

THE BREEDING BIRDS OF THREE PINE BARRENS IN NEW YORK STATE

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The pine barrens of the eastern United States have traditionally been considered wastelands and until recently have been spared heavy pressure from development. As more suitable or desirable habitats have been developed fewer sites remain, so that pine barrens have become more attractive to developers. The pine barrens of New York State are now being developed at an alarming rate, resulting in drastic changes in the biota of these habitats.

Pine barrens are harsh ecosystems, subject to frequent fires. Situated on sandy, well drained and mineral-poor soils, pine barrens usually have large reservoirs of pure, fresh water beneath them. Both vegetation and animals found on pine barrens are depauperate with respect to number of species. Pitch pine (*Pinus rigida*) dominates the canopy vegetation along with white oak (*Quercus alba*) and red oak (*Q. borealis*). The shrub layer is usually dominated by scrub oak (*Q. ilicifolia*) and on some barrens dwarf chestnut oak (*Q. prinoides*). Both species seldom exceed three meters in height. Growing beneath the scrub oaks are various heaths, such as huckleberry (*Gaylussacia baccata*) and blueberry (*Vaccinium vacillans*). Many of these species have the ability to resprout following fires that denude or kill the above ground portion of these plants. When fires are suppressed, organic matter accumulates creating a micro-habitat that is ideal for germination of many non-fire adapted (non-pine barrens) plant species. The result of fire suppression is a succession of species that are most often associated with northern mixed forests which eventually overshadow and eliminate the pine barren plant species. Thus, fire suppression is another of the many disturbances by man in pine barrens.

As citizens and private conservation organizations have become aware that pine barrens are interesting and ecologically important habitats, they have brought pressure on state and federal governmental agencies to preserve these ecosystems. The result has been the acquisition of a few tracts by the state. Before sound preservation and management plans can be formulated, field work is needed to determine what species of plants and animals are present, and in what quantities, so that the tracts can be evaluated for preservation potential. This paper examines the status of the breeding avifauna of

three New York pitch pine barrens: the Rome Sand Plain in Oneida Co., the Albany Pine Bush, Albany Co., and Long Island pine barrens in Suffolk Co. All of these barrens have experienced decreases in size and other disturbances.

We present lists of avian species found as well as their relative abundances, historical presence at each site, comparisons with other New York pine barrens and finally speculation as to the prospects for the persistence of the avifauna at each of these locations.

STUDY AREAS AND METHODS

Breeding birds were censused using the Emlen (1971) method at selected habitats along successional gradients at the three New York pine barrens. With the Emlen method, a transect is walked and all birds seen or heard are recorded along with their distance from the transect. After numerous censuses are completed a correction factor (termed the coefficient of detectability) is calculated for each species (Kerlinger 1981). For this study 400 x 200 meter transects were walked twice between 0530 hrs. and 0900 hrs. Transects were selected on the basis of similarity of vegetation (floristics and structure) to pine barren vegetation. Sites that had been invaded by non-pine barren plants were used only when more pristine sites were not available. The number of transects, location and dates of study are given in Table I.

RESULTS AND DISCUSSION

In the following three sections the avifauna of the three barrens is discussed. Comparisons may not be entirely justifiable due to the differences in geography and climatic conditions between sites and this must be kept in mind. To take these differences into account we have examined historical data where it was available. Table 2 should be consulted for species recorded on the transects, as well as relative abundances, frequencies and successional stages in which each species was found. We have cited all publications and papers that we know of regarding the avifauna of New York pine barrens so the literature cited can be considered a fairly complete bibliography for birds of New York State pine barrens.

Albany Pine Bush

The Albany Pine Bush has been subjected to extensive disturbances and reductions in size. Road construction and urban sprawl have reduced the pine bush from more than 60 km² (Rittner 1976) to approximately 1200 hectares that are not contiguous. Fire suppression,

abandonment of agricultural sites and dissection by roads have created a mosaic of habitats that have been overgrown by non-pine barren plants including quaking aspen (*Populus tremuloides*), white pine (*P. strobus*) and black locust (*Robinia pseudoacacia*) (Milne 1981). The result of these disturbances has been disastrous for the avifauna.

Comparing the list of species in Table 2 with studies of the early 1950's (Treacy 1953) and the 1960's through early 1970's (Miller 1976) shows that numerous changes have occurred in the abundances of characteristic pine barren species. Two species, the Eastern Bluebird and the Pine Warbler, were not found on any of the Albany transects, although the latter species was seen adjacent to one of the 1979 transects. These species were reported as common by Treacy (1953) and as "typical" by Miller (1976). The decline of the Pine Warbler is correlated with the reduction of large stands of mature pitch pine with which it is usually associated (Kerlinger 1981). Three other species, the Prairie Warbler, Brown Thrasher and Ovenbird, were found at low densities and at fewer sites than reported by Treacy (1953), Miller (1976) or Bull (1974). The decline of species characteristic of pine barrens at Albany has been described by Kerlinger and Doremus (1981) who maintain that as vegetation changes have transpired various ecotonal bird species have replaced the dominant ones. Included are the Chestnut-sided Warbler, Indigo Bunting, Song Sparrow, Field Sparrow and others. Brown-headed Cowbirds were also numerous at Albany and nest parasitism there may be high (Kerlinger and Doremus 1981). Prime habitat at Albany is being destroyed rapidly. Within the past years hundreds of hectares of early successional habitat, prime breeding habitat for Prairie Warblers and Brown Thrashers, have been developed or are slated for development. On the positive side, nearly 400 hectares of the choicest habitat of the Albany Pine Bush has been acquired by the City of Albany and the State of New York for preservation.

Rome Sand Plain

The Rome Sand Plain is situated between the City of Rome and Lake Oneida and encompasses more than 2000 hectares. The canopy vegetation is a mixture of pitch pine, oak (*Q. alba*, *Q. borealis*) white pine, bigtooth aspen (*P. grandidentata*) and sugar maple (*Acer saccharum*). The latter three species are not fire tolerant and as such are only found on barrens that have not been burned recently. As pitch

pine is overshadowed by the faster and taller growth of these species, it dies out leaving a forest that no longer resembles a pine barren. The scrub oaks and heaths are also being overshadowed with the same result. Fires seem to be infrequent at Rome and few trees were found bearing fire scars or charcoal. Overall, the forests west of Rome land fill resemble pine barrens in some locations and northern mixed forests in others.

The Sand Plains have not been as heavily impacted by development as at Albany but there is increasing development pressure (personal communication from J. Homburger, Dept. of Environmental Conservation). Because no quantitative studies are available from the past it is difficult to determine if there have been any radical changes in the avifauna. Several qualitative references are available which can provide information on the avifauna present historically at Rome (Rusk 1968, Scheider 1959, Bull 1974). Comparing the list compiled here (Table 2) with the above references produces few differences. Although numerous species characteristic of pine barrens were present, such as the Ovenbird, Pine Warbler and Rufous-sided Towhee, the avifauna was not truly that of a pine barren. Edge species such as the Indigo Bunting, Chipping Sparrow, White-throated Sparrow, Chestnut-sided Warbler and Brown-headed Cowbird were numerous on some sites. The remaining birds can be considered as regularly occurring in mixed northern forests. From the presence of the edge species it is obvious that there are ecotonal areas in the vegetation but the shrub stage bird species found at other pine barrens are missing. The avian community has some pine barren, ecotone and northern hardwood affinities. Extensive searches of other areas at Rome failed to find avian communities that were typical of pine barren habitats.

Long Island Pine Barrens

The Long Island barrens are the largest pine barrens in New York, with nearly 100,000 hectares remaining, and have been less severely stressed than the two previously mentioned barrens. Although the westernmost habitats in Nassau County have been all but destroyed the eastern barrens in Suffolk County offer excellent potential for preservation. Unlike the upstate pine barrens that have been invaded by non-pine barren plants, most Long Island habitats are relatively free from this problem. This may be explained by the fact that Long Island is an insular habitat with potential invading species not close geographically or present at densities that are necessary for successful

invasion. The problem on Long Island is fire suppression, with the subsequent overgrowth of oak trees. As the oaks grow they shade out scrub oaks and pitch pines. When fires finally do occur in these forests it is usually much more devastating than fires that occur in pitch pine stands and the recovery following these fires is slow.

Efforts are being made on Long Island to preserve some of the remaining habitats. The state has recently acquired 3000 hectares at sites in Riverhead and Rocky Point (both donated by the Radio-broadcasting Corporation of America). A parcel of this size and quality is a first step toward creating the preserves that pine barrens species need. Selection of appropriate sites for preservation is important and the rarer habitat types such as the pitch pine plains at Westhampton should probably be given priority.

The avifauna at Long Island is most similar to that of the New Jersey pine barrens (Kerlinger and Doremus 1981). This is true on some sites, but on others some species have declined or have been extirpated. For instance, the Pine and Prairie Warblers are now confined to the eastern Long Island tracts (Salzman 1977). Bull (1974) also suggested that the total populations of these species has declined. The trend is the same for other species and Raynor (1976), after examining ten years of census data, concluded that the Brown Thrasher and Rufous-sided Towhee were declining, with the Mockingbird taking their place. Raynor (1976) may have been working in marginal habitats although he asserts that the vegetation changed little during the course of his study. The results of Kerlinger and Doremus (1981), and Raynor (1978) *et al* and (1977) show that on some sites, such as the pine plains at Westhampton, the densities of Brown Thrashers and Prairie Warblers were higher than would be expected if densities were declining, while at other suitable habitats these species were at considerably lower densities than expected. However, Pine Warblers and Ovenbirds were not found at high densities anywhere.

MANAGEMENT AND PRESERVATION OF PINE BARREN HABITATS

If the plant and animal life of the New York pine barrens is to persist, habitats must be preserved and managed properly. The first step is to preserve large tracts of "good" pine barren habitat. By "good," we mean those with vegetation and animal species characteristic of pine barrens (as mentioned above) at significant densities. Large tracts are preferable to small ones because the larger populations usually found on these tracts are less susceptible to extinctions by random

fluctuations of the environment. It is also desirable in pine barrens to preserve and manage a mosaic of successional habitats to accommodate early and late successional species. Because these ecosystems change rapidly as a result of fire and succession, the presence of stands of similar or slightly different vegetation allow emigration of individuals following fires or as succession proceeds. Eventually, if enough sites are available and natural or prescribed burns occur, a dynamic equilibrium may be achieved that can perhaps persist indefinitely.

CONCLUSIONS

By presenting historical and comparative data we have shown that the avian communities of pine barrens in New York State have been affected to varying degrees. At Albany, characteristic pine barren species have experienced drastic reductions. The trend may be irreversible due to the small size and vegetational character of the remaining habitat. The avifauna of the Rome site was more like that of northern forests and ecotones lacking many of the brush-scrub community species. In some of the pitch pine stands some species that are characteristic pine barren species were found in high densities. A lack of fires and the invasion of deciduous species such as maples and aspens threaten what is left of the pitch pine forests at both of these sites. The barrens of Long Island, although severely impacted in more westerly locales, offer the greatest potential for preservation of the three pine barrens studied. Large tracts of moderately disturbed forests remain with high densities of plant and bird species characteristic of pine barrens. With adequate preservation and sound management plans, including either selective timber harvests or controlled burns, plant and animal species of these ecosystems may persist.

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Table 1. Location, number of transects and dates of censusing work
at the three New York pine barrens.

	<u>Long Island</u>	<u>Albany</u>	<u>Rome</u>
Dates of Censuses	23-29 May 1979	26 May-12 June 1978 31 May 1979	1-2 June 1979
Latitude/Longitude	40° 51' N, 72° 40' W	42° 30' N, 73° 52' W	43° 10' N, 75° 35' W
Number of Transects	19	15	3
Townships	Brookhaven, Riverhead Rocky Point, Westhampton	Albany, Guilderland Colonie	Rome
County	Suffolk	Albany	Oneida

Table 2. Complete list of bird species found at three New York pine barrens including the proportion of the total at each site accounted for by each species (P_i), the percentage of transects on which that species was found (F) and the successional stages in which each was found (E=Early, M=Middle, L=Mature, ED=Edge or Ecotonal). The five most numerous species at each site are indicated by an asterisk.

<u>Species</u>	<u>Seral Stage</u>	<u>Long Island</u>		<u>Albany</u>		<u>Rome</u>	
		<u>P_i</u>	<u>F</u>	<u>P_i</u>	<u>F</u>	<u>P_i</u>	<u>F</u>
Rufous-sided Towhee	E-M-L	.337*	1.000	.205*	1.000	.063	.666
Common Yellowthroat	E-M	.161*	.789	.114*	.733	.092*	.333
Field Sparrow	E-ED	.049*	.526	.110*	.867	----	----
Prairie Warbler	E-M	.170*	.737	.106*	.533	----	----
Brown-headed Cowbird	E-ED	.026	.421	.054*	.800	.043	1.000
Blue Jay	M-L	.046*	.579	.054	.933	.032	.666
Indigo Bunting	ED-E	----	----	.034	.333	.019	.666
House Wren	E-ED	.006	.105	.031	.400	----	----
Gray Catbird	E-M	.012	.263	.030	.600	----	----
American Goldfinch	E-ED	----	----	.030	.533	----	----
Chestnut-sided Warbler	ED	----	----	.027	.267	.084*	.333
Brown Thrasher	E-M	.039	.737	.023	.400	----	----
Black-capped Chickadee	M-L	.028	.474	.020	.467	.043	.666
Song Sparrow	ED-E	----	----	.020	.267	----	----
Wood Thrush	L	----	----	.015	.200	.083*	.666
American Robin	ED	.006	.211	.015	.600	----	----
Veery	L	----	----	.014	.267	.134*	1.000
Eastern Kingbird	ED	.021	.467	.012	.467	----	----
Northern Oriole	ED-M	.019	.421	.010	.333	----	----
Golden-winged Warbler	M	----	----	.008	.200	----	----
Scarlet Tanager	L	.007	.158	.008	.267	----	----

<u>Species</u>	<u>Seral Stage</u>	<u>Long Island</u>		<u>Albany</u>		<u>Rome</u>	
		<u>P_i</u>	<u>F</u>	<u>P_i</u>	<u>F</u>	<u>P_i</u>	<u>F</u>
Eastern Wood Pewee	L	----	----	.007	.200	----	----
Cardinal	ED-M	----	----	.007	.200	----	----
Yellow Warbler	E-ED	----	----	.007	.133	----	----
Ovenbird	L	.018	.211	.006	.133	.193*	1.000
Mourning Dove	----	.006	.158	.006	.067	----	----
Great Crested Flycatcher	----	----	----	.004	.200	.017	.333
Red-winged Blackbird	ED-E	.002	.053	.003	.133	----	----
Rose-breasted Grosbeak	M-L	----	----	.003	.133	----	----
Common Flicker	-ED	.010	.263	.003	.067	----	----
Downy Woodpecker	M-L	.002	.053	.003	.133	----	----
Red-eyed Vireo	M-L	----	----	.002	.067	.061	1.000
White-throated Sparrow	E-M	----	----	.002	.067	.008	.333
Common Grackle	ED	----	----	.002	.067	----	----
Eastern Phoebe	ED	----	----	.002	.067	----	----
Starling	ED	----	----	.002	.067	----	----
Hermit Thrush	ED	----	----	.002	.067	+	.333
Black-and-white Warbler	M-L	.023	.316	.002	.067	.070	.666
Yellow-breasted Chat	E	.003	.053	----	----	----	----
Bobwhite	----	+	.158	----	----	----	----
Pine Warbler	M-L	.014	.263	----	----	.041	1.000
Mockingbird	ED	.003	.105	----	----	----	----
Chipping Sparrow	ED	----	----	----	----	.018	.666

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