Forest and Campground Bird Communities of Peninsula State Park, Wisconsin

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Recent studies of bird communities in forest habitat suggest that logging or other habitat disturbance greatly alters the community (Whitcomb 1977, Whitcomb et. al. 1977). Hooper et. al. (1973) demonstrated that bird density and diversity varied with vegetation structure in forest recreational areas in the Southern Appalachians. I counted birds in June, 1977, in Peninsula State Park, Door County, Wisconsin, in order to compare bird populations of mature forests, forest edge, and altered campground sites. I attempted to answer two questions:

1. How do bird density and diversity vary between mature forest and campgrounds?
2. Are there differences in the guilds or types of species which live in campgrounds as opposed to forest?

Study Area and Methods

Peninsula State Park is located on the western shore of the Door Peninsula near Fish Creek, Wisconsin. I counted birds along trails and drives of the park from June 14 to June 17, 1977. Areas studied included parts of Nicolet Camping Area, Welker's Camping Area, Shore Road, Sentinel Trail, Hemlock Road, Nicolet Bay Trail, Sunset Trail (NE end), and Trail Tramper's Delight Trail, as determined from park publications. Forests were composed of sugar maple, basswood, beech, hemlock, and red oak, with some white cedar along Lake Michigan. Campgrounds were intensely used areas of deciduous and coniferous trees with much understory and some areas of grass. I recorded bird use of 91 m x 91 m segments of the habitat, traversing each segment in 4 minutes (Geis 1974). This technique is not a bird census, but an index to bird use which allows comparisons between sites. I recorded the presence or absence of forest understory, an estimate of the extent of conifer species in the segment, the presence of grass, and whether the site was mature forest, forest edge, or campground. The segments were divided into 8 major habitats as follows: deciduous forest with little or no understory, deciduous forest with understory, mixed deciduous forest with conifers and understory, hemlock forest, edge habitat with grassy vegetation and large conifers, forest-like campground sites with deciduous trees, trees, forest-like campground sites with deciduous trees and conifers, and campground sites with both grass and trees. The number of segments counted in each habitat are indicated at the bottom of Table 1. Common and scientific names of birds follow American Ornithologists' Union (1957) and supplements.

Results

In Table 1, I present the list of species encountered, bird density index, number of species, and computed bird species diversity (Simpson 1949) index of number of equally common species. The density of birds was low (2.50-3.27 birds/segment) for the forest and forest edge sites, slightly higher in mixed sites with understory (3.88), and greatly increased in camp grounds (7.67 - 10.00 birds/segment). The number of species encountered

was smallest in deciduous forest, and greater in mixed and hemlock forest as well as campgrounds. The number of equally common species was likewise greater in mixed forest, hemlock forest, and campground sites with grass and trees. Equibility (Simpson's index D/number of species) was lower for each campground category as compared with its forest counterpart, although equibility was also low for mixed forest with understory. Thirty-three species were found in campground sites (31 segments counted), and thirty-two species were found in forest sites (62 segments counted). I conclude that bird density was increased and diversity declined in campgrounds as compared to forests. Table 1 also illustrates changes in the species composition between forests and campgrounds.

Discussion

I examined the results to determine if the larger bird density in campgrounds was due to richer soil type or proximity to Lake Michigan. I found that some forest areas which I counted were also on similar soils at the same elevation, but had low bird densities. Although some of the increased bird density in campgrounds may be due to the location of the campgrounds, the contrast between forest and campground appears to be the major factor for density differences.

Hooper et. al. (1973) showed that the presence of understory in forest-like recreational areas increased bird density, that mixed forest sites with both deciduous and coniferous trees had greater numbers of species, and that parklike recreational areas with grass sometimes had larger bird densities than expected from understory cover alone. I did not directly test these conclusions, but the results of Table 1 do not contradict them. Campgrounds have a patchwork of open and closed canopy, a mixture of deciduous and coniferous trees, and many clumps of shrubs and understory vegetation which are maintained by the frequent habitat disturbance. Species which use this habitat appear in greater density, with great variety of species.

The composition of the bird community in campground sites represents a different component of the community. There were 14 species found in forest habitats which were not in campgrounds, and 14 species found in the campground counts, but not the forest counts. The fourteen species absent in campgrounds included 5 warbler species, 2 thrush species, 2 large species (Ruffed Grouse and Pileated Woodpecker), 3 rare hemlock forest species (Winter Wren, Red-breasted Nuthatch, and Brown Creeper), and 2 widespread species (Black-capped Chickadee and Indigo Bunting). These species are mostly insectivores. The fourteen species gained in campgrounds included 2 warblers, 2 vireos, 3 swallows, and 7 widespread species (Common Flicker, House Wren, Brown Thrasher, Starling, Common Grackle, American Goldfinch, and Song Sparrow). Graber and Graber (1976), using Faunal Index point values for northern Illinois, weighted 8 species absent in campgrounds at 550 points, with the other 6 species off-scale or not listed for Illinois, but 13 species gained by campgrounds at only 180 points (1 species absent in Illinois). Some of this increase in widespread species may be attributable to the patchy matrix of campgrounds which resembles the patchy habitat of urban and agricultural areas in the central United States. These widespread species appear abundantly in urban and in agricultural habitat, and do not appear to need additional preservation.

Table 1. List of bird species, bird density index, number of species, and computed bird species diversity for 8 habitat types in Peninsula State Park, June, 1977. Habitat types are abbreviated as follows: DF, decicuous forest with no understory; DFU, deciduous forest with understory; MFU, mixed forest with understory; HF, hemlock forest; GCE, grass and conifer edge; DFC, deciduous forest campgrounds; MFC, mixed forest campgrounds; CGT, campgrounds with grass and trees.

Species	DF	DFU	MFU	HF	GCE	DFC	MFC	CGT
Black-capped Chickadee	x	x	x	x	x			
Ovenbird	x	x	x	x	x			
Least Flycatcher	x		x			x	x	x
American Redstart	x		x	x		x	x	x
Eastern Wood Pewee	x	x	x			x	x	
Red-eyed Vireo	x	x	x	x	x	x	x	x
Great Crested Flycatcher	x	x	x	x	x	x		
Scarlet Tanager	x	x	x	x	x	x	x	x
Rose-breasted Grosbeak	x	x	x		x	x	x	x
American Robin	x	x	x	x		x	x	x
Downy Woodpecker	x	x	x			x	x	
Blue Jay		x	x	x	x	x	x	
Mourning Warbler		x		x				
Mourning Dove			x				x	x
Gray Catbird			x					x
Veery			x					
Blackburnian Warbler			x	x	x			
Indigo Bunting			x		x			
Pine Warbler			x				x	x
Chipping Sparrow			x		x		x	x
Yellow-bellied Sapsucker			x				x	
Brown-headed Cowbird			x		x	x		x
Ruffed Grouse			x	x				
Cedar Waxwing			x		x		x	x
Black-throated Green Warbler			x	x				
Wood Thrush			x	x				

Table 1 — Continued

Species	DF	DFU	MFU	HF	GCE	DFC	MFC	CGT
Red-winged Blackbird			x				x	x
Black and White Warbler				x				
Winter Wren				x				
Pileated Woodpecker				x				
Red-breasted Nuthatch				x				
Brown Creeper				x				
Northern Oriole					x	x	x	x
Common Grackle						x	x	x
Yellow Warbler						x	x	x
Tree Swallow						x	x	
Common Flicker							x	
Brown Thrasher							x	x
Barn Swallow								x
Rough-winged Swallow								x
Warbling Vireo								x
Song Sparrow								x
Black-throated Blue Warbler								x
Starling								x
American Goldfinch								x
House Wren								x
Yellow-throated Vireo								x
Density Index	2.50	3.00	3.88	3.10	3.27	8.00	7.67	10.00
Number of Species	11	11	26	18	13	15	21	26
Number of segments censused	12	9	31	10	11	9	9	13
Computed bird species diversity	7.89	6.94	12.44	11.58	8.64	8.18	9.54	11.36

The campground habitats in this study had a greater density of birds than forest habitats, with slightly greater variety but lowered equibility of species. The species which inhabitated campgrounds represented a greater percentage of widespread species, whereas numerous rare forest species were absent. The benefit of increased density and variety of birds in campgrounds must be balanced against the loss of rare forest species which may need conservation.

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Play Behavior In Northern Ravens

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During 1944-45 I was part of the U.S. Army's North Pacific Combat School in the Aleutian Islands. Among the many perpetually interesting and amusing sights was the behavior of the Northern Raven (**Corvus corax**) — aerobat, acrobat, clown, scoundrel, tease, and daredevil.

Raven play is well known to ornithologists. Bent in his **Life Histories of North American Birds** describes behavior similar to several of my observations. As a geologist I am well aware that these observations may be scientifically redundant, but since I have never seen such elaborate antics in any other bird, including those of the same species in the northern Rocky Mountains, I write these notes primarily to share the entertainment **Corvus corax** provided for me.

My first important encounter with **Corvus** took place during a tactical exercise on a high fog-bound ridge near Dutch harbor, June, 1944. Visibility was limited to a few feet but varied with the density of the fast-moving clouds. First we heard what sounded like hilarious laughter. As we moved forward to investigate, we finally could make out a group of four Ravens taking turns sliding down an old snow bank. One would slide, mainly riding on tail feathers, feet forward, half-spread wings touching the snow for stability. As he gathered speed, he spread his wings and became airborne, circled the updraft and landed at the top of the snow bank to become one in the line of spectators. Throughout there was a great deal of "Haw! Haw!