

# The Effects of the Canopy Opening on Breeding and Migrant Birds at Hutcheson Memorial Forest

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The dramatic loss of canopy cover at Hutcheson Memorial Forest (H.M.F.) in recent years has been apparent to all visitors. Botanists have quantified some of the effects of this loss in tree cover; for example, the percent of summer light penetration to 15 cm above the ground increased by 12 times in the period from 1969 to 1979 (Davison and Forman 1982). The causes of the tree mortality have included drought (e.g., severe in 1957 and 1981), wind storms, and especially defoliation by cankerworms and gypsy moths (e.g., 1972-76, Moulding 1977). The breeding season and the fall migration of 1982 were studied with an interest in the possible effects of the "open" nature of the forest on birdlife. Intuitively, with the loss of much canopy vegetation, we might expect declines or losses in certain forest interior species, and a concomitant increase in species that prefer thicket growth. The use of the forest by birds during fall migration was compared with the use of a nearby second growth area, as another measure of the attraction quality of the forest.

## Fieldwork

Bird banding was conducted at the forest during the breeding season by Leck, with a total of 102 net hours from the following dates: May 14, 16, 17, 18, 24, 25, and 31, and June 2, 8, 15, 18, 21, and 26. For each of these dates several nets were used along the forest edge. A total of 75 birds of 26 species were banded during this breeding period.

Banding at the forest during the fall migration was a cooperative effort of Leck and Brady, with a total of 345 net hours from the following dates: August 23, 26, 28, 31, September 3, 6, 10, 16, 17, 18, 19, 24, and October 5. Five nets were usually in the forest interior and one at the forest edge. We banded 201 individuals of 37 species for the season. (Both workers made observations on numerous other dates at H.M.F. during the breeding season, late summer, and early fall.)

Banding at the second-growth area, 4 miles from H.M.F., in Somerset, N.J., was conducted by Wander on the same fall dates as for the forest. At this location a total of 902 net hours resulted in the banding of 253 individuals of 50 species. Nets at Somerset were placed in a hedgerow and advanced (>25 year) old-field growth bordering a small permanent stream and its

ephemeral tributary. Six nets were usually used, with one crossing the permanent stream. The dominant trees in this area are American elm (*Ulmus americana*), Eastern redcedar (*Juniperus virginiana*), pin oak (*Quercus palustris*), red maple (*Acer rubrum*), and pear (*Pyrus*). The common shrubs and vines include multiflora rose (*Rosa multiflora*), blackhaw (*Viburnum prunifolium*), silky dogwood (*Cornus amomum*), Japanese honeysuckle (*Lonicera japonica*), and poison ivy (*Rhus radicans*).

## Results and Discussion

### Breeding bird community

Despite the very open canopy a number of species characteristic of the forest were present during the 1982 breeding season. These included, for example, Great Horned Owl (a resident pair), Red-bellied Woodpecker (one pair), Downy Woodpecker (several), Great Crested Flycatcher (several), Eastern Wood Pewee (two territorial males), Blue Jay, Common Crow, Black-capped Chickadee (several), Tufted Titmouse (one pair?), White-breasted Nuthatch (one), Brown Creeper (singing through June), Wood Thrush, Veery (one pair?), Red-eyed Vireo (several territorial males), Ovenbird (one pair, one unmated male), American Redstart (two), Scarlet Tanager (at least one pair), and Rose-breasted Grosbeak. It is notable that this list of woodland birds still includes most of the species that were dominants at H.M.F. when it had a generally closed canopy (i.e., through the 1960s), although most are now greatly reduced in numbers. Leck, Murray, and Swinebroad (1981), discussing the long-term losses in the forest breeding-bird community, did not consider vegetational changes alone to be a sufficient explanation for the marked declines or local extinctions of forest interior species. (Population declines started before vegetational changes, and the extent of canopy opening does not seem sufficient to explain the complete loss of several breeding species.) Interestingly, three forest species returned to the forest in small numbers with the summers of 1981 and 1982, after an absence of many breeding seasons (Brown Creeper, Red-eyed Vireo, and Ovenbird). Still, populations of most birds are depressed in the woods.

The only *forest species* that were recaptured (i.e., after having been banded in previous years) were *residents* (nonmigratory): Downy Woodpecker and Black-capped Chickadee. Other species in the breeding bird community that were recaptured included birds of thickets and second growth such as the Common Yellowthroat, Brown Thrasher, and Gray Catbird (one of which was at least 7 years old). The lack of recaptures for any *migrant* species of breeding bird of the forest interior, in spite of extensive banding in previous breeding seasons (e.g., with Wood Thrushes), may well reflect high mortality of this group. Population declines of neotropical migrants have been detected in a number of forested areas in the northeastern United States (e.g. Butcher, et al. 1981, and Robbins 1980).

The open aspect of the H.M.F. canopy in recent years has apparently attracted a number of "edge habitat" birds into the forest. Species whose nesting populations have clearly been increasing *within* the woods now include House Wren, Blue-winged Warbler, Yellowthroat, Cardinal, and Indigo Bunting. (All these species are commonly found in the old fields and forest edge.)

#### *Birds in the fall migration*

Netting totals for fall migration at both the forest and the second-growth area are presented in Table 1. Review of the species shows that despite the opening of the woodland canopy, the forest apparently still attracts certain migrating birds much more strongly than does second-growth. Species more commonly caught at the forest (as reflected by the percentages of the netting totals) include a number of forest interior species that are neotropical migrants, such as Wood Thrush, Veery, and Scarlet Tanager. As would be expected, H.M.F. also produced higher catches of certain woodland species that are both resident and migratory in our area (e.g., Black-capped Chickadee and Tufted Titmouse). It was striking, however, that there were a number of *forest* species that appeared in comparable abundances at the two sites. These included the relatively rare Eastern Wood Pewee and Red-eyed Vireo, as well as the more common Black-and-white Warbler and Ovenbird. It may well be that on migration some *forest* species (e.g., thrushes, Worm-eating Warbler) are fairly specific in using forest habitats, whereas others (e.g., American Redstart) use a much broader range of habitat types. There appears to be little information in the literature on this possible behavioral variation, one which would be of considerable ecological interest.

The attractiveness of the open-forest undergrowth to thicket species was reflected by the mass movements at H.M.F. of such migrants as Gray Catbird. The high light levels at the ground have allowed invasions and/or increased fruit production by various plants (e.g., pokeberry, *Phytolacca americana*, and spicebush, *Lindera benzoin*) that are attractive to many birds that are frugivorous during the fall migration. In a 22 ha woodlot in Illinois, a variety of fall migrants (fruit-, insect-, and seed-eating birds) showed preference for light gap areas of the woods as compared with forest interior (Willson, Porter, and Condit 1982).

As expected, numbers caught at Somerset were higher for the streamside-inhabiting Northern Waterthrush, some birds of open habitats (e.g., House Finch and American Goldfinch), and thicket species (e.g., Yellowthroat, White-throated Sparrow, and Song Sparrow).

#### Literature Cited

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#### Addendum

The number of banding days was inadvertently omitted from Table 2 in "Changes in breeding bird populations at Hutcheson Memorial Forest since 1958" by C.F. Leck, B.G. Murray, Jr., and J. Swinebroad (*Wm. L. Hutcheson Mem. Forest Bull.* 6: 8-15). The number of banding days for June, July and August are for 1971 (6/9/4), 1972 (9/4/0), 1975 (7/4/1), 1976 (13/7/1), 1978 (5/2/0), and 1980 (10/0/2).

**Table 1. The numbers of new birds banded at Hutcheson Memorial Forest (H.M.F.) during the 1982 breeding season, and at Hutcheson Forest and Somerset during fall migration, 1982.**

Species	H.M.F.	H.M.F.		Somerset	
	Breeding Season No.	Fall No.	%	Fall No.	%
Mourning Dove ( <i>Zenaida macroura</i> )	0	0	—	1	0.4
Yellow-billed Cuckoo ( <i>Coccyzus americanus</i> )	2	0	—	0	—
Black-billed Cuckoo ( <i>Coccyzus erythrophthalmus</i> )	1	0	—	0	—
Ruby-throated Hummingbird ( <i>Archilochus colubris</i> )	0	0	—	4	
Downy Woodpecker ( <i>Picoides pubescens</i> )	0	5	2.5	2	0.4
Eastern Phoebe ( <i>Sayornis phoebe</i> )	0	0	—	1	0.4
Yellow-bellied Flycatcher ( <i>Empidonax flaviventris</i> )	0	0	—	2	0.8
“Traill’s” Flycatcher ( <i>Empidonax “traillii”</i> )	0	0	—	6	2.4
Least Flycatcher ( <i>Empidonax minimus</i> )	0	0	—	1	0.4
Eastern Wood Pewee ( <i>Contopus virens</i> )	1	1	0.5	1	0.4
Blue Jay ( <i>Cyanocitta cristata</i> )	0	5	2.5	4	1.6
Black-capped Chickadee ( <i>Parus atricapillus</i> )	0	7	3.5	1	0.4
Tufted Titmouse ( <i>Parus bicolor</i> )	0	5	2.5	0	—
White-breasted Nuthatch ( <i>Sitta carolinensis</i> )	0	1	0.5	0	—
Brown Creeper ( <i>Certhia familiaris</i> )	0	0	—	1	0.4
House Wren ( <i>Troglodytes aedon</i> )	1	0	—	2	0.8
Catbird ( <i>Dumetella carolinensis</i> )	12	43	21.4	39	15.4
Brown Thrasher ( <i>Toxostoma rufum</i> )	1	2	1.0	0	—
American Robin ( <i>Turdus migratorius</i> )	7	21	10.4	3	1.2
Wood Thrush ( <i>Hylocichla mustelina</i> )	5	16	8.0	2	0.8
Swainson’s Thrush ( <i>Catharus ustulatus</i> )	1 <sup>a</sup>	5	2.5	2	0.8
Gray-cheeked Thrush ( <i>Catharus minima</i> )	0	1	0.5	1	0.4
Veery ( <i>Catharus fuscescens</i> )	1	12	6.0	4	1.6
Golden-crowned Kinglet ( <i>Regulus satrapa</i> )	0	0	—	1	0.4
Ruby-crowned Kinglet ( <i>Regulus calendula</i> )	0	2	1.0	1	0.4
White-eyed Vireo ( <i>Vireo griseus</i> )	0	0	—	2	0.8
Solitary Vireo ( <i>Vireo solitarius</i> )	0	1	0.5	0	—
Red-eyed Vireo ( <i>Vireo olivaceus</i> )	3	1	0.5	2	0.8
Warbling Vireo ( <i>Vireo gilvus</i> )	1	1	0.5	0	—
Black-and-white Warbler ( <i>Mniotilta varia</i> )	0	5	2.5	7	2.8

Worm-eating Warbler ( <i>Helmitheros vermivorus</i> )	0	2	1.0	0	—
Blue-winged Warbler ( <i>Vermivora pinus</i> )	1	0	—	0	—
Tennessee Warbler ( <i>Vermivora peregrina</i> )	0	1	0.5	0	—
Nashville Warbler ( <i>Vermivora ruficapilla</i> )	0	2	1.0	3	1.2
Yellow Warbler ( <i>Dendroica petechia</i> )	2	0	—	2	0.8
Magnolia Warbler ( <i>Dendroica magnolia</i> )	2 <sup>a</sup>	4	2.0	7	2.8
Black-throated Blue Warbler ( <i>Dendroica caerulescens</i> )	0	4	2.0	1	0.4
Yellow-rumped Warbler ( <i>Dendroica coronata</i> )	0	0	—	1	0.4
Blackburnian Warbler ( <i>Dendroica fusca</i> )	0	0	—	1	0.4
Chestnut-sided Warbler ( <i>Dendroica pensylvanica</i> )	0	1	0.5	0	—
Bay-breasted Warbler ( <i>Dendroica castanea</i> )	0	3	1.5	1	0.4
Blackpoll Warbler ( <i>Dendroica striata</i> )	0	0	—	2	0.8
Ovenbird ( <i>Seiurus aurocapillus</i> )	7 <sup>b</sup>	7	3.5	10	4.0
Northern Waterthrush ( <i>Seiurus noveboracensis</i> )	0	1	0.5	9	3.5
Connecticut Warbler ( <i>Oporornis agilis</i> )	0	0	—	2	0.8
Common Yellowthroat ( <i>Geothlypis trichas</i> )	2	1	0.5	11	4.4
Wilson's Warbler ( <i>Wilsonia pusilla</i> )	0	0	—	1	0.4
Canada Warbler ( <i>Wilsonia canadensis</i> )	1 <sup>a</sup>	14	7.0	4	1.6
American Redstart ( <i>Setophaga ruticilla</i> )	2	7	3.5	22	8.7
Red-winged Blackbird ( <i>Agelaius phoeniceus</i> )	1	0	—	0	—
Common Grackle ( <i>Quiscalus quiscula</i> )	0	0	—	12	4.7
Scarlet Tanager ( <i>Piranga olivacea</i> )	0	2	1.0	0	—
Cardinal ( <i>Cardinalis cardinalis</i> )	4	2	1.0	1	0.4
Rose-breasted Grosbeak ( <i>Pheucticus ludovicianus</i> )	0	1	0.5	3	0.8
Indigo Bunting ( <i>Passerina cyanea</i> )	2	1	0.5	1	0.4
House Finch ( <i>Carpodacus mexicanus</i> )	0	0	—	8	3.2
American Goldfinch ( <i>Carduelis tristis</i> )	4	0	—	7	2.8
Rufous-sided Towhee ( <i>Pipilo erythrophthalmus</i> )	2	0	—	5	2.0
Dark-eyed Junco ( <i>Junco hyemalis</i> )	0	0	—	1	0.4
Field Sparrow ( <i>Spizella pusilla</i> )	3	3	1.5	1	0.4
White-throated Sparrow ( <i>Zonotrichia albicollis</i> )	0	10	5.0	29	11.5
Lincoln's Sparrow ( <i>Melospiza lincolnii</i> )	0	1	0.5	0	—
Swamp Sparrow ( <i>Melospiza georgiana</i> )	0	1	0.5	2	0.8
Song Sparrow ( <i>Melospiza melodia</i> )	6	0	—	16	6.3

Note: <sup>a</sup> = three species which were banded in the breeding season only as late migrants (they do not nest at H.M.F.); <sup>b</sup> = breeding season total includes five nestlings. (Hummingbirds were not banded.)