

AVIFAUNAL REPORT

for the

CONESTOGO

Wind Energy Centre

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Conestogo Avifaunal Report

Table of Contents

1.0 Background

- 1.1 Location in Ontario
- 1.2 Location in relation to significant bird areas
- 1.3 Landscape setting and bird habitats
- 1.4 Level of concern
- 1.5 Recommended surveys

2.0 Results

- 2.1 Overview
- 2.2 Significant concentrations of birds
 - 2.2.1 Discussion of concentrations by guilds
 - 2.2.2 Discussion of concentrations by habitats
- 2.3 Species at Risk (SAR)
- 2.4 Partners in Flight Priority Landbird Species for Bird Conservation Region
13

3.0 References

1.1.1 Tables

- Table 1 Partners in Flight priority species by habitat

Appendices

- Appendix A Conestogo Annotated Species List
- Appendix B Seasonal species lists for Conestogo
- Appendix C Baseline Data for Conestogo
- Appendix D 4-letter species codes for baseline data table

Conestogo Avifaunal Report

2.0 Background

1.1 Location in Ontario

The Conestogo study area encompasses an area of about 8000 ha in north Wellington County to the east, southeast and southwest of the town of Arthur. For the purposes of the avifaunal study, the larger study area was divided into three sectors: the Peepabun, Southeast and Southwest sectors.

The Peepabun sector lies east of Arthur. The south boundary of the Peepabun sector is Wellington Road 109. The north boundary lies between 2 Line and the south end of the Luther Marsh complex. The east boundary is just east of the 11th Line. The west boundary is 10 Sideroad East.

The Southwest sector lies to the southwest of Arthur. The south boundary is the Twelfth Line. The west boundary is Road 11. The north boundary is Wellington Road 109 west of Arthur. The east boundary is Highway 6, from Arthur to just south of 21 Sideroad.

The Southeast sector lies to the southeast of Arthur. Wellington Road 109 forms the north boundary. Hwy 6 is the west boundary. The south boundary is 20 Sideroad. The east boundary is the East-West Garafraxa Townline.

Since the completion of this study the project area has decreased in size and now only covers 2400 ha as shown in figure 1, Appendix A

1.2 Location in relation to significant bird areas

The Natural Heritage Information Centre web site does not show any significant features (e.g. Areas of Natural and Scientific Interest, Provincially Significant Wetlands) in the study area that are designated because of significant birds or significant bird habitats.

The north boundary of the Peepabun sector is about 2 km south of the southernmost extension of Luther Marsh and about 5 km south of the closest open water. Luther Marsh is designated as an Important Bird Area of National Significance for waterfowl and threatened species. The south end of the Luther Marsh complex is primarily wet woods and thickets. The significant species that resulted in the designation of the Luther Marsh IBA are mostly located in the marsh portions of Luther Lake, not in the wet woods at the south end.

The south boundary of the Southeast sector is about 5 km from Belwood Lake Conservation Area.

The southeast corner of the Southwest sector is about 5 km from Conestogo Lake Conservation Area and nearly 10 km from the main body of Conestogo Lake.

1.3 Landscape setting and bird habitats

The land in the 8000 ha study area is primarily intensive agricultural. The number of kilometres of roads driven to cover all three sectors averaged about 240 km. A habitat reconnaissance visit on January 3, 2007, showed that about 86% of the landscape is actively farmed with 56% of the landscape planted in beans, corn or winter wheat in 2007, 20% in hay and 10% intensely pastured. About 8% of the landscape is abandoned farmland, mostly in the old field or early shrub stage of succession. Less than 5% of the land is in natural habitat and most of this is early successional woodland, treed swamp or shrub swamp.

1.4 Level of concern

Using the Environment Canada matrix in “Wind Turbines and Birds: A Guidance Document for Environmental Assessment “ and taking a precautionary approach, it was determined that this site could be ranked as MEDIUM to HIGH *Site Sensitivity* and LARGE *Facility Size* (Environment Canada, Canadian Wildlife Service, July 28, 2006). The resulting *Level of Concern* was *Category 2 or 3*. The Level of Concern guides what kinds of surveys are recommended.

Site Sensitivity was ranked as MEDIUM to HIGH because the site partially meets the following criteria. It should be noted though, that many of the criteria pertain more to the nearby Luther Marsh complex rather than to the study area.

- 1) Past presence of Species at Risk (i.e. Loggerhead Shrike and Henslow’s Sparrow more than 25 years ago)
- 2) Nearby presence of a large or important bird colony (i.e. Least Bittern, Black Tern and Great Blue Heron at Luther Marsh)
- 3) Significant staging or wintering area (i.e. thousands of waterfowl at Luther Marsh)
- 4) Recognized important area (i.e. Luther Marsh IBA)
- 5) Site contains large concentrations of raptors in winter (unknown but possible)
- 6) Species of conservation concern (e.g. possible presence of “grassland’ species)

Facility size was ranked as Medium.

1.5 Recommended Surveys

In consultation with Environment Canada and based on a *Level of Concern* of Category 2 or 3, it was agreed that the following surveys would suffice to characterize the birds of the study area and determine whether any Species at Risk or significant concentrations of birds are present at any season. As well, the surveys would help to determine whether any distinctive usage or flight patterns were present that might have some bearing on turbine locations or buffer zones. On all surveys all individuals were recorded whether they were migrants, permanent residents, summer breeders or visitors to the area. Because different species are on different life cycle schedules, breeders, migrants and winter visitors could be encountered on the same visit.

- 1) One to three area searches for overwintering raptors. The number of subsequent visits would depend on the density of raptors on prior visits.

- 2) Two breeding season visits. Breeding season visits consisted of a combination of area searches and ten-minute point counts spread evenly through the three sectors of the study area. A total of 75 point counts were spread through the three sectors over a variety of habitats including row crop fields, hay fields, intense pasture, grassy swales, creeks and streams, hedgerows, upland and swamp forest woodlots, conifer plantations and abandoned regenerating fields.

In addition to the recommended surveys, a late March visit to survey for waterfowl was done when local residents suggested that large concentrations of Snow Geese stage annually in spring in the northeast part of the Peepabun sector. All three sectors were covered on this visit.

3.0 Results

3.1 Overview

An annotated species list (Appendix A) shows the use of the site by the various species and their status at the national, provincial and regional levels. Appendix B provides a species list for each season. The schedule of visits, viewing conditions, a list of the species found and the number of individuals encountered on each visit is found in Appendix C. The following is a overview of the results.

Five surveys were conducted in the study area between January 3, 2007, and July 1, 2007. Surveys on January 3 and February 2, 2007, targeted overwintering raptors. The March 27, 2007, survey targeted spring migrant waterfowl. Two rounds of breeding bird surveys were carried out in early and late June/early July. The first round of surveys took place on June 6, 7 and 8. The second round of surveys was completed on June 29 and July 1.

A total of 9679 birds of 103 species was observed. The number of species per visit varied from 12 species on February 2 to 72 species on July 1. The total number of species by sector for all visits was 86 species in the Southwest, 87 in Peepabun and 70 in the Southeast.

Species counts by season for the entire study area was:

Overwintering species and permanent residents	27 species
Spring migrants	7 species
Breeding birds and summer visitors	92 species

About 33 % of the species were seldom to rarely encountered. Five or fewer individuals were observed for 34 of the 103 species on the 5 surveys.

3.2 Significant concentrations of birds

This section reviews whether or not significant concentrations of birds were found.

3.2.1 Discussion of concentrations by guilds

Loons

On June 29, one *Common Loon* flew overhead during a point count in the Peepabun sector. This bird was likely from Luther Lake out for a morning flight.

Hérons and Egrets:

Very few herons were observed using the study area. Three *Great Blue Herons* were observed in the study area on the early June surveys and 6 on the late June surveys. No heronries were noticed on the January, February or March area searches. One *Green Heron* was observed flying along a creek in the Southwest sector on the July 1 survey. On the June 6 survey, one *American Bittern* was heard calling from the south end of Luther Marsh in Peepabun during a point count.

Waterfowl:

The March 27 survey covered the entire study area (~ 8000 ha, 210 km of roads). The survey found 227 Tundra Swans, 1053 Canada Geese and 115 ducks (mostly Mallards). The January and June surveys produced very few waterfowl (35 Canada Geese in January, 138 Canada Geese, 21 Mallards and 1 Wood Duck in June) and the February survey none.

The *Peepabun sector* had the most activity on the March 27 survey although 320 of the 928 Canada Geese observed were north of the proposed turbine placement area. Four flocks of geese were found on the ground in 3 locations (pond, pasture, corn) and three flocks flew through the area. The fields where two local residents claim that 100s to 1000s of Snow Geese stage annually had no waterfowl on this visit.

Waterfowl in the *Southeast sector* were found in three corn stubble fields. One concentration was found in the triangular-shaped concession bordered by Hwy 109 on the north, the Sixth Line to the southwest and 25 Sideroad to the southeast. This concentration consisted of 340 Canada Geese, 160 Tundra Swans and 50 ducks. A second concentration was east of First Line between 25 Sideroad and 20 Sideroad. This group consisted of 58 Tundra Swans, 30 Canada Geese and 5 ducks. The third concentration consisted of 55 Canada Geese on the east side of Second Line between 25 Sideroad and 30 Sideroad.

Surveys in the *Southwest sector* found one flock of 9 Tundra Swans in a wet cornfield to the southeast of Wellington Rd 12.

Wintering Raptors:

Winter raptor densities were calculated from area searches on January 3 and February 2, 2007. The January 3 survey had 4 *American Kestrels*, 1 *Red-tailed Hawk* and 1 *Northern Harrier* which produced a density of 6.2 hawks / 100 km. The February 2 survey had 6 Red-tailed Hawks and 11 *Rough-legged Hawks* giving a density of 12.5 hawks / 100 km. The combined density over the two visits was 9.7 hawks / 100 km. This is very low density compared to other sites that we have surveyed in southwestern Ontario. Typically sites in the southwest range from about 10 to 30 birds / 100 km. The raptor density at our control site in southwest Middlesex County is 125 birds / 100 km and densities on Wolfe and Amherst Island approach 325 birds / 100 km. Because the raptor density was so low on the first two visits it was deemed unnecessary to conduct a third visit. Typically raptor densities do not change significantly over the winter

Breeding Raptors:

Three species of hawks were found during the breeding season surveys in the study area. **Northern Harriers** were conspicuous and widespread with 11 individuals observed on the early June surveys and 8 on the late June surveys. Only two of the sightings were in the Southwest sector while 11 were found in the Southeast and 8 in the Peepabun sectors. The latter two sectors have more hay fields than the Southwest sector. Six **Red-tailed Hawks** were counted on the early June and 14 on the late June breeding season visits. This species was spread rather evenly throughout the three sectors. Four **American Kestrels** were noted on the early June and four were found on the late June surveys. No kestrels were found on either survey in the Southeast sector. An Osprey that was observed over the Southwest sector on the June 7 survey was likely a bird moving between Conestogo Reservoir and Luther Marsh.

Shorebirds:

Shorebirds are not an issue in the study area. Three species were observed during the breeding season in relatively small numbers. The high count for **Killdeer** was 40 birds on the late June surveys. Four **Spotted Sandpipers** were noted on the early June and four on the late June surveys. Only one **Upland Sandpiper** was observed on the two surveys; a bird on the June 8 survey in the Southeast sector. Three spring migrant **Wilson's Snipe** were noted on the March 27 survey in a wet field in the Peepabun area.

Gulls:

Three species of gulls were observed in the study area: **Ring-billed Gull**, **Herring Gull** and **Iceland Gull**. On the January 3 visit, a large number of gulls (mostly Herring Gulls) were found around the composting facility about 2-km southwest of Arthur on Wellington Rd 12. When not at the compost facility the gulls were resting in the field on the opposite of the road. This flock included 322 Herring, 2 Iceland and 1 Ring-billed Gulls. On the breeding bird surveys, 94 Ring-billed Gulls were scattered throughout the agricultural fields on the early June surveys and 91 on the late June surveys. These gulls are not breeding in the area and may be non-breeding two- or three-year-olds that are spending the summer in the vicinity of Luther Marsh.

Terns:

No terns were found. There is no breeding habitat for terns in the study area.

Owls:

No diurnal-hunting owls were recorded on any of the five surveys that we completed including two winter surveys. However, local residents reported both Short-eared Owls and Snowy Owls. One landowner reported that Short-eared Owls occurred "very regularly" on her property in spring and summer for a period of about 7 years until two years ago. Snowy owls were reported by two local residents and were also reported to Ontbirds (the Ontario Field Ornithologists email list for birders in Ontario). One resident stated that Snowy Owls have visited her property in some though not all years over the past 30 years. Another resident said that she has seen Snowy Owl on a couple of occasions every winter for nine years along 25 Sideroad. A January 21, 2008, posting to Ontbirds stated that three Snowy Owls were present in fields along side roads to the north and south of Wellington Road 109 between the Sixth and Third Lines south of Rd 109 and between Wellington 16 and 7 Sideroad north of Rd 109. Both of the residents who reported owls live in the same general area as described in the Ontbirds email, one to the south and one to the north of

Rd 109. From our experience elsewhere, the habitat in this area is suitable for overwintering owls of both species.

Larks, pipits, snow buntings, longspurs:

Two early winter and one late winter/early spring visits produced very few birds from this guild of field users. The only **Horned Larks** found on winter surveys were 12 birds on the February 2 area search. This species is most conspicuous in winter when 100s of birds often come to roadsides for salt and gravel. Eighty **Snow Buntings** were recorded on the January 3 visit and 400 on the March 27 visit. No **Lapland Longspurs** were found. The surveys did not coincide with the **American Pipit** spring or fall migration. During the breeding season, 26 Horned Larks were recorded on the early June and 41 on the late June surveys.

Crows and Jays:

American Crows and **Blue Jays** were present in small numbers compared to sites in southwestern Ontario. The peak count for jays was 26 birds in late June. On the winter surveys, the peak count for crows was 98 on February 2. The peak breeding season count was 175 birds in late June.

Swallows:

Swallows were not present in unusual numbers. All species except Purple Martin were present during the breeding season. **Cliff Swallows** amounted to 114 birds on the first round of surveys in early June and 146 on the second round in late June. Most were clustered in colonies under bridges. **Tree Swallows** numbered 20 in early June and 60 in late June. Many were at swallow boxes. **Northern Rough-winged Swallows** were least numerous of the swallows with 2 in early June and 11 in late June. They were associated with stream banks and drainpipes under bridges. One **Bank Swallow** colony was located at an active gravel pit in the Southwest sector. On June 7, the count was 210 birds and on July 1, 106 birds. **Barn Swallows** were widespread with 91 counted on the early June surveys and 125 on the late June surveys.

Blackbirds:

Blackbirds were widespread but not particularly abundant compared to other sites that we have surveyed in southwestern Ontario. The total number of sightings by species was 574 **Red-winged Blackbirds**, 532 **Common Grackles** and 158 **Brown-headed Cowbirds**. **Bobolinks** were conspicuously clustered in hayfields and winter wheat fields and to a lesser extent at pasture fields. Bobolink counts were 166 birds in early June and 147 in late June. Eastern Meadowlarks were more likely to be found in the pastures so were not as common as Bobolinks. The resulting tally was 24 birds in early June and 15 in late June. Baltimore Orioles were widespread but not particularly numerous for such a large study area with 22 birds in early June and 12 in late June. A single Orchard Oriole was found in the Peepabun sector on the June 29 survey.

Sparrows:

Most sparrow species were found in or below average numbers for such a large study area. High counts were for wintering sparrows were 3 **American Tree Sparrows**. High counts for breeding sparrow were 32 **Chipping Sparrows**, 3 **Clay-colored Sparrows**, 1 **Field Sparrow**, 12 **Vesper Sparrows**, 1 **Lincoln's Sparrow**, 14 **Swamp Sparrows** and 11 **White-throated Sparrows**. Exceptions to this generalization were counts of 113 **Savannah Sparrows** and 163 **Song Sparrows**, both of which were distributed widely over the three sectors.

3.2.2 Discussion of concentrations by habitats

Marsh breeding birds:

There are no marshes in the study area.

Grassland and cropped field breeding birds:

With the exception of Upland Sandpiper, most grassland species were well distributed throughout the study area. Nearly 20% of the landscape was planted in hay and 10% was in intense pasture. Winter wheat fields, which attract Bobolinks and Savannah Sparrows, were also noticeable in the landscape. The latter also breeds along grassy roadsides.

Species	Highest Count	General Distribution
Northern Harrier	11	Spread throughout, most in Southeast and Peepabun
American Kestrel	4	Southwest and Peepabun only
Upland Sandpiper	1	Southeast
Horned Lark	41	Spread evenly throughout
Vesper Sparrow	12	Spread throughout
Savannah Sparrow	113	Spread evenly throughout
Bobolink	166	Spread evenly throughout
Eastern Meadowlark	24	Spread evenly throughout

Old field, hedgerow and scrub breeding birds:

About 8% of the study area is composed of abandoned farmland in the old field or shrub stage. Some of these fields are dry and some moist which explains the similar abundance of species that prefer drier to moister habitats such as Willow and Alder Flycatchers and Yellow Warblers and Common Yellowthroats. Hedgerows and abandoned pasture with hawthorn are scarce in the study area.

Species	Highest Count	General Distribution
Alder Flycatcher	14	Mostly in Peepabun
Willow Flycatcher	18	Mostly in Peepabun and Southwest
Eastern Kingbird	41	Spread evenly throughout
Eastern Bluebird	3	Spread throughout
Brown Thrasher	10	Spread throughout
Clay-colored Sparrow	3	Southeast (all in one young conifer plantation)
Field Sparrow	1	Southwest
Song Sparrow	163	Spread evenly throughout
Swamp Sparrow	14	Spread throughout, mostly in Peepabun
White-throated Sparrow	11	Mostly in Peepabun
Yellow Warbler	42	Spread evenly throughout
Common Yellowthroat	38	Spread throughout with most in Peepabun
American Goldfinch	146	Spread evenly throughout

Woodland breeding birds:

In the 8000 ha study area wooded habitat covers about 5% of the landscape. Many of the woodlands are second growth. None of the woodland birds were particularly abundant in the

study area especially considering that point counts were done at all roadside woodlots, producing a deliberate bias towards woodland habitat.

Species	Highest Count	General Distribution by Sector
Black-billed Cuckoo	8	Spread throughout
Ruby-throated Hummingbird	1	Southeast and Southwest
Yellow-bellied Sapsucker	1	Peepabun
Hairy Woodpecker	4	Southwest only
Species	Highest Count	General Distribution by Sector
Northern Flicker	22	Spread evenly throughout
Pileated Woodpecker	2	Southeast and Peepabun
Eastern Wood-Pewee	16	Spread throughout, fewest in Peepabun
Least Flycatcher	8	Mostly in the Southeast and Peepabun sectors
Great Crested Flycatcher	12	Spread throughout, fewest in Peepabun
Warbling Vireo	22	Spread evenly throughout
Red-eyed Vireo	32	Spread evenly throughout
Black-capped Chickadee	20	Spread throughout with most in Peepabun
White-breasted Nuthatch	4	Evenly split between Southwest and Southeast
House Wren	42	Spread evenly throughout
Blue-gray Gnatcatcher	1	Southeast
Veery	10	Spread throughout with most in Southwest
Wood Thrush	9	Spread throughout
Gray Catbird	29	Spread throughout with most in Peepabun
Nashville Warbler	4	Mostly in Peepabun
Chestnut-sided Warbler	3	Southwest and Peepabun
Black-and-white Warbler	2	Southwest and Peepabun
American Redstart	19	Mostly in Southeast
Ovenbird	3	Southwest and Peepabun
Mourning Warbler	9	Spread evenly throughout
Rose-breasted Grosbeak	23	Spread throughout with most in Southwest
Indigo Bunting	13	Spread evenly throughout
Baltimore Oriole	22	Spread throughout with most in Peepabun

3.3 Species at Risk (SAR)

Species at Risk are those designated as Endangered, Threatened or of Special Concern in Canada by the Species at Risk Act or in Ontario by the Endangered Species Act.

Chimney Swift [*Proposed as Threatened in Canada, not ranked in Ontario*]

Two birds were observed foraging through the Southwest sector on July 1. They could have been breeding in a farm house chimney or, more likely, in a chimney in the nearby town of Arthur.

Eastern Yellow-breasted Chat [*Special Concern in Canada, Special Concern in Ontario*]

A singing Yellow-breasted Chat was heard on a point count on June 6 at the north end of the Peepabun sector. The point count was about 2 km north of the where the closest turbines might be placed. Despite a deliberate search, it was not found on the second round of breeding bird surveys.

Short-eared Owl [*Special Concern in Canada, Special Concern in Ontario*]

None were encountered on the January or February area searches. However, a local resident stated that the species flew over her property regularly in spring and summer for about seven years starting in 1999 but not for the last two years. According to the resident there is a pasture that was abandoned about 20 years ago to the east of her property. This would be the most likely place in the immediate vicinity for Short-eared Owls to nest. A review of the results for the five Ontario Breeding Bird Atlas squares that encompass the study area showed the following. During the first atlas (1981-1985), Short-eared Owl was recorded as being found in suitable habitat in square 17NJ45 which is the square that the local resident's property is located in. None of the other 4 squares recorded this species. During the second Atlas (2001-2005) no Short-eared Owls were found in any of the five atlas squares.

3.4 Partners in Flight priority landbird species for Bird Conservation Region 13

As part of the North American Bird Conservation Initiative, Partners in Flight Ontario is developing Conservation Plans for Ontario's four Bird Conservation Regions (BCRs). Southwestern Ontario lies in BCR 13 and roughly corresponds to the Carolinian Zone in Ontario. See the Notes and Codes section in Appendix A for more details about PIF priority levels. The following table shows the priority species, the number of territories or individuals noted for each round of breeding season visits and their breeding habitat in or near the 8000 ha study area. The density is low for most species given that 75 point counts were completed over about 240 km of roads, but not surprising given the intensive agriculture and general lack of natural vegetation in the study area.

3.5 Partners in Flight Priority Landbird Species

Species	Priority Level	# of individuals / breeding territories	Breeding habitat in study area when known
AGRICULTURAL FIELDS			
Northern Harrier	Regional Concern	11 early June 8 late June	Brushy hedgerows, hay fields, grassy swales
American Kestrel	Regional Concern	4 early June 4 late June	Grassy roadsides
Vesper Sparrow	Management Interest	8 early June 12 late June	Grassy edges of cropped fields
Savannah Sparrow	Regional concern	113 early June 107 late June	Grassy roadside edges, winter wheat fields, hay fields, pasture
Bobolink	Regional concern Regional stewardship	166 early June 147 late June	Winter wheat and hay fields
Eastern Meadowlark	Regional Concern	24 early June 15 late June	Hay fields, pasture
WOODLAND			
Black-billed Cuckoo	Regional Concern Regional Stewardship	3 early June 8 late June	Willow thickets, early successional woodland
Northern Flicker	Regional concern	11 early June 22 late June	Woodland
Eastern Wood-Pewee	Regional Concern	16 early June 10 late June	Woodland
Wood Thrush	Continental Concern	9 early June	Woodland

	Regional Concern	5 late June	
Eastern Towhee	Regional Concern	0 early June 3 late June	Early successional woodland edge
Rose-breasted Grosbeak	Regional Stewardship	19 early June 23 late June	Woodland
Baltimore Oriole	Regional Concern Regional Stewardship	22 early June 12 late June	Woodland
<i>OLD FIELDS / HEDGEROWS</i>			
Willow Flycatcher	Continental concern	18 early June 6 late June	Shrubby hedgerows, abandoned fields with dogwood and willows
Eastern Kingbird	Regional concern	32 early June 41 late June	Hedgerows, fencerows
Brown Thrasher	Regional concern	2 early June 10 late June	Hedgerows
Field Sparrow	Regional Concern	1 July 1	Southwest sector
<i>OTHER</i>			
Chimney Swift	Management interest	2 individuals July 1	Foraging over Southwest sector. Possibly breeding in nearby Arthur
Belted Kingfisher	Regional Concern	4 early June 3 late June	Spread through all 3 sectors along streams
Bank Swallow	Regional Stewardship	210 early June 106 late June	Gravel pit Southwest sector

3.6 References:

Environment Canada. 2006. "Wind Turbines and Birds: A Guidance Document for Environmental Assessment ". Final July 28, 2006.

Important Bird Area database: <http://www.bsc-eoc.org/iba/IBAsites.html>

Ontario Breeding Bird Atlas provisional data. Bird Studies Canada, Canadian Wildlife Service, Ontario Nature, Ontario Field Ornithologists and Ontario Ministry of Natural Resources. 2006. Ontario Breeding Bird Atlas Interim Database, 31 July 2006. <http://www.birdsontario.org/atlas/datapolicy.html>

Ontario Partners in Flight. 2005. Ontario Landbird Conservation Plan: Lower Great Lakes/St. Lawrence Plain (North American Bird Conservation Region 13), Priorities, Objectives and Recommended Actions. EC/MNR.

Appendix A: Conestogo Annotated Species List

Appendix A: Conestogo Annotated Species list with significance and use of study area

See end of table for notes and explanation of codes used. Species with some level of significance are **bold-faced**.

	<i>Species</i>	<i>Use of study area as detected by this study</i>	<i># of sightings</i>	<i># of surveys recorded (n = 5)</i>	<i>SCTE CAN ON</i>	<i>SRank</i>	<i>Partners In Flight priority species</i>	<i>Wellington breeding status 1st atlas % squares</i>	<i>Wellington breeding status 2nd atlas % squares</i>
01	Common Loon	<u>Summer visitor</u> 1 June 29 over Peepabun; likely from Luther Marsh	1	1	-	S4	-	9	9
02	American Bittern	<u>Summer breeder</u> 1 June 6 in Peepabun	1	1	-	S4	-	51	58
03	Great Blue Heron	<u>Summer breeder or visitor</u> 3 early June, 6 late June	9	2	-	S5	-	93	87
04	Green Heron	<u>Summer breeder</u> 1 July 1 in Southwest	1	1	-	S4	-	93	93
05	Turkey Vulture	<u>Summer resident</u> 8 Mar 27, 10 early June, 19 late June	37	3	-	S4	-	64	93
06	Canada Goose	<u>Overwinters</u> 35 Jan 3 <u>Spring migrant</u> 1023 Mar 27 <u>Summer breeder</u> 138 early June 7, none late June	1196	3	-	S5	-	87	100
07	Tundra Swan	<u>Spring migrant</u> 227 Mar 27	227	1	-	S3	-	Not a breeder	Not a breeder
08	Wood Duck	<u>Summer breeder</u> 1 June 6 in Peepabun	1	1	-	S5	-	80	92
09	Mallard	<u>Spring migrant</u> 10 Mar 27 <u>Summer breeder</u> 21 early June, 5 late June	36	3	-	S5	-	100	100

	<i>Species</i>	<i>Use of study area as detected by this study</i>	<i># of sightings</i>	<i># of surveys recorded (n = 5)</i>	<i>SCTE CAN ON</i>	<i>SRank</i>	<i>Partners In Flight priority species</i>	<i>Wellington breeding status 1st atlas % squares</i>	<i>Wellington breeding status 2nd atlas % squares</i>
-	<i>Duck species</i>	<u>Spring migrants</u> 50 March 27	50	1	-	-	-	-	-
10	Osprey	<u>Summer visitor</u> 1 June 7 in Southwest	1	1	-	S4	-	16	29
11	Northern Harrier	<u>Overwinters</u> 1 Jan 3 <u>Spring migrant</u> 5 Mar 27 <u>Summer breeder</u> 11 early June, 8 late June	25	4	-	S4	RC	100	93
12	Red-tailed Hawk	<u>Permanent breeding resident</u> 1 Jan 3, 6 Feb 2, 2 Mar 27, 6 early June, 14 late June	29	5	-	S5	-	100	100
13	Rough-legged Hawk	<u>Overwinters / Spring migrant</u> 11 Feb 2, 2 Mar 27	13	2	-	S1	-	Not a breeder	Not a breeder
14	American Kestrel	<u>Overwinters</u> 4 Jan 3, 4 Mar 27 <u>Summer breeder</u> 4 early June, 4 late June	16	4	-	S5	RC	100	93
15	Wild Turkey	<u>Permanent breeding resident</u> 1 Mar 27 in Peepabun	1	1	-	S4	-	0	87
16	Sandhill Crane	<u>Summer breeder</u> 4 Mar 27, 3 June 6 in Peepabun	7	2	-	S4	-	0	6
17	Killdeer	<u>Summer breeder</u> 17 early June, 40 late June	57	2	-	S5	-	100	100
18	Spotted Sandpiper	<u>Summer breeder</u> 3 early June, 4 late June	7	2	-	S5	-	100	96

	<i>Species</i>	<i>Use of study area as detected by this study</i>	<i># of sightings</i>	<i># of surveys recorded (n = 5)</i>	<i>SCTE CAN ON</i>	<i>SRank</i>	<i>Partners In Flight priority species</i>	<i>Wellington breeding status 1st atlas % squares</i>	<i>Wellington breeding status 2nd atlas % squares</i>
19	Upland Sandpiper	<u>Summer breeder</u> 1 June 8 in Southeast	1	1	-	S4	-	51	35
20	Wilson's Snipe	<u>Spring migrant</u> 3 Mar 27 in Peepabun	3	1	-	S5	-	87	80
21	Ring-billed Gull	<u>Winter visitor</u> 1 Jan 3 <u>Summer visitor</u> 94 early June, 91 late June	186	3	-	S5	-	0	3
22	Herring Gull	<u>Winter visitor</u> 319 Jan 3, 3 Feb 2	322	2	-	S5	-	6	3
23	Iceland Gull	<u>Winter visitor</u> 2 Jan 3	2	1	-	SZN	-	Not a breeder	Not a breeder
24	Rock Pigeon	<u>Permanent breeding resident</u> 108 Jan 3, 33 Feb 2, 38 early June, 72 late June	251	4	-	SE	-	100	100
25	Mourning Dove	<u>Permanent breeding resident</u> 56 early June, 48 late June	105	3	-	S5	-	100	100
26	Black-billed Cuckoo	<u>Summer breeder</u> 3 early June, 8 late June	11	2	-	S4	RC RS	74	74
27	Chimney Swift	<u>Summer visitor</u> 2 birds July 1 over Southwest sector	2	1	UR NIAC	S5	MI	58	48
28	Ruby-throated Hummingbird	<u>Summer breeder</u> 1 June 7 in Southwest, 1 June 29 in Southeast	2	2	-	S5	-	80	93
29	Belted Kingfisher	<u>Summer breeder</u> 4 early June, 3 late June	7	2	-	S5	RC	100	100
30	Yellow-bellied Sapsucker	<u>Summer breeder</u> 1 June 29 in Peepabun	1	1	-	S5	-	64	58

	<i>Species</i>	<i>Use of study area as detected by this study</i>	<i># of sightings</i>	<i># of surveys recorded (n = 5)</i>	<i>SCTE CAN ON</i>	<i>SRank</i>	<i>Partners In Flight priority species</i>	<i>Wellington breeding status 1st atlas % squares</i>	<i>Wellington breeding status 2nd atlas % squares</i>
31	Downy Woodpecker	<u>Permanent breeding resident</u> 1 Feb 2, 7 early June, 5 late June	13	3	-	S5	-	100	100
32	Hairy Woodpecker	<u>Permanent breeding resident</u> 1 early June, 4 late June	5	2	-	S5	-	90	96
33	Northern Flicker	<u>Summer breeder</u> 11 early June, 22 late June	33	2	-	S5	RC	100	100
34	Pileated Woodpecker	<u>Permanent breeding resident</u> 1 Mar 27, 2 June 8, 2 June 29	5	3	-	S4S5	-	74	96
35	Eastern Wood-Pewee	<u>Summer breeder</u> 16 early June, 10 late June	26	2	-	S5	RC	100	100
36	Alder Flycatcher	<u>Summer breeder</u> 14 early June, 8 late June	22	2	-	S5	-	74	96
37	Willow Flycatcher	<u>Summer breeder</u> 18 early June, 6 late June	24	2	-	S5	CC	80	87
38	Least Flycatcher	<u>Summer breeder</u> 2 early June, 8 late June	10	2	-	S5	-	93	96
39	Eastern Phoebe	<u>Summer breeder</u> 2 early June, 1 late June	3	2	-	S5	-	96	100
40	Great Crested Flycatcher	<u>Summer breeder</u> 12 early June, 11 late June	23	2	-	S5	-	96	100
41	Eastern Kingbird	<u>Summer breeder</u> 32 early June, 41 late June	73	2	-	S5	RC	100	100
42	Northern Shrike	<u>Winter visitor</u> 1 Jan 3, 1 Feb 2, 1 Mar 27	3	3	-	S2S3	-	Not a breeder	Not a breeder
43	Warbling Vireo	<u>Summer breeder</u> 22 early June, 20 late June	42	2	-	S5	-	93	96
44	Red-eyed Vireo	<u>Summer breeder</u> 32 early June, 31 late June	63	2	-	S5	-	90	100

	<i>Species</i>	<i>Use of study area as detected by this study</i>	<i># of sightings</i>	<i># of surveys recorded (n = 5)</i>	<i>SCTE CAN ON</i>	<i>SRank</i>	<i>Partners In Flight priority species</i>	<i>Wellington breeding status 1st atlas % squares</i>	<i>Wellington breeding status 2nd atlas % squares</i>
45	Blue Jay	<u>Overwinters</u> 13 Jan 3, 1 Feb 2 <u>Summer breeder</u> 19 early June, 26 late June	59	4	-	S5	-	100	100
46	American Crow	<u>Overwinters</u> 47 Jan 3, 98 Feb 2 <u>Summer breeder</u> 120 early June, 175 late June	440	4	-	S5	-	100	100
47	Horned Lark	<u>Overwinters</u> 12 Feb 2 <u>Summer breeder</u> 26 early June, 41 late June	79	3	-	S5	-	100	100
48	Tree Swallow	<u>Summer breeder</u> 20 early June, 60 late June	80	2	-	S5	-	100	100
49	Northern Rough-winged Swallow	<u>Summer breeder</u> 2 early June, 11 late June	13	2	-	S5	-	93	90
50	Bank Swallow	<u>Summer breeder</u> 210 June 7, 106 July 1; gravel pit in Southwest sector	316	2	-	S5	RS	93	90
51	Cliff Swallow	<u>Summer breeder</u> 114 early June, 146 late June	260	2	-	S5	-	96	100
52	Barn Swallow	<u>Summer breeder</u> 91 early June, 125 late June	216	2	-	S5	-	100	100
53	Black-capped Chickadee	<u>Permanent breeding resident</u> 17 early June, 20 late June	38	3	-	S5	-	100	100
54	Red-breasted Nuthatch	<u>Post breeding visitor</u> 1 July 1	1	1	-	S5	-	51	83
55	White-breasted Nuthatch	<u>Permanent breeding resident</u> 1 early June, 4 late June	5	2	-	S5	-	80	93

	<i>Species</i>	<i>Use of study area as detected by this study</i>	<i># of sightings</i>	<i># of surveys recorded (n = 5)</i>	<i>SCTE CAN ON</i>	<i>SRank</i>	<i>Partners In Flight priority species</i>	<i>Wellington breeding status 1st atlas % squares</i>	<i>Wellington breeding status 2nd atlas % squares</i>
56	House Wren	<u>Summer breeder</u> 32 early June, 42 late June	74	2	-	S5	-	100	100
57	Blue-gray Gnatcatcher	<u>Summer breeder</u> 1 June 8 in Southeast sector	1	1	-	S4	-	25	12
58	Eastern Bluebird	<u>Spring migrant</u> 2 March 27 <u>Summer breeder</u> 3 early June, 1 late June	6	3	-	S4S5	-	16	77
59	Veery	<u>Summer breeder</u> 7 early June, 10 late June	17	2	-	S4	-	96	96
60	Hermit Thrush	<u>Summer breeder</u> 1 June 29 in Peepabun	1	1	-	S5	-	0	3
61	Wood Thrush	<u>Summer breeder</u> 9 early June, 5 late June	14	2	-	S5	RC CC	83	93
62	American Robin	<u>Summer breeder</u> 142 early June, 172 birds late June	314	2	-	S5	-	100	100
63	Gray Catbird	<u>Summer breeder</u> 17 early June, 29 late June	46	2	-	S5	-	96	100
64	Brown Thrasher	<u>Summer breeder</u> 2 early June, 10 late June	12	2	-	S5	RC	100	100
65	European Starling	<u>Permanent breeding resident</u> 570 Jan 3, 153 Feb 2, 198 early June, 191 late June	1112	4	-	SE	-	100	100
66	Cedar Waxwing	<u>Summer breeder</u> 96 early June, 93 late June	189	2	-	S5	-	100	100
67	Tennessee Warbler	<u>Fall migrant</u> 1 July 1 in Southwest	1	1	-	S5	-	Not a breeder	Not a breeder
68	Nashville Warbler	<u>Summer breeder</u> 4 early June	4	1	-	S5	-	74	83

	<i>Species</i>	<i>Use of study area as detected by this study</i>	<i># of sightings</i>	<i># of surveys recorded (n = 5)</i>	<i>SCTE CAN ON</i>	<i>SRank</i>	<i>Partners In Flight priority species</i>	<i>Wellington breeding status 1st atlas % squares</i>	<i>Wellington breeding status 2nd atlas % squares</i>
69	Yellow Warbler	<u>Summer breeder</u> 42 early June, 32 late June	74	2	-	S5	-	100	100
70	Chestnut-sided Warbler	<u>Summer breeder</u> 2 early June, 3 late June	5	2	-	S5	-	51	80
71	Yellow-rumped Warbler	<u>Summer breeder</u> 1 June 6 in Peepabun	1	1	-	S5	-	22	74
72	Black-and-white Warbler	<u>Summer breeder</u> 1 June 7 Southwest, 1 June 29 Peepabun	2	2	-	S5	-	77	83
73	American Redstart	<u>Summer breeder</u> 19 early June, 11 late June	30	2	-	S5	-	74	100
74	Ovenbird	<u>Summer breeder</u> 3 early June, 2 late June	5	2	-	S5	-	100	96
75	Mourning Warbler	<u>Summer breeder</u> 9 early June, 3 late June	12	2	-	S5	-	77	80
76	Common Yellowthroat	<u>Summer breeder</u> 38 early June, 33 late June	71	2	-	S5	-	83	90
77	Yellow-breasted Chat	<u>Summer breeder</u> 1 June 6 Peepabun	1	1	SC SC	S2S3	-	Not a breeder	Not a breeder
78	Eastern Towhee	<u>Summer breeder</u> 0 early June, 3 late June	3	1	-	S4	RC	48	64
79	American Tree Sparrow	<u>Overwinters</u> 2 Jan 3, 1 Feb 2	3	2	-	S5	-	Not a breeder	Not a breeder
80	Chipping Sparrow	<u>Summer breeder</u> 25 early June, 32 late June	57	2	-	S5	-	100	100
81	Clay-colored Sparrow	<u>Summer breeder</u> 3 June 29 Southeast	3	1	-	S4	-	19	41

	<i>Species</i>	<i>Use of study area as detected by this study</i>	<i># of sightings</i>	<i># of surveys recorded (n = 5)</i>	<i>SCTE CAN ON</i>	<i>SRank</i>	<i>Partners In Flight priority species</i>	<i>Wellington breeding status 1st atlas % squares</i>	<i>Wellington breeding status 2nd atlas % squares</i>
82	Field Sparrow	<u>Summer breeder</u> 1 July 1 in Southwest	1	1	-	S5	RC	74	90
83	Vesper Sparrow	<u>Summer breeder</u> 8 early June, 12 late June	20	2	-	S4	MI	93	83
84	Savannah Sparrow	<u>Summer breeder</u> 113 early June, 107 late June	220	2	-	S5	RC	96	100
85	Song Sparrow	<u>Summer breeder</u> 139 early June, 163 late June	302	2	-	S5	-	100	100
86	Lincoln's Sparrow	<u>Summer breeder</u> 1 June 29 in Peepabun	1	1	-	S5	-	6	12
87	Swamp Sparrow	<u>Summer breeder</u> 6 early June, 14 late June	20	2	-	S5	-	100	96
88	White-throated Sparrow	<u>Summer breeder</u> 11 early June, 8 late June	19	2	-	S5	-	96	87
89	Northern Cardinal	<u>Permanent breeding resident</u> 2 Feb 2, 8 early June, 12 late June	22	3	-	S5	-	80	96
90	Rose-breasted Grosbeak	<u>Summer breeder</u> 19 early June, 23 late June	42	2	-	S5	RS	100	100
91	Indigo Bunting	<u>Summer breeder</u> 10 early June, 13 late June	23	2	-	S5	-	100	100
92	Snow Bunting	<u>Winter visitor</u> 80 Jan 3, 400 Mar 27	480	2	-	SZN	-	Not a breeder	Not a breeder
93	Bobolink	<u>Summer breeder</u> 166 early June, 147 late June	313	2	-	S4	RC RS	100	100
94	Red-winged Blackbird	<u>Summer breeder</u> 302 early June, 272 late June	574	2	-	S5	-	100	100
95	Eastern Meadowlark	<u>Summer breeder</u> 24 early June, 15 late June	32	2	-	S5	RC	100	100

	<i>Species</i>	<i>Use of study area as detected by this study</i>	<i># of sightings</i>	<i># of surveys recorded (n = 5)</i>	<i>SCTE CAN ON</i>	<i>SRank</i>	<i>Partners In Flight priority species</i>	<i>Wellington breeding status 1st atlas % squares</i>	<i>Wellington breeding status 2nd atlas % squares</i>
96	Common Grackle	<u>Summer breeder</u> 199 early June, 333 late June	532	2	-	S5	-	100	100
97	Brown-headed Cowbird	<u>Summer breeder</u> 64 early June, 94 late June	158	2	-	S5	-	96	100
98	Orchard Oriole	<u>Summer breeder</u> 1 June 29 in Peepabun	1	1	-	SZB	-	6	12
99	Baltimore Oriole	<u>Summer breeder</u> 22 early June, 12 late June	34	2	-	S5	RC RS	100	100
100	House Finch	<u>Summer breeder</u> 1 June 29, 1 July 1	2	1	-	SE	-	19	96
101	White-winged Crossbill	<u>Post breeding dispersal visitor</u> 4 Mar 27	4	1	-	S5	-	Not a breeder	Not a breeder
102	American Goldfinch	<u>Summer breeder</u> 79 early June, 146 late June <u>Overwinters</u> 12 Jan 3, 3 Feb 2	240	5	-	S5	-	100	100
103	House Sparrow	<u>Permanent breeding resident</u> 57 early June, 57 late June	114	2	-	SE	-	100	100

Notes and Codes for Appendix A

Column 4: # of sightings

In column 4 the expression # of sightings is used instead of # of individuals because some individuals may have been recorded more than once on a single survey or on more than one survey. For example, 57 House Sparrows were recorded on each of two June breeding season surveys resulting in 114 sightings.

Column 5: # of surveys recorded (n = 5)

Five surveys were conducted at Arthur. This column shows how many surveys a species was recorded on. So, 2 in this column means that the species was found on 2 of the 5 surveys.

Column 6: SCTE CAN ON

Endangered rankings as determined by COSEWIC [Committee on the Status of Endangered Wildlife in Canada and listed on Schedule 1, 2 or 3 by SARA [Species at Risk Act], and/or, in Ontario by COSSARO [Committee on the Status of Species at Risk in Ontario].

SCTE: Special Concern, Threatened, Endangered

CAN: Canada

ON: Ontario

Special Concern: A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.

Threatened: A species likely to become endangered if limiting factors are not reversed.

THR?: proposed by COSEWIC as Threatened by not yet accepted.

Endangered: A species facing imminent extirpation or extinction throughout its range.

END-R: Endangered-Regulated in Ontario.

NAR: Not at Risk

NIAC: Not in any COSARO category. Any native species evaluated by COSSARO, which does not currently meet criteria for assignment to a provincial risk category.

UR: Under review by COSEWIC.

Column 7: S Rank

Rank assigned by the Natural Heritage Information Centre [NHIC] for Ontario.

S5: Very common and demonstrably secure in Ontario

S4: Common and apparently secure in Ontario
S3: Rare to uncommon in Ontario; usually between 20 and 100 occurrences in the province; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances.

S3: Rare to uncommon in Ontario: usually between 20 and 100 occurrences in the province; may have fewer occurrences, but with a larger number of individuals in some populations; may be susceptible to large-scale disturbances.

S2: Very rare in Ontario: usually between 5 and 20 occurrences in the province or with many individuals in fewer occurrences; often susceptible to extirpation.

S1: Extremely rare in Ontario; usually 5 or fewer occurrences in the province or very few remaining individuals, often especially vulnerable to extinction.

SE: Exotic; not believed to be a native component of Ontario.

SZN: Non-breeding migrants/vagrants.

SZB: Breeding migrants/vagrants

Column 8: Partners in Flight (PIF) priority species

As part of the North American Bird Conservation Initiative, Partner in Flight Ontario is developing Conservation Plans for Ontario's four Bird Conservation Regions (BCRs). Column 8 lists the designations for species found in Bird Conservation Region 13, which encompasses the Carolinian Zone and some of the Great Lakes/St. Lawrence valley. Codes used are:

CC: Continental Concern. A species on the PIF Continental Watch List for which the BCR has some conservation responsibility

CS: Continental Stewardship. A species for which the BCR has high stewardship responsibility

RC: Regional Concern. A species of regional concern in this BCR due to combination of regional population decline and high threat score

RS: Regional Stewardship. A species of regional stewardship responsibility in this BCR because of high regional density score and/or BCR contains a high proportion of the global population

MI: Of Management Interest. Includes species not listed in other categories that are of regional management interest or importance for any variety of reasons. Examples of reasons include substantial local declines (in the BCR) in abundance or distribution, combined with elevated threat conditions.

UR: Under Review for designation as SCTE

Column 9 and 10: Wellington breeding status, % squares

Columns 9 and 10 show the percentage of squares in Wellington County in which a species was found during the 1st Ontario Breeding Bird Atlas (1981-1985) and during the 2nd Ontario Breeding Bird Atlas (2001-2005). Wellington County had 31 atlas squares. If a species was found in 100% of the atlas squares that means it was found in 31 of the 31 squares. If it was found in 56% of the squares that means it was found in 17 atlas squares. While this data does not speak to abundance it does show distribution, albeit at a macro scale. Nevertheless, it gives a sense of a species occurrence in the Wellington and whether it has increased or decreased from the 1st to the 2nd atlas or whether it has remained stable. **Not a breeder** means that the species does not breed in Wellington County.

Appendix B: Seasonal Species Lists For Conestogo

This section lists the species encountered by season in the study area or immediately adjacent to the study area: 1) spring migrants, 2) breeding birds and summer visitors and 3) overwintering birds and permanent residents. Some species were encountered in more than one season so are listed more than once.

Spring migrants

One area search targeting early spring migrants was completed on March 27, 2007. Although permanent residents and early breeding season species were also encountered, this list includes only those species considered to be migrants. Migrants are birds observed in flocks or birds found away from their breeding habitat or outside their breeding season.

	Species
01	Canada Goose
02	Tundra Swan
03	Mallard
04	Northern Harrier
05	Rough-legged Hawk
06	Wilson's Snipe
07	White-winged Crossbill

Breeding birds and summer visitors

Two rounds of surveys for breeding birds were completed: the first round on June 6, 7 and 8, 2007, and the second round on June 29 and July 1, 2007. A few species encountered during this period such as Ring-billed Gull are considered to be summer visitors since they do not breed in the area.

	Species		Species
01	Common Loon (visitor)	47	Red-breasted Nuthatch
02	American Bittern	48	White-breasted Nuthatch
03	Great Blue Heron	49	House Wren
04	Green Heron	50	Blue-gray Gnatcatcher
05	Turkey Vulture	51	Eastern Bluebird
06	Canada Goose	52	Veery
07	Wood Duck	53	Hermit Thrush
08	Mallard	54	Wood Thrush
09	Osprey (visitor)	55	American Robin
10	Northern Harrier	56	Gray Catbird
11	Red-tailed Hawk	57	Brown Thrasher
12	American Kestrel	58	European Starling
13	Wild Turkey	59	Cedar Waxwing
14	Sandhill Crane (visitor)	60	Nashville Warbler
15	Killdeer	61	Yellow Warbler
16	Spotted Sandpiper	62	Chestnut-sided Warbler
17	Upland Sandpiper	63	Yellow-rumped Warbler
18	Ring-billed Gull (visitor)	64	Black-and-white Warbler
19	Rock Pigeon	65	American Redstart
20	Mourning Dove	66	Ovenbird
21	Black-billed Cuckoo	67	Mourning Warbler
22	Chimney Swift	68	Common Yellowthroat
	Species		Species

23	Ruby-throated Hummingbird	69	Yellow-breasted Chat
24	Belted Kingfisher	70	Eastern Towhee
25	Yellow-bellied Sapsucker	71	Chipping Sparrow
26	Downy Woodpecker	72	Clay-colored Sparrow
27	Northern Flicker	73	Field Sparrow
28	Pileated Woodpecker	74	Vesper Sparrow
29	Eastern Wood-Pewee	75	Savannah Sparrow
30	Alder Flycatcher	76	Song Sparrow
31	Willow Flycatcher	77	Lincoln's Sparrow
32	Least Flycatcher	78	Swamp Sparrow
33	Eastern Phoebe	79	White-throated Sparrow
34	Great Crested Flycatcher	80	Northern Cardinal
35	Eastern Kingbird	81	Rose-breasted Grosbeak
36	Warbling Vireo	82	Indigo Bunting
37	Red-eyed Vireo	83	Bobolink
38	Blue Jay	84	Red-winged Blackbird
39	American Crow	85	Eastern Meadowlark
40	Horned Lark	86	Common Grackle
41	Tree Swallow	87	Brown-headed Cowbird
42	Northern Rough-winged Swallow	88	Orchard Oriole
43	Bank Swallow	89	Baltimore Oriole
44	Cliff Swallow	90	House Finch
45	Barn Swallow	91	American Goldfinch
46	Black-capped Chickadee	92	House Sparrow

Wintering birds and permanent residents

Birds listed as wintering were those found on the January 2 and February 3, 2007, area searches. Some are permanent residents. Others are birds that remain in the area until they are forced out by freeze-up.

	Species		Species
01	Canada Goose	15	Pileated Woodpecker
02	Northern Harrier	16	Northern Shrike
03	Red-tailed Hawk	17	Blue Jay
04	Rough-legged Hawk	18	American Crow
05	American Kestrel	19	Horned Lark (resident)
06	Wild Turkey	20	Black-capped Chickadee
07	Ring-billed Gull	21	White-breasted Nuthatch
08	Herring Gull	22	European Starling
09	Iceland Gull	23	American Tree Sparrow
10	Rock Pigeon	24	Northern Cardinal
11	Mourning Dove	25	Snow Bunting
12	Downy Woodpecker	26	American Goldfinch
13	Hairy Woodpecker	27	House Sparrow
14	Northern Flicker		

Appendix C Baseline data for Conestogo

Survey #	Date	AMKE	AMRE	AMRO	ATSP	BAOR	BANS	BARS	BAWW	BBCU	BCCH	BEKI	BGGN	BHCO	BLJA	BOBO	BRTH	CAGO	CCSP	CEDW	CHSP	CHSW	CLSW	COGR	COLO	COYE	CSWA	DOWO	ducks	EABL	EAKI	EAME	EAPH	EATO	EAWP	EUST	FISP	GBHE	GCFL	GRCA	GRHE		
1	January 3, 2007	2	0	0	2	0	0	0	0	0	0	0	0	0	12	0	0	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	220	0	0	0	0	
2	February 2, 2007	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	150	0	0	0	0		
3	March 27, 2007	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
4	June 7, 2007	2	4	59	0	3	210	25	1	1	7	1	0	18	8	24	1	84	0	43	8	0	57	75	0	5	1	4	0	0	13	7	1	0	6	60	0	2	5	7	0		
5	July 1, 2007	3	1	95	0	2	106	35	0	4	5	2	0	64	15	16	3	0	0	46	13	2	84	178	0	9	1	2	0	1	14	7	1	2	4	130	1	4	8	8	1		
	Southwest	0-3	0-4	0-95	0-2	0-3	0-210	0-35	0-1	0-4	0-7	0-2	0	0-64	0-15	0-24	0-3	0-84	0	0-46	0-13	0-2	0-84	0-178	0	0-9	0-1	0-4	0	0-1	0-14	0-7	0-1	0-2	0-6	0-220	0-1	0-4	0-8	0-8	0-1		
	Southwest	7	5	154	3	5	316	60	1	5	12	3	0	82	36	40	4	119	0	89	21	2	141	253	0	14	2	6	0	1	27	7	2	2	10	560	1	6	13	15	1		
	Southwest	3	2	2	2	2	2	2	1	2	2	2	0	2	4	2	2	2	0	2	2	1	2	2	0	2	2	2	0	1	2	2	2	1	2	4	1	2	2	2	1		
1	January 3, 2007	1	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
2	February 2, 2007	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3	0	0	0	0		
3	March 27, 2007	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	55	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	
4	June 8, 2007	0	13	48	0	5	0	50	0	0	6	2	1	37	6	86	0	15	0	36	12	0	44	79	0	12	0	2	0	2	13	10	0	0	9	74	0	0	7	5	0		
5	June 29, 2007	0	5	32	0	4	0	52	0	2	2	1	0	14	6	57	3	0	3	17	11	0	14	64	0	4	0	2	0	0	10	1	0	0	5	33	0	0	0	4	0		
	Southeast	0-1	0-13	0-48	0	0-5	0	0-52	0	0-2	0-6	0-2	0-1	0-37	0-6	0-86	0-3	0-55	0-3	0-36	0-12	0	0-44	0-79	0	0-12	0	0-2	0	0-2	0-13	0-10	0	0	0-9	0-74	0	0	0-7	0-5	0		
	Southeast	2	18	80	0	9	0	102	0	2	9	3	1	51	13	143	3	70	3	53	23	0	58	143	0	16	0	5	0	4	23	11	0	0	14	110	0	0	7	9	0		
	Southeast	2	2	2	0	2	0	2	0	1	3	2	1	2	3	2	1	2	1	2	2	0	2	2	0	2	0	3	0	2	2	2	0	0	2	3	0	0	1	2	0		
1	January 3, 2007	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	350	0	0	0	0	0	
2	February 2, 2007	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
3	March 27, 2007	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	968	0	0	0	0	0	0	0	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	June 6, 2007	2	2	35	0	14	0	16	0	2	4	1	0	9	5	56	1	39	0	17	5	0	13	45	0	21	1	1	0	1	6	7	1	0	1	64	0	1	0	5	0		
5	June 29, 2007	1	5	45	0	6	0	38	1	2	13	0	0	16	5	74	4	0	0	30	8	0	48	91	1	20	2	1	0	0	17	7	0	1	1	28	0	2	3	17	0		
	Peepabun	0-3	0-5	0-45	0	0-14	0	0-38	0-1	0-2	0-13	0-1	0	0-16	0-5	0-74	0-4	0-968	0	0-30	0-8	0	0-48	0-91	0-1	0-21	0-2	0-1	0-50	0-1	0-17	0-7	0-1	0-1	0-1	0-350	0	0-2	0-3	0-17	0		
	Peepabun	7	7	80	0	20	0	54	1	4	17	1	0	25	10	130	5	1007	0	47	13	0	61	136	1	41	3	2	50	1	23	14	1	1	2	442	0	3	3	22	0		
	Peepabun	4	2	2	0	2	0	2	1	2	2	1	0	2	2	2	2	2	0	2	2	0	2	2	1	2	2	1	1	2	2	1	1	2	3	0	2	1	2	0			
	All sectors	16	30	314	3	34	316	216	2	11	38	7	1	158	59	313	12	1196	3	189	57	2	260	532	1	71	5	13	50	6	73	32	3	3	26	1112	1	9	23	46	1		
	All sectors	4	2	2	2	2	2	2	2	3	2	1	2	4	2	2	3	1	2	2	1	2	2	1	2	2	3	1	3	2	2	2	1	2	4	1	2	2	2	1			

Survey #	Date	TEWA	TRES	TUSW	TUVU	UPSA	VEER	VESP	WAVI	WBNU	WIFL	WISN	WITU	WODU	WOTH	WTSP	WWCR	YBCH	YBSA	YRWA	YWAR
1	January 3, 2007	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	February 2, 2007	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	March 27, 2007	0	0	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	June 7, 2007	0	7	0	9	0	3	3	9	1	9	0	0	0	3	0	0	0	0	0	15
5	July 1, 2007	1	16	0	14	0	6	7	6	2	2	0	0	0	0	1	0	0	0	0	14
	Southwest	0-1	0-16	0-9	0-14	0	0-6	0-7	0-9	0-2	0-9	0	0	0	0-3	0-1	0	0	0	0	0-15
	Southwest	1	23	9	24	0	9	10	15	3	11	0	0	0	3	1	0	0	0	0	29
	Southwest	1	2	1	3	0	2	2	2	2	2	0	0	0	1	1	0	0	0	0	2
1	January 3, 2007	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	February 2, 2007	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	March 27, 2007	0	0	58	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	June 8, 2007	0	6	0	1	1	1	3	8	0	3	0	0	0	4	1	0	0	0	0	13
5	June 29, 2007	0	18	0	5	0	1	2	8	2	0	0	0	0	1	0	0	0	0	0	3
	Southeast	0	0-18	0-58	0-7	0-1	0-1	0-3	0-8	0-2	0-3	0	0	0	0-4	0-1	0	0	0	0	0-13
	Southeast	0	24	58	13	1	2	5	16	2	3	0	0	0	5	1	0	0	0	0	16
	Southeast	0	2	1	3	1	2	2	2	1	2	0	0	0	2	1	0	0	0	0	2
1	January 3, 2007	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	February 2, 2007	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	March 27, 2007	0	0	160	0	0	0	0	0	0	3	1	0	0	0	4	0	0	0	0	0
4	June 6, 2007	0	7	0	0	0	3	2	5	0	6	0	0	1	2	10	0	1	0	1	14
5	June 29, 2007	0	26	0	0	0	3	3	6	0	4	0	0	0	4	7	0	0	1	0	15
	Peepabun	0	0-26	0-160	0	0	0-3	0-3	0-6	0	0-6	0-3	0-1	0-1	0-4	0-10	0-4	0-1	0-1	0-1	0-15
	Peepabun	0	33	160	0	0	6	5	11	0	10	3	1	1	6	17	4	1	1	1	29
	Peepabun	0	2	1	0	0	2	2	2	0	2	1	1	1	2	2	1	1	1	1	2
	All sectors																				
	All sectors	1	80	227	37	1	17	20	42	5	24	3	1	1	14	19	4	1	1	1	74
	All sectors	1	2	1	3	1	2	2	2	2	2	1	1	1	2	2	1	1	1	1	2

**Appendix D 4-Letter Species Codes For Baseline
Data Table**

ACFL	Acadian Flycatcher	LEFL	Least Flycatcher
ABDU	American Black Duck	LESA	Least Sandpiper
AMBI	American Bittern	LISP	Lincoln's Sparrow [also LCSP]
AMCO	American Coot		
AMCR	American Crow	MALL	Mallard
AMGO	American Goldfinch	MAWA	Magnolia Warbler
AMGP	American Golden-Plover	MAWR	Marsh Wren
AMKE	American Kestrel	MERL	Merlin
AMPI	American Pipit	MODO	Mourning Dove
AMRE	American Redstart	MOWA	Mourning Warbler
AMRO	American Robin	MUSW	Mute Swan
AMWI	American Wigeon		
AMWO	American Woodcock	NAWA	Nashville Warbler
ATSP	American Tree Sparrow	NOCA	Northern Cardinal
		NOFL	Northern Flicker
BAEA	Bald Eagle	NOGO	Northern Goshawk
BAOR	Baltimore Oriole	NOHA	Northern Harrier
BANS	Bank Swallow	NOMO	Northern Mockingbird
BARS	Barn Swallow	NOPA	Northern Parula
BASA	Baird's Sandpiper	NOPI	Northern Pintail
BBCU	Black-billed Cuckoo	NRWS	N. Rough-winged Swallow
BBPL	Black-bellied Plover	NSHO	Northern Shoveler
BCCH	Black-capped Chickadee	NSHR	Northern Shrike
BCNH	Black-crowned Night-Heron		
BEKI	Belted Kingfisher	OROR	Orchard Oriole
BGGN	Blue-gray Gnatcatcher	OSFL	Olive-sided Flycatcher
BHCO	Brown-headed Cowbird	OSPR	Osprey
BHVI	Blue-headed Vireo		
BLBW	Blackburnian Warbler		
BLJA	Blue Jay	PAWA	Palm Warbler
BLPW	Blackpoll Warbler	PBGR	Pied-billed Grebe
BLTE	Black Tern	PEFA	Peregrine Falcon
BOB0	Bobolink	PESA	Pectoral Sandpiper
BOGU	Bonaparte's Gull	PIWO	Pileated Woodpecker
BRBL	Brewer's Blackbird	PUFI	Purple Finch
BRCR	Brown Creeper	PUMA	Purple Martin
BRTH	Brown Thrasher		
BTNW	Black-throated Green Warbler	RBGR	Rose-breasted Grosbeak
BUFF	Bufflehead	RBGU	Ring-billed Gull
BWHA	Broad-winged Hawk	RBME	Red-breasted Merganser
BWTE	Blue-winged Teal	RBNU	Red-breasted Nuthatch
		RBWO	Red-bellied Woodpecker
CAGO	Canada Goose	RCKI	Ruby-crowned Kinglet
CANV	Canvasback	REDH	Redhead
CARW	Carolina Wren	REVI	Red-eyed Vireo
CATE	Caspian Tern	RHWO	Red-headed Woodpecker
CEDW	Cedar Waxwing	RIPH	Ring-necked Pheasant
CHSP	Chipping Sparrow	RLHA	Rough-legged Hawk
CHSW	Chimney Swift	RNDU	Ring-necked Duck
CLSW	Cliff Swallow	RNGR	Red-necked Grebe
COGO	Common Goldeneye	ROPI	Rock Pigeon
COGR	Common Grackle	RSHA	Red-shouldered Hawk
COHA	Cooper's Hawk	RTHA	Red-tailed hawk
COLO	Common Loon	RTHU	Ruby-throated Hummingbird
COME	Common Merganser	RUBL	Rusty Blackbird
COMO	Common Moorhen	RUDU	Ruddy Duck
CONI	Common Nighthawk	RUGR	Ruffed Grouse

COTE	Common Tern	RUTU	Ruddy Turnstone
COYE	Common Yellowthroat	RWBL	Red-winged Blackbird
DEJU	Dark-eyed Junco	SACR	Sandhill Crane
DCCO	Double-crested Cormorant	SASP	Savannah Sparrow [also SAVS]
DOWO	Downy Woodpecker	SBDO	Short-billed Dowitcher
DUNL	Dunlin	SCTA	Scarlet Tanager
		SESA	Semipalmated Sandpiper
EABL	Eastern Bluebird	SNBU	Snow Bunting
EAKI	Eastern Kingbird	SNGO	Snow Goose
EAME	Eastern Meadowlark	SNOW	Snowy Owl
EAPH	Eastern Phoebe	SORA	Sora
EASO	Eastern Screech-Owl	SOSP	Song Sparrow
EATO	Eastern Towhee	SPPL	Semipalmated Plover [also SEPL]
EAWP	Eastern Wood-Pewee	SPSA	Spotted Sandpiper
EUST	European Starling	SSHA	Sharp-shinned Hawk
EVGR	Evening Grosbeak	STSA	Stilt Sandpiper
		SUSC	Surf Scoter
FISP	Field Sparrow	SWSP	Swamp Sparrow
FOTE	Forster's Tern	SWTH	Swainson's Thrush
FOSP	Fox Sparrow		
GADW	Gadwall	TRES	Tree Swallow
GBBG	Great Black-backed Gull	TUSW	Tundra Swan
GBHE	Great Blue Heron	TUVU	Turkey Vulture
GCFL	Great Crested Flycatcher		
GCKI	Golden-crowned Kinglet		
GLGU	Glaucous Gull	VEER	Veery
GOEA	Golden Eagle	VESP	Vesper Sparrow
GRCA	Gray Catbird	VIRA	Virginia Rail
GRHE	Green Heron		
GRSP	Grasshopper Sparrow		
GHOW	Great Horned Owl		
GLGU	Glaucous Gull	WAVI	Warbling Vireo
GREG	Great Egret	WBNU	White-breasted Nuthatch
GRYE	Greater Yellowlegs	WCSP	White-crowned Sparrow
GWFG	Greater White-fronted Goose	WHIM	Whimbrel
GWTE	Green-winged Teal	WIFL	Willow Flycatcher
		WISN	Wilson's Snipe
HAWO	Hairy Woodpecker	WITU	Wild Turkey
HERG	Herring Gull	WIWR	Winter Wren
HETH	Hermit Thrush	WODU	Wood Duck
HOFI	House Finch	WOTH	Wood Thrush
HOLA	Horned Lark	WRSA	White-rumped Sandpiper
HOME	Hooded Merganser	WTSP	White-throated Sparrow
HOSP	House Sparrow	WBNU	White-breasted Nuthatch
HOWR	House Wren	WWCR	White-winged Crossbill
HUGO	Hudsonian Godwit	WWSC	White-winged Scoter
ICGU	Iceland Gull	YBCU	Yellow-billed Cuckoo
INBU	Indigo Bunting	YBSA	Yellow-bellied Sapsucker
KILL	Killdeer	YHBL	Yellow-headed Blackbird
		YTVI	Yellow-throated Vireo
LALO	Lapland Longspur		
LBBG	Lesser Black-backed Gull		
LBDO	Long-billed Dowitcher	YRWA	Yellow-rumped Warbler
LEBI	Least Bittern	YWAR	Yellow Warbler