

T11.2 FOREST AND EDGE-HABITAT BIRDS

HABITAT FACTORS

The densities of birds found in a given habitat are better correlated with the structure of the habitat than with the tree species, although the latter affect the number and mix of bird species found there. The overall fertility of the site, based on bedrock geology and the soils derived from the rocks, under the influence of climate, affects both diversity and density of vegetation and of the invertebrate life it supports; thus, the more fertile forests support denser and more diverse bird communities.

In general, mixed-age, and mixed-species stands support more birds than even-aged monocultures, and dense stands support more birds than open ones. However, the presence of edge, including tree and shrub cover and open areas in close proximity, increases habitat diversity and also bird diversity. Edge and successional habitats abound in Nova Scotia as a result of human settlement (see T12). Few detailed studies of conifer edge and succession have

been made, but recent work in Nova Scotia has increased understanding of poplar and birch succession after fire and cutting.^{1,2}

VERTICAL ZONATION

In forest habitats, foraging niches are stratified vertically, with a different mix of birds using each zone—ground, low shrub, subcanopy (tall shrubs and young trees) and upper canopy. Trunks and branches add further foraging opportunities, and mature forests offer also stumps, rotting trunks, and openings caused by wind-throw. Most breeding birds of woodlands are insectivorous, and a well-stratified (mixed-age) forest with good vertical diversity helps to segregate their feeding niches (see Plate T11.2.1). Examples of stratification associated with different forest types include

- Pines: variably open upper canopy, subcanopy lacking, low-shrub and ground cover sparse
- Poplars: upper canopy and shrub layers often dense, but with strong seasonal variation



Plate T11.2.1: Although considered a forest bird, the Downy Woodpecker also occurs in orchards and suburban areas with shade trees. This permanent resident in Nova Scotia is insectivorous, finding most of its food in and under the bark of trees. Photo: M. Elderkin

(owing to leaf-fall)

- Spruces (especially Black Spruce): fairly open upper canopy, dense complete ground cover of low shrubs and mosses
- Balsam Fir (climax): mixed-age and thus mixed-height of canopy trees, all stages of regenerative growth in shrub and subcanopy layers, much dead wood on ground but often little plant cover

Younger trees (of all species) often exhibit bushy growth, sometimes leaving no room for a distinct sub-canopy layer.

BREEDING DENSITIES

General densities of breeding birds were estimated for different habitats in the Boreal Region,³ and the few density data collected from Nova Scotia habitats of these types were roughly similar (see Table T11.12.1).

The earliest stages of secondary succession, up to seven years after fire or cutting, are treated under Birds of Open Habitats (see T11.3), as the birds there are largely distinct from those of forest and edge.

PAIRS PER km ²	
Jack Pine & bog forest (open)	80–200
Spruce (mature)	200–400
Balsam Fir (mature)	300–600
Fir with heavy budworm infestation	400–800
Hemlock (mature)	500–800
Mixed conifers (20–30 yr)	400–800
Maple/beechn (mature)	400–650
Birch/poplar (late successional)	300–600
Mixed hardwood (20–40 yr)	800–1000
Young regeneration (8–15 yr)*	300–700

Table T11.2.1: The number of pairs of breeding birds per km² for different forest habitats. *The exception occurs in young Jack Pine plantations, where breeding densities are much lower, at 100–200 pairs per km².

COMMUNITY DIFFERENTIATION

The bird communities of different forest types differ to varying degrees.^{2,3,4} With the great local variation in forest types in Nova Scotia, as a result of geology, climate, and disturbance, the bird communities here show much overlap, with few species restricted to one habitat. Birds characteristic of deciduous or hardwood stands less often occur regularly in conifer-dominated stands than the reverse, and many birds of conifers occur across most of the conifer-dominated types (see Table T11.2.2).

Many other birds are found in each habitat, but more species, as well as higher densities, occur in the more fertile stand types dominated by Eastern Hemlock or Balsam Fir. Mixed wood habitats include varying assemblages of the bird species found in the other types.

The larger species, including birds of prey (hawks, owls), grouse, and ravens, crows, and jays, generally occur at lower densities than many small songbirds. They also range over various habitats, even if nesting mainly in one type. (Birds of prey are discussed in further detail in T11.3 and T11.4.) The cardueline finches, a group adapted to feed on tree seeds, are also wide ranging. Their distribution is less predictable than most birds. Evening Grosbeaks often serve as evidence of Spruce Budworm concentrations, but the other finches—Pine Grosbeak, crossbills, Pine Siskin—appear in response to the seed crops of their preferred food trees.

SUCCESSIONAL HABITATS

The earliest stages of succession after fire or cutting are largely open habitats (see T11.3). Starting 8–10 years after disturbance, the birds of open areas and low shrubbery are gradually superseded by those of tall shrubs, many of which are tolerant species found in edges and openings in all forest stages; for example,

- Yellow-bellied Flycatcher
- Hermit Thrush
- American Robin
- Red-eyed Vireo
- Chestnut-sided Warbler
- Magnolia Warbler
- American Redstart
- Lincoln's Sparrow
- White-throated Sparrow
- Northern Junco

Studies elsewhere suggested no consistent trends in bird density or diversity through the forest succession. Generally the highest levels, both in density

and numbers of species, occurred somewhere in mid-succession rather than in young stands or old growth forest.

Stand Type: HARDWOOD (POPLAR/BIRCH, MAPLE/BIRCH)	
• Least Flycatcher	• Northern Parula Warbler
• Black-capped Chickadee	• Black-throated Blue Warbler
• Veery	• American Redstart
• Hermit Thrush	• Ovenbird
• American Robin	• Canada Warbler
• Red-eyed Vireo	• Rose-breasted Grosbeak
Stand Type: HEMLOCK/WHITE PINE	
• Black-capped Chickadee	• Northern Parula Warbler
• Red-breasted Nuthatch	• Black-throated Green Warbler
• Winter Wren	• Blackburnian Warbler
• Veery	• Ovenbird
• Hermit Thrush	• White-throated Sparrow
• Red-eyed Vireo	
Stand Type: FIR/SPRUCE	
• Yellow-bellied Flycatcher	• Black-throated Green Warbler
• Winter Wren	• Bay-breasted Warbler
• Swainson's Thrush	• Ovenbird
• Golden-crowned Kinglet	• White-throated Sparrow
• Ruby-crowned Kinglet	• Northern Junco
• Magnolia Warbler	• Purple Finch
Stand Type: BLACK SPRUCE	
• Yellow-bellied Flycatcher	• Magnolia Warbler
• Winter Wren	• Yellow-rumped Warbler
• Swainson's Thrush	• Blackpoll Warbler
• Hermit Thrush	• Common Yellowthroat
• Golden-crowned Kinglet	• White-throated Sparrow
• Ruby-crowned Kinglet	• Northern Junco
• Nashville Warbler	
Stand Type: BOG FOREST	
<i>Regular Species</i>	
• Nashville Warbler	• Common Yellowthroat
• Yellow-rumped Warbler	• Lincoln's Sparrow
• Palm Warbler	• Northern Junco

Table T11.2.2: Bird species found most regularly in the various forest types in Nova Scotia.^{2,3,4} (See T11.5 for additional passerine species associated with freshwater wetlands.)

BIRDS IN FOREST AND EDGE HABITATS AT OTHER SEASONS

Breeding birds advertise their presence by song or other sounds. Outside the breeding season, most birds are less obvious and much harder to study. Most birds moult immediately after breeding, and insectivorous birds, including most forest birds, leave Nova Scotia as soon as moult is completed. Except for stragglers, nearly all flycatchers, wrens, thrushes, vireos, and warblers (with many other species) are absent from the province from September through mid-May, thus spending only 3 1/2 months here each year. The general patterns of moult and migration are known for most of our bird species, but no intensive studies of these activities have been made in the Maritimes. Spring arrivals of insectivorous birds come in a rush during May, when many species may appear in numbers overnight, especially during the passage of the "warm sector" (south of the centre) of a weather system across the province. The fall departure is inconspicuous, featuring silent woods punctuated by "chip"-notes and drab little bird shapes fluttering among the leaves. "Confusing fall warblers" require long study, and many pass by unidentified and undocumented.

Many migrant birds switch from insect food to seeds or fruits after the breeding season, and these frequent edges and open lands then as much as or more than forests. With wider food choice, these species, including the familiar American Robin and many native sparrows, stay longer in fall and return earlier in spring, leaving in October and arriving during April.

Only a few birds of forest and edge appear in Nova Scotia only as migrants or in winter. Birds of the subarctic fringe include mostly widespread species tolerant of most conifer habitats, for example, Swainson's Thrush, Yellow-rumped Warbler and Northern Junco. These swell the passage through the province but cannot be distinguished from individuals of the same species that bred here. Others, such as Gray-cheeked Thrush, Blackpoll Warbler and Fox Sparrow, are at the southern limits of their breeding range here, and most migrants detected are of more northern populations. Only Tree Sparrow, White-crowned Sparrow and Common Redpoll are unambiguous visitors here, coming from the north in the off-season. All of these birds are more often seen here in edge situations rather than forest.

Our forest birds in winter are either residents or nomads. The former include grouse (feeding on leaves, fruits and buds) (see Plate T11.2.2) and woodpeckers, chickadees and Golden-crowned Kinglets



Plate T 11.2.2: The Spruce Grouse is found predominantly in the interior at the edges of second-growth softwood forests. Forestry practices in Nova Scotia have increased their preferred habitat. There are an estimated 24000 breeding pairs in Nova Scotia.⁵ Photo: M. Elderkin

(feeding on insect pupae and egg-cases in the trunks, bark or foliage of trees), plus the wide-ranging raptors (predators on birds and mammals) and corvids (scavengers on anything edible). The nomads include the cardueline finches (feeding on tree seeds) and sometimes the waxwings (feeding on tree fruits).



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Associated Topics

T10.6 Trees, T11.3 Open-habitat Birds, T11.4 Birds of Prey, T11.5 Freshwater Wetland Birds and Waterfowl, T11.16 Land and Freshwater Invertebrates

Associated Habitats

H5.1 Barren, H5.2 Oldfield, H6.1–H6.3 Forests

References

- 1 Freedman, B., C. Beauchamp, I.A. McLaren and S.I. Tingley (1981) "Forestry management practices and populations of breeding birds in a hardwood forest in Nova Scotia." *Can. Field-Nat.* 95.
- 2 Morgan, K., and B. Freedman (1986) "Breeding bird communities in a hardwood forest succession in Nova Scotia." *Can. Field-Nat.* 100: 506-519.
- 3 Erskine, A.J. (1977) *Birds in Boreal Canada: Communities, Densities and Adaptations*. Canadian Wildlife Service. (Report Series no. 41).
- 4 Lunn, S. (1973) *Avifaunal Survey of Kejimikujik National Park, 1972-73*. Report to Parks Canada, nos. 72-31.
- 5 Erskine, A.J. (1992) *Atlas of Breeding Birds of the Maritime Provinces*. Nimbus Publishing & Nova Scotia Museum, Halifax

Additional Reading

- Martin, N.D. (1960) "An analysis of bird populations in relation to forest succession in Algonquin Provincial Park, Ontario." *Ecology* 41(1).