Avifauna of an Urbanizing Environment in Southern Ontario, 1921–1982

by
Kenneth W. Dance

Introduction and Background

Data on the occurrence of bird species dating to 1921 are available for a 35 ha area surrounding a kettle lake located in Kitchener, Waterloo R.M., Ontario. A municipal water supply complex has been located on part of the study area since the 1890s. Land use surrounding the site, now called Lakeside Park, changed from agricultural to urban during the study period. The urban park was established between 1968 and 1978. Dance (1982, 1983) provides a description of portions of the study area.

An annotated discussion of 172 species recorded during the 1921–1982 study period has been prepared previously (Dance 1984). The present paper describes changes in land use and vegetation patterns and changes in status of 13 bird species at Lakeside Park. Factors which may have affected the avifauna at Lakeside Park during the study period are also discussed.

Methods

Aerial photos and discussions with residents provided information on changes in site specific vegetation patterns.

The sources of bird observation data by individual and years of observation are listed in Table 1. The observation effort by decade is indicated in Figure 1.

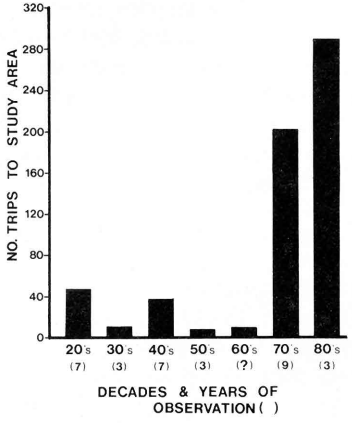

Figure 1. Number of Trips to Study Area and Number of Years of Observation Each Decade.

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Between 1921 and 1979, observations of birds were made during an estimated 290 visits to the site. Few observations exist for the 1950s and 1960s. Birders may have visited the area less frequently because of "the grinding and hammering of construction activity on all sides" (Bender 1958). During the 1980–1982 period approximately 320 visits were made to the site.

An assessment of annual occurrence of bird species revealed that 13 species had undergone obvious changes in status during the study period. Figures were prepared which show the number of years of occurrence by decade for those species which exhibited a change in status. Birds were grouped on these figures according to the following habitat types: wetland, woodland and field.

Table 1. Observers and Years of Observation

G.W. Knechtel	– 1921–1947
W. & G. Schaefer	– 1946–1972
F. Bender	– 1958
P. Warzecha	– 1973–1982
Ecologistics Limited	– 1973, 1979–1980
H. & M. Walker	– 1979–1982
Mr. & Mrs. G. Moores	– 1979–1982
K. Dance	– 1979–1982
A. Sandilands	– 1982

Findings and Discussion

Figures 2 and 3 provide a comparison of land use surrounding the study site in 1955 and 1982. Residential and some commercial development extended to the south and engulfed the Lakeside Park area during this period.

Figures 4, 5 and 6 depict vegetation patterns in the study area in 1955, 1968 and 1978. Agricultural land use and large trees were replaced by grass and successional tree and shrub species. Between 1955 and 1968, considerable tree cutting and earth filling occurred. Many of the trees around the lake were elm (*Ulmus* sp.), tamarack (*Larix laricina*) and willow (*Salix* sp.). The elms were killed by dutch elm disease and were cut.

The data contained in Figures 7, 8 and 9 are for the 13 species which occurred frequently prior to urbanization. Although there is only positive breeding evidence for the Red-shouldered Hawk, records on seasonal frequency of occurrence suggest that all of these species, with the exception of the Black-crowned Night-Heron, have bred in the past on the site or in adjacent areas.

Of the 13 declining species only the night-heron, Eastern Phoebe, Savannah Sparrow, Swamp Sparrow and Eastern Meadowlark have been observed at Lakeside during the 1970s and 1980s. These five species are now considered to be migrants in the study area.

Species addressed in Figures 7, 8 and 9 require grassland/pasture, wetland or woodland habitats which were modified dramatically during the late 1950s and 1960s. Several of the displaced species, particularly American Bittern, Black-crowned Night-Heron, Red-shouldered Hawk, and Ruffed Grouse may have also been

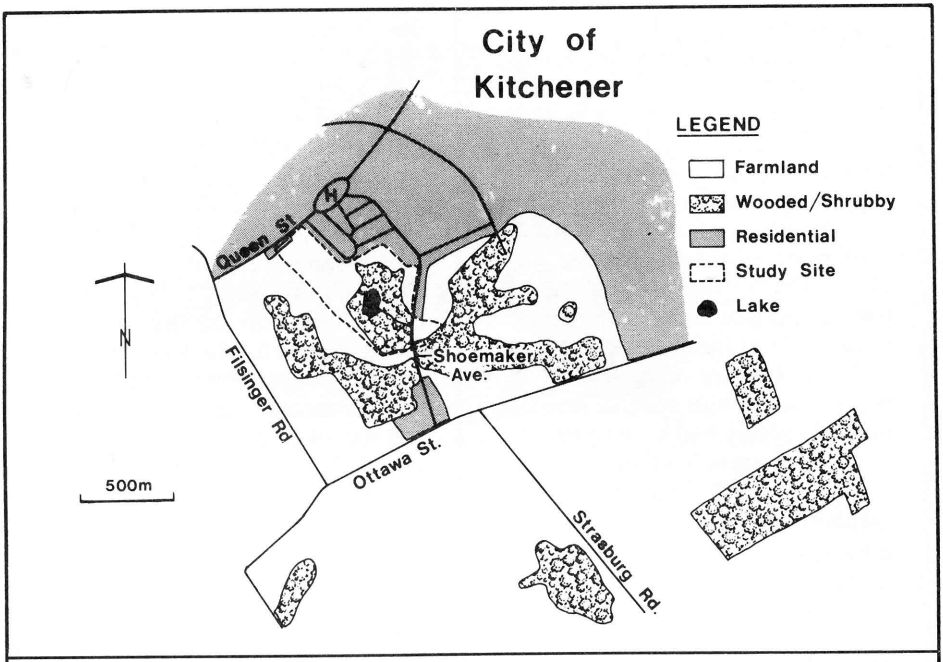


Figure 2. Land Use Surrounding Study Site, 1955.

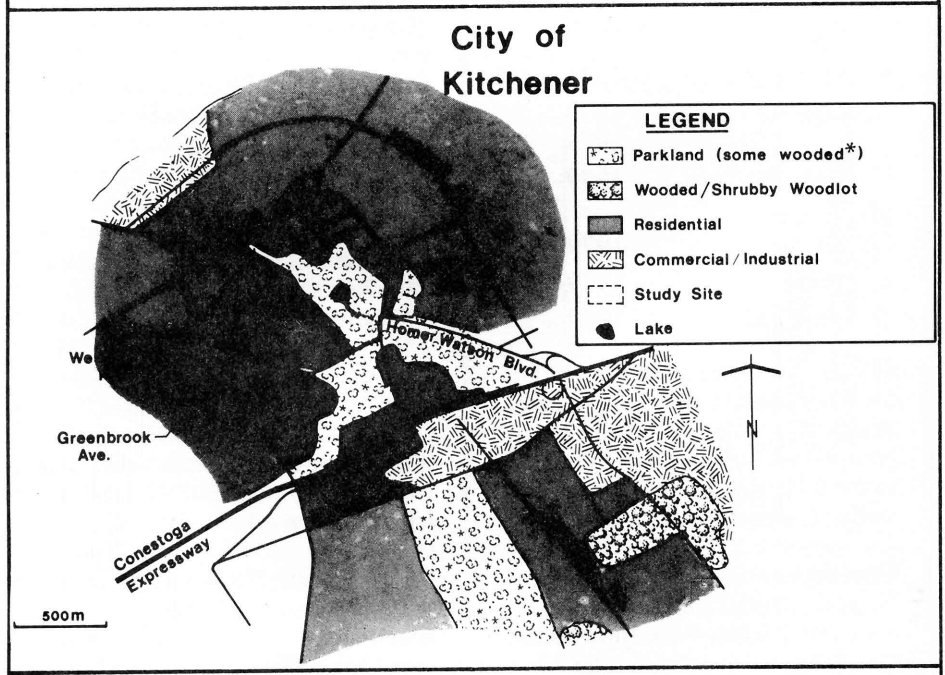


Figure 3. Land Use Surrounding Study Site, 1982.

sensitive to increases in human intrusion and development of the site for recreational use. Loss of forest cover on adjacent lands (Figure 3) may have been an additional factor which affected Red-shouldered Hawk and Ruffed Grouse populations.

Red-shouldered Hawk and Eastern Bluebird are known to have declined in numbers and distribution across southern Ontario during the study period (Risley 1982; Baillie 1967).

Four species, Canada Goose, Mallard, Northern Cardinal, and Orchard Oriole, have become established as elements of the Lakeside avifauna since 1921.

confirmed as a breeding species during 1981 (Dance 1984). Breeding bird atlas data indicate that the breeding distribution of the Orchard Oriole (Cadman 1984) is more extensive than previously recognized in Ontario.

Factors which may have influenced the bird fauna of the Lakeside Park area are listed in Table 2.

Despite certain negative factors, 127 bird species were observed during the 1980–1982 period. The number of breeding, migrant and winter species are given in Table 3.

Table 2. Factors Affecting Avifauna at Lakeside

A. *Vegetation Change*
- Planting
- Succession
- Digging
- Cutting
- Burning
- Filling
- Mowing
- Trampling
- Pesticide Spraying

B. *Direct Human Activity*
- Intrusion During Breeding Season
- Feeding Birds
- Hunting

Observations of Canada Geese at Lakeside have only been of migrating flocks. The first record was in 1977. Peck and James (1983) indicate that breeding in southern Ontario is thought to be primarily a result of reintroductions. Mallard and Northern Cardinal are presently common breeding species. Both species have extended their distribution in eastern North America during the study period (Heusmann 1974; Baillie 1967). Orchard Oriole was

Table 3. Status of Bird Species Observed at Lakeside Park, 1980–82

	No.	%
Nesting:		
On Site	35	28
Adjacent Areas	17	13
Migrants only	66	52
Winter only	9	7
TOTAL:	127	100

Figure 4. Land Use and Vegetation, Lakeside Park, 1955.

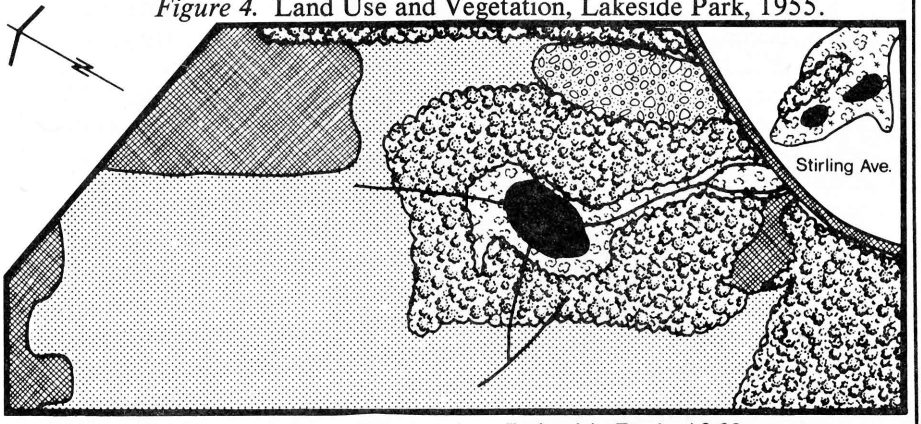


Figure 5. Land Use and Vegetation, Lakeside Park, 1968.

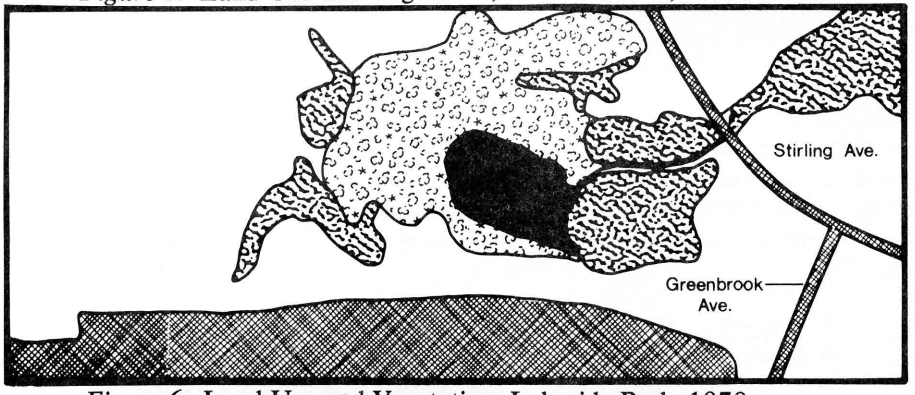
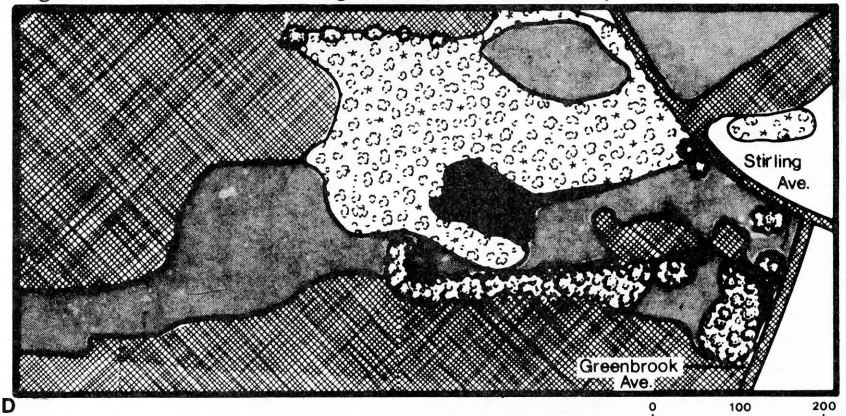


Figure 6. Land Use and Vegetation, Lakeside Park, 1978.



LEGEND

Water
Small trees, shrubby vegetation
Fields, Orchards
Large trees
Weeds, grass, lawn
Sand/gravel pit
Soil fill
Residential, services

0 100 200
metres

Slightly more than half of the avian species observed during the 1980–1982 period used the site exclusively during migration. Forty-one percent bred on or adjacent to the study site. The remaining seven percent have occurred only in winter. This illustrates the potential significance of urban habitat islands to migrant and winter bird populations.

Several authors have shown that habitat island size has a significant effect on the richness of breeding bird species (Galli *et al.* 1976; Graber and Graber 1976; Martin 1980). Rafe *et al.* (1985) have demonstrated that habitat diversity also has a significant influence on avian species richness. "Edge" habitat, often created by forest fragmentation, usually increases breeding bird richness (Anderson 1979).

The avian richness at Lakeside may result from a broader attraction which the four park complex (adjacent lands to the south) holds for migrating and breeding birds. The 17 species which forage but do not nest on the site are an indication that Lakeside Park is used intensively by individuals inhabiting surrounding habitat. Middleton and Merriam (1983) concluded that woodland plants and animals have evolved efficient mechanisms for medium-distance movement and that isolation of woods in farmland did not restrict the distribution of woodland species.

Loss of agricultural land, including farm woodlots, has been extensive during the study period. Warren and Rump (1981) report that from 1971 to 1976 forest and swamp/marsh constituted nearly 9% and 1%, respectively, of the rural land converted to urban use at Kitchener. During the 1966–1971 period, three times as much rural forest was converted to urban use than during the following five year period at Kitchener.

Aldrich (1980) reports that following suburban development in a mature deciduous forest in Virginia, the number of breeding bird territories and species increased. Six formerly abundant forest bird species did not breed following residential development. Typical suburban species became dominant. Although detailed breeding bird data are lacking for the period when mature trees were dominant at Lakeside, a similar pattern of change to that found by Aldrich likely occurred.

Walcott (1974) compared breeding bird data for study tracts

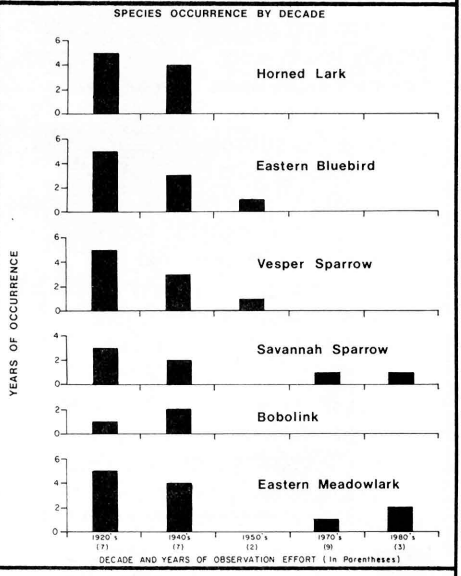


Figure 7. Changes in Occurrence of Field Species.

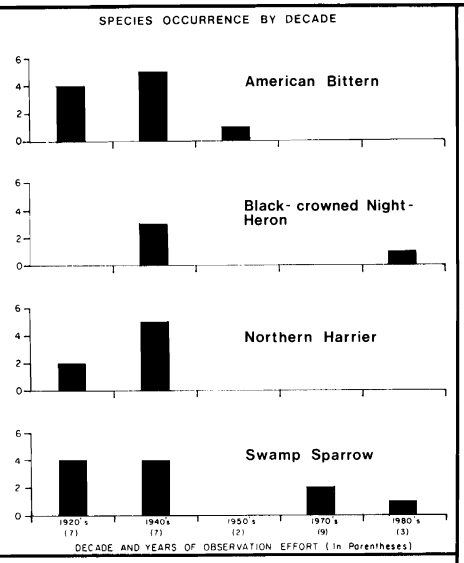


Figure 8. Changes in Occurrence of Wetland Species.

in Cambridge, Massachusetts in the 1940s and 1960s with historical data collected between 1860 and 1904.

Between 1873 and 1900, treed, garden and pasture areas of certain study tracts were "subdivided and closely built upon" (Walcott 1974). A number of factors resulted in subsequent changes in the breeding bird community: maturation of trees, tree and shrub planting and pesticide spraying.

Walcott also reported that despite marsh filling and industrial and residential development, which engulfed a pond and parkland area, breeding bird richness remained similar, with migrant summer residents constituting 70% of the nesting species.

Changes in avifauna recorded at the Lakeside site are undoubtedly typical of those which have occurred across extensive areas on the urban fringe of southern Ontario. Forest and wetland species are displaced and the breeding bird community becomes dominated by such "suburban" species as: Mallard, Black-capped Chickadee, American Robin, Gray Catbird, Northern Cardinal, Chipping Sparrow, Song Sparrow, Red-winged Blackbird, Common Grackle, Northern Oriole and American Goldfinch.

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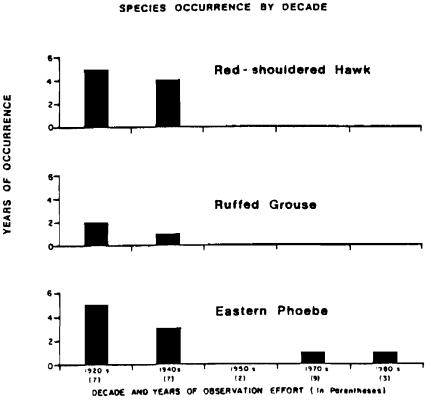

Figure 9. Changes in Occurrence of Woodland Species.

field notes. Dr. Ross James of the Royal Ontario Museum provided access to the Knechtel notes.

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