Great Horned Owl	<i>Bubo virginianus</i>
Green Heron	<i>Butorides virescens</i>
Hairy Woodpecker	<i>Picoides villosus</i>
<b>Hooded Merganser</b>	<i>Lophodytes cucullatus</i>
<b>Least Flycatcher</b>	<i>Empidonax minimus</i>
Mallard	<i>Anas platyrhynchos</i>
<b>Mourning Dove</b>	<i>Zenaida macroura</i>
Northern Flicker	<i>Colaptes auratus</i>
Northern Waterthrush	<i>Seiurus noveboracensis</i>
Osprey	<i>Pandion haliaetus</i>
<b>Ovenbird</b>	<i>Seiurus aurocapillus</i>
Red-breasted Nuthatch	<i>Sitta canadensis</i>
<b>Red-eyed Vireo</b>	<i>Vireo olivaceus</i>
<b>Red-winged Blackbird</b>	<i>Agelaius phoeniceus</i>
<b>Ring-billed Gull</b>	<i>Larus delawarensis</i>
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>
<b>Song Sparrow</b>	<i>Melospiza melodia</i>
<b>Swamp Sparrow</b>	<i>Melospiza georgiana</i>
<b>Tree Swallow</b>	<i>Tachycineta bicolor</i>
Turkey Vulture	<i>Cathartes aura</i>
<b>Veery</b>	<i>Catharus fuscescens</i>
White-breasted Nuthatch	<i>Sitta carolinensis</i>
White-throated Sparrow	<i>Zonotrichia albicollis</i>
<b>Wilson's Snipe</b>	<i>Gallinago delicata</i>
Winter Wren	<i>Troglodytes troglodytes</i>
Wood Duck	<i>Aix sponsa</i>
<b>Wood Thrush</b>	<i>Hylocichla mustelina</i>
<b>Yellow Warbler</b>	<i>Dendroica petechia</i>
<b>Yellow-bellied Sapsucker</b>	<i>Sphyrapicus varius</i>

<sup>1</sup> Species in bold were residential

Table 2. Bird counts in the forest-wetland ecotone habitat type at LAWMA, summer 2003.

Species	Bird Count				Relative Abundance (%)
	LP3	LP4	LP7	Total <sup>1</sup>	
Red-winged Blackbird	49	0	42	91	21.1
European Starling	40	0	0	40	9.3
Song Sparrow	17	0	21	38	8.8
Common Yellowthroat	37	0	0	37	8.6
Chipping Sparrow	24	0	0	24	5.6
Tree Swallow	16	0	6	22	5.1
Yellow Warbler	6	0	14	20	4.6
Common Grackle	17	0	0	17	3.9
Veery	0	12	5	17	3.9
American Goldfinch	10	0	6	16	3.7
American Robin	9	0	7	16	3.7
Red-eyed Vireo	0	13	0	13	3.0
Yellow-bellied Sapsucker	0	13	0	13	3.0
American Crow	12	0	0	12	2.8
Blue Jay	0	11	0	11	2.6
Black-capped Chickadee	0	10	0	10	2.3
Mourning Dove	0	0	8	8	1.9
Ovenbird	0	8	0	8	1.9
Cedar Waxwing	6	0	0	6	1.4
Eastern Wood Pewee	0	6	0	6	1.4
Wilson's Snipe	6	0	0	6	1.4
<b>Total</b>	<b>249</b>	<b>73</b>	<b>109</b>	<b>431</b>	<b>100.0</b>
Diversity Index	11.8				

<sup>1</sup>Means the total number of times that species were identified by sight or song.

Table 3. Bird counts in the forest habitat type at LAWMA, summer 2003.

Species	Bird Count				Total <sup>1</sup>	Relative Abundance (%)
	LP1	LP6	LP8	LP9		
Red-eyed Vireo	6	7	15	22	50	18.1
Veery	7	0	18	16	41	14.9
Ovenbird	0	0	22	17	39	14.2
Red-winged Blackbird	0	24	0	0	24	8.7
Blue Jay	0	17	0	0	17	6.2
Yellow-bellied Sapsucker	0	0	8	9	17	6.2
Canada Goose	0	15	0	0	15	5.5
Yellow Warbler	15	0	0	0	15	5.5
Black-capped Chickadee	0	6	0	8	14	5.1
Mourning Dove	0	0	14	0	14	5.1
Eastern Kingbird	0	0	13	0	13	4.7
Gray Catbird	6	0	0	0	6	2.2
Eastern Wood Pewee	0	0	5	0	5	1.8
Wood Thrush	0	0	0	5	5	1.8
<b>Total</b>	<b>34</b>	<b>69</b>	<b>95</b>	<b>77</b>	<b>275</b>	<b>100.0</b>
Diversity Index	9.8					

<sup>1</sup>Means the total number of times that species were identified by sight or song.

Table 4. Bird counts in the forest-field ecotone habitat type at LAWMA, summer 2003.

Species	Bird Count			Relative Abundance (%)
	LP10	LP11	Total <sup>1</sup>	
Song Sparrow	0	29	29	15.3
Red-eyed Vireo	26	0	26	13.7
Red-winged Blackbird	0	23	23	12.1
American Goldfinch	0	17	17	9.0
Ovenbird	16	0	16	8.4
Veery	9	5	14	7.4
Common Yellowthroat	0	13	13	6.8
American Robin	7	5	12	6.3
American Crow	0	8	8	4.2
Chipping Sparrow	0	6	6	3.2
Yellow-bellied Sapsucker	6	0	6	3.2
Black-capped Chickadee	5	0	5	2.6
Blue Jay	5	0	5	2.6
Least Flycatcher	0	5	5	2.6
Swamp Sparrow	0	5	5	2.6
<b>Total</b>	<b>74</b>	<b>116</b>	<b>190</b>	<b>100.0</b>
Diversity Index	11.4			

<sup>1</sup>Means the total number of times that species were identified by sight or song.

Table 5. Bird counts in the field-wetland ecotone habitat type at LAWMA, summer 2003.

Species	Bird Count				Total <sup>1</sup>	Relative Abundance (%)
	LP2	LP12	LP13	LP14		
Red-winged Blackbird	52	88	53	65	258	38.6
Swamp Sparrow	0	0	22	33	55	8.2
Song Sparrow	13	23	13	0	49	7.3
Common Yellowthroat	9	5	16	14	44	6.6
Tree Swallow	19	8	0	14	41	6.1
Bobolink	34	0	0	0	34	5.1
American Goldfinch	5	0	11	10	26	3.9
Eastern Kingbird	0	7	14	5	26	3.9
Barn Swallow	0	0	0	23	23	3.4
American Crow	21	0	0	0	21	3.1
Wilson's Snipe	5	0	7	6	18	2.7
Yellow Warbler	7	0	0	8	15	2.3
Chipping Sparrow	0	0	5	9	14	2.1
Hooded Merganser	0	11	0	0	11	1.7
Cedar Waxwing	0	9	0	0	9	1.4
Common Grackle	0	0	7	0	7	1.1
Mourning Dove	0	0	7	0	7	1.1
American Robin	0	0	0	5	5	0.8
Ring-billed Gull	5	0	0	0	5	0.8
Total	170	151	155	192	668	100.0
Diversity Index	5.6					

<sup>1</sup>Means the total number of times that species were identified by sight or song.

Table 6. Habitat specific species for each of the four habitat types at LAWMA, summer 2003.

Field-wetland	Forest	Forest-field	Forest-wetland
Bobolink	Canada Goose <sup>a</sup>	Least Flycatcher	European Starling
Barn Swallow	Gray Catbird		
Hooded Merganser	Wood Thrush		
Ring-billed Gull			

<sup>a</sup>Canada Geese in flight were heard while sampling in the forest habitat type  $\geq 5$  times.



## DISCUSSION

Populations of many migratory bird species are declining in North America resulting from the fragmentation and deterioration of habitats such as forests, grasslands, wetlands, or other habitats that birds utilize for food, shelter or nesting (Hagan and Johnston, 1992; Finch and Stengel, 1993; Herkert, 1997). Part of this trend is due to the decrease in disturbance-dependent habitats, especially in the Northeast (DeGraff and Yamasaki, 2003). For example, fire-dependent forest habitats that contain only mature and overmature trees have lost much of their habitat value for many species of woodland birds (DeGraff and Rudis, 1983). Without management, the habitat complex of shallow, open water and marshes can become a dense monoculture of plants such as cattail, a low quality habitat for waterfowl and other bird species associated with wetlands (Schneider and Pence, 1992; Mitsch and Gosselink, 1994). In New England and northern New York, agricultural fields on abandoned farms are becoming shrub and early-successional forest (DeGraff et al., 1992, 1993). The combination of plant succession on abandoned farmland and changes in farming practices (e.g., mowing fields earlier and more frequently than in the past), is causing a decline in suitable breeding habitat for grassland birds (Bollinger et al., 1990; Bollinger and Gavin, 1992; Rodenhouse et al., 1992; Johnson, 1995; Thompson, 1996; Herkert, 1997; Elphic et al., 2001).

Management of habitat by utilizing artificial disturbances (e.g., tree harvest, pothole construction, field mowing, prescribed burning, wetland dredging) are alternatives to natural disturbances such as lightning-ignited fire in forests or fields, ice storm canopy damage and windstorms (Wright and Bailey, 1982; Rotenberry et al., 1993; Bolen and Robinson, 2003; Faccio, 2003) or wetland hydrology disturbances caused by Beavers (*Castor canadensis*) (DeGraff and Yamasaki, 2003). Well-designed habitat management practices enhance habitat quality and suitability for healthy populations of a wide diversity of species (Elphic et al., 2001).

The purpose of this study was to describe the avian community of several habitat types at the Lake Alice Wildlife Management Area in Chazy, New York. The habitat with the highest diversity index (11.8) was the forest-wetland ecotone. This habitat type also had the highest species richness (21 species). Relative abundances in the forest-wetland habitat were generally well-distributed, with each species showing less than 10 percent except Red-winged Blackbirds with a relative abundance of 21 percent. Six bird species were observed in each of the forest and forest ecotone habitat types (Red-eyed Vireo, Veery, Ovenbird, Blue Jay, Yellow-bellied Sapsucker and Black-capped Chickadee).

Parts of the LAWMA forest were managed for Ruffed Grouse habitat in 1985 (Ventura et al., 1987). The trees that regenerated in these two-ha clearcuts are now nearly 20 years old. Neither Ruffed Grouse nor Woodcock were seen or heard during the sampling times for this study. A new series of clearcut patches would enhance the habitat for these bird species.

The habitat with the lowest diversity was the field-wetland ecotone (5.6 index). Red-winged blackbirds were dominant, with a relative abundance of almost 40 percent. The second most abundant species was Swamp Sparrow with a relative abundance of 8 percent. Out of the 19 species surveyed in the field-wetland ecotone, four species were habitat specific, the highest number for the habitats in this study. Therefore, the field-wetland ecotone habitat type had the most habitat specific species but the lowest species diversity.

Bird species that are generally abundant in wetland habitats similar to those at LAWMA but were observed only occasionally during the summer, 2003 include Great Blue Heron, Green Heron, dabbling ducks, raptors and shorebirds. These species may be more common at LAWMA during other seasons of the year, but perhaps wetland habitat enhancement projects would increase the abundance of these



species. Large areas of the cattail marsh at LAWMA are dense monocultures with little value for marsh birds. Creating a series of connected potholes of various sizes and shapes within the marsh would enhance this habitat type for a variety of birds by increasing interspersed and edge effect. This type of wildlife habitat enhancement is currently being conducted in the marsh at LAWMA as part of a collaborative project between the New York State Department of Environmental Conservation, U.S. Department of Fish and Wildlife and Plattsburgh State University.

The installment of artificial nest boxes in the open field habitat would help increase the abundance of Eastern Bluebirds (*Sialia sialis*) at LAWMA. No Bluebirds were observed during the summer, 2003 study period. Annual, late-summer mowing of the fields may enhance the nesting habitat for Bobolinks at LAWMA and increase the abundance of this species at the site.

According to the latest BBA, Lake Alice is utilized by American Bittern (*Botaurus lentiginosus*), Cooper's Hawk (*Accipiter cooperii*), Sharp-shinned Hawk (*Accipiter striatus*), and Northern Harrier (*Circus cyaneus*), all of which are threatened or species of special concern in New York State (NYSDEC, 2004). Two other threatened or species of special concern in New York, Common Nighthawk (*Chordeiles minor*) and Bald Eagle (*Haliaeetus leucocephalus*), were also seen during non-sampling periods at LAWMA during summer, 2003. The osprey, a species of special concern, was observed a few times during the census periods. Surprisingly, only four species of warblers (Yellow Warbler, Common Yellowthroat, Ovenbird and Northern Waterthrush) were observed at LAWMA during this study period.

This study provided a glimpse into the bird communities at LAWMA. A comprehensive list of the birds that utilize LAWMA would require sampling during the fall and spring migratory periods. Several different habitat enhancement projects are required to maintain LAWMA as one of the premier birding locations in northeastern New York.

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