

A STUDY OF BREEDING BIRDS

in the
Southeast Quadrant of
South Burlington, Vermont

June 2004



Report Date: November 19, 2004

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The logo for Wings Environmental features a stylized butterfly with orange and black wings, positioned between the words "Wings" and "Environmental". The text is in a serif font.

Cover Photo: Savannah Sparrow (*Passerculus sandwichensis*), among the more common bird species of open country in South Burlington's Southeast Quadrant.

Photograph by Bryan Pfeiffer

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1.0 Introduction

Wings Environmental was retained by the City of South Burlington to conduct an inventory of breeding birds on properties that comprise the city's Southeast Quadrant (SEQ). The study's objectives include:

- Obtaining a general baseline knowledge, through simple field investigations, of birds breeding on selected SEQ properties.
- Locating any rare, threatened or endangered bird species on the SEQ properties.
- Suggesting land-management strategies that protect or improve the ecological integrity of key SEQ natural communities for avian diversity and its related benefits.

2.0 Methodology

Normally, the gathering of reliable evidence of breeding in bird species is a time-consuming endeavor. It involves lengthy field investigations for evidence of breeding – i.e. copulation, nest-building, or the presence of fledglings – for each bird species encountered. This approach was beyond the scope of the SEQ project. However, a reliable and cost-effective alternative involves a rapid field assessment. This strategy was employed on the SEQ properties.

The rapid field assessment involves a skilled individual's investigation of representative natural communities during the peak of breeding activity – normally the month of June in South Burlington. Early-morning field visits were conducted in order to observe and overhear birds. During this period of high breeding activity, a bird observed or heard vocalizing *within its proper habitat* (with certain exceptions) can reasonably be assumed to be breeding in that location. Accordingly, the fieldwork established three levels of certainty of breeding:

- **Confirmed Breeder** – Species exhibiting obvious and conclusive evidence of breeding activity, i.e. copulation, nest-building or distraction displays.
- **Probable Breeder** – Species encountered in viable habitat during the field investigations without demonstrating incontrovertible evidence of breeding. (This category comprises the bulk of this study's evidence.)
- **Possible or Potential Breeder** – Species known to be associated with habitat existing within the SEQ, but not encountered during field investigations. These species may or may not breed in the SEQ.

The rapid field assessment consisted of three phases: (1) landscape analysis; (2) field investigations; and (3) the securing of additional sources of breeding bird data. They are summarized below:

2.1 Landscape Analysis

A landscape-level review of the SEQ properties preceded field investigations. This review was performed in consultation with Arrowwood Environmental LLC, the principal investigators for the wildlife and natural community assessment of SEQ properties. Also consulted during this phase was South Burlington's director of planning and zoning, Julie Beth Hoover, as well as several landowners within the SEQ study area. The following digital and hard-copy resources were employed during the landscape analysis:

- Vermont Significant Wetlands Inventory (VSWI) maps
- Landuse/Landcover from Landsat satellite imagery
- U.S. Geological Survey topographic maps (1:24,000)
- Digital Orthophotography

2.2 Field Investigations

The field investigations were designed to survey representative natural communities in the SEQ properties. These were primarily wetlands (including wet, shrubby, early-successional fields); forested areas (including, to a limited extent, riparian zones); grasslands (including, to a limited extent, agricultural land) and dry shrublands; as well as ponds, brooks and streams.

Field investigations covered only those properties for which permission to visit was secured in advance. The lack of access to certain properties in the SEQ study areas, notably the riparian zone along Muddy Brook (Muddy Brook Corridor and Muddy Brook Basin study areas) and agricultural grasslands, did indeed limit the results of this breeding bird investigation.

Eight distinct sites were visited between 3 Jun 2004 and 16 June 2004. Field investigations began at or before dawn – typically between 0430 hours and 0500 hours and lasted until no later than 0820 hours. Each of the SEQ study areas was visited at least once. Additionally, numerous casual encounters with various bird species occurred between site visits. Field visits are summarized in Appendix A.

Field technique involved walking properties and noting each and every bird species observed or heard vocalizing. The field investigator himself regularly vocalized (“spishing” and imitating the call of an Eastern Screech Owl) in order to elicit activity or vocalization from more secretive bird species. In appropriate habitat, recorded version of bird songs were broadcast in order to investigate for a few target species: Upland Sandpiper, Sedge Wren, Golden-winged Warbler, Cerulean Warbler, Vesper Sparrow, Grasshopper Sparrow, and Henslow's Sparrow.

2.3 Other Data Sources

Additional sources of data on bird diversity in the SEQ included consultations with other birdwatchers¹ and results from the Vermont Breeding Bird Atlas project (Laughlin and Kibbe, 1985).

¹ Wings Environmental thanks Peter Jones, Ted Murin, and Allen Strong, all South Burlington residents, for their time spent reviewing bird lists for this study.

3.0 Study Areas

For the purposes of this inventory, the SEQ properties were divided into six focus areas: (1) Muddy Brook Corridor; (2) Muddy Brook Basin; (3) The Great Swamp; (4) Spear Street; (5) The Bowl; and (6) city-owned Calkins Land. These areas were selected based upon presence of natural land uses as compared to the remainder of the SEQ. Each study area is summarized below. For a more detailed description of the ecology of the SEQ study areas consult *Wildlife and Natural Communities Assessment of the South East Quadrant, South Burlington, Vermont*, prepared by Arrowwood Environmental LLC (July 16, 2004). A map of the SEQ is shown in Figure 1.

3.1 Muddy Brook Corridor – The Muddy Brook Corridor sits in the northeast corner of the SEQ and includes Muddy Brook and its surrounding wetlands, upland forests and old fields.

3.2 Muddy Brook Basin – The Muddy Brook Basin area is located in the southeastern corner of the SEQ. It consists of rural lands dominated by agriculture, small woodlots, the Muddy Brook and its wetlands.

3.3 The Great Swamp – The Great Swamp area is centered on a large hardwood swamp east of Spear Street. It also includes upland forests, shrubby old fields, wetlands and residential use areas that surround it.

3.4 Spear Street – This area is located east of Spear Street and west of the Great Swamp. The Spear Street area is a mix of small wooded areas, old fields, residential land uses, and shrubby and emergent wetlands.

3.5 The Bowl – The Bowl is located in the south-central portion of the SEQ and contains some of the greatest concentration of wetland and wildlife resources. It is the southern “wild” anchor for the connected lands that include the City-owned lands and the golf course to the north.

3.6 Calkins – Located roughly in the middle of the SEQ, this is largely city-owned land with patches of forest, wetlands, and old fields. This area has a mix of residential uses as well as open land uses such as a golf course and recreational trails.

Figure 1 – South Burlington’s Southeast Quadrant



0 Miles 1

 Study Area

 Wetlands

 Forested

Map Source: United States Geological Survey – Burlington 1:24,000 Quadrangle

4.0 Summary Discussion of Habitats and Breeding Bird Diversity in the SEQ

In general, the habitats of the Southeast Quadrant are not of a composition and extent to serve as critical breeding areas for state or federally listed threatened or endangered bird species. None was encountered during field investigations. Overall, the SEQ properties exhibit a mix of nesting, migrating and “visiting” bird species to be expected in these largely or somewhat disturbed and fragmented habitats. Nevertheless, certain notable bird species – termed “priority species” – were discovered during field investigations.

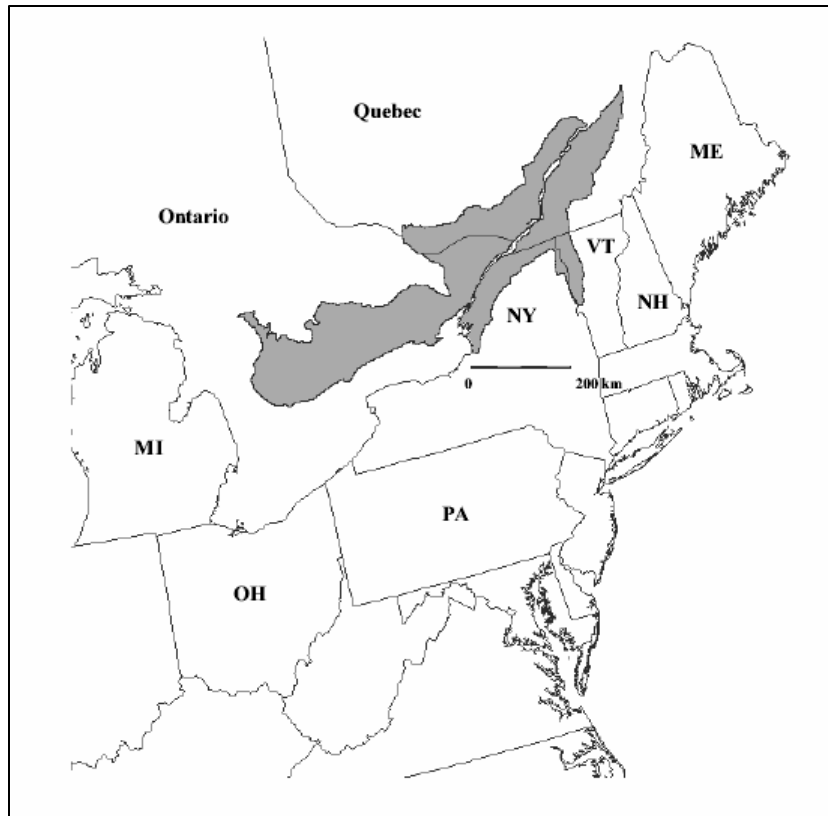
4.1 Summary of Natural Communities and Habitat Types

The SEQ properties lie in what is known for the purposes of bird conservation (Rosenberg, 2000) as the St. Lawrence Plain (Figure 2). Vast lowlands covering contiguous areas of New York, Vermont and Canada, the St. Lawrence Plain formerly included more forested land and forested wetlands. During the past two centuries, the rise of agriculture, as well as new commercial and residential development, have left the region with only isolated and fragmented forest habitats, some lacking their former tree diversity.

Nevertheless, the St. Lawrence Plain does include “agricultural grasslands” (actively farmed) and shrubby, early-successional fields (abandoned agricultural land), both of which host priority bird species that are threatened or in decline elsewhere in the continent.

Figure 2 – St. Lawrence Plain (shaded in gray)

A detailed review of natural communities within the SEQ was beyond the scope of this project. Such a review can be found in *Wildlife and Natural Communities Assessment of the South East Quadrant, South Burlington, Vermont* (Arrowwood Environmental, 2004). Instead, this investigation distinguished birds inhabiting various gross habitat structures among the SEQ properties. These include:



- **Wetlands** – Cattail and/or sedge marshes; overgrown or regenerating, wet fields; shrub swamps; and woodland (deciduous-dominated) swamps.
- **Woodlands** – Patches of hardwood, coniferous or mixed woodland communities, including clayplain forest, northern hardwoods, riparian zones, and juniper component communities.
- **Openings** – Agricultural grasslands, dry fields not involved in agriculture, and small woodland openings.
- **Ponds and Streams** – Scattered examples throughout the SEQ properties, with Muddy Brook forming the eastern boundary of this study’s survey area.

4.2 Summary of Breeding Bird Diversity

A diversity of habitats can harbor a diversity of bird species. This is certainly the case within the SEQ properties. The limited field investigation component of this study revealed a total of 75 bird species, the vast majority of which breed within the SEQ properties or depend on the properties as part of their ecology. These range from urban, non-native species such as House Sparrow (*Passer domesticus*) and European Starling (*Sternus vulgaris*) to common and widespread species such as Yellow Warbler (*Dendroica petechia*) and Savannah Sparrow (*Passerculus sandwichensis*) to uncommon or declining species such as Northern Harrier (*Circus cyaneus*) and Wood Thrush (*Catharus mustelinus*). An additional 20 species are expected to be breeding within the properties but were not encountered during field investigations. Another 20 species are less likely but possibly inhabiting SEQ properties. Details on these species are presented in the next section.

5.0 Birds of the Southeast Quadrant

Birds are creatures of habit – and of habitat. During the breeding season they tend to occupy predictable places. Great Blue Herons, because they feed largely on fish and amphibians, are found in or near wetlands, for example. Eastern Meadowlarks, as the name implies, are indeed birds of the open country, never to be found nesting in woods. Indeed, woods are the preferred habitat of the Wood Thrush.

But most bird species, unlike other wildlife found in the SEQ properties (with the notable exception of Monarchs and bats), are long-distance migrants. Some species inhabit and breed in South Burlington from spring through fall. Others remain in their habitats year-round. And still others only stop in the SEQ properties, mostly to rest and feed, along their migratory routes.

This study’s emphasis is on breeding birds – those strongly connected to the ecology of the SEQ and therefore more sensitive to forces shaping and affecting the landscape of South Burlington. But there is another reason to focus attention on breeding birds: the vernal synthesis of color, flight and song found in the lives of breeding birds is, for human residents of and visitors to the SEQ, among the most evident and cherished signs of nature. In short, a lot of people like birds. And in the populated region of South Burlington, human interactions with birds should figure to a degree in conservation planning.

Results from this investigation begin with a few bird lists¹. **Bird Species Encountered During SEQ Field Investigations** (Table 1) is simply a list of the 75 bird species Wings Environmental encountered during field work. Sixty-eight of these species can be reasonably assumed to breed in the SEQ. **Additional Bird Species Expected to Breed in the SEQ** (Table 2) lists 20 species not encountered during field investigations², but that are most likely breeding in the SEQ (based on habitat analysis and personal communications with other investigators). **Possible or Unlikely SEQ Breeding Species** (Table 3), includes 20 species – most of which were not encountered during field investigations – but that potentially breed or may breed in the SEQ. Finally, **Priority Bird Species** (Table 4) includes 34 rare, threatened, endangered, declining or otherwise significant species for the SEQ (seven of which were encountered during field work) that potentially warrant further investigation.

¹ Birds are listed in phylogenetic order according to the *American Ornithologists' Union Check-list of North American Birds, Seventh Edition* (revised), which is the official source on the taxonomy of birds found in North and Middle America, including adjacent islands.

² Certain bird species typically elude detection during a rapid field assessment of this nature. Because most of the field work was conducted around dawn, owls (nocturnal) and hawks and falcons (active later in the morning and day) were as a result largely undetected. Other species probably eluded detection owing to a lack of access to certain properties.

Table 1 – Bird Species Encountered During SEQ Field Investigations

Canada Goose	<i>Branta canadensis</i>	Common Yellowthroat	<i>Geothlypis trichas</i>
Wood Duck	<i>Aix sponsa</i>	Scarlet Tanager	<i>Piranga olivacea</i>
Mallard	<i>Anas platyrhynchos</i>	Eastern Towhee	<i>Pipilo erythrophthalmus</i>
Ruffed Grouse	<i>Bonasa umbellus</i>	Chipping Sparrow	<i>Spizella passerina</i>
Wild Turkey	<i>Meleagris gallopavo</i>	Clay-colored Sparrow	<i>Spizella pallida</i>
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	Field Sparrow	<i>Spizella pusilla</i>
Green Heron	<i>Butorides virescens</i>	Savannah Sparrow	<i>Passerculus sandwichensis</i>
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	Song Sparrow	<i>Melospiza melodia</i>
Northern Harrier	<i>Circus cyaneus</i>	Swamp Sparrow	<i>Melospiza georgiana</i>
Cooper's Hawk	<i>Accipiter cooperii</i>	White-throated Sparrow	<i>Zonotrichia albicollis</i>
Spotted Sandpiper	<i>Actitis macularia</i>	Northern Cardinal	<i>Cardinalis cardinalis</i>
American Woodcock	<i>Scolopax minor</i>	Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>
Ring-billed Gull	<i>Larus delawarensis</i>	Bobolink	<i>Dolichonyx oryzivorus</i>
Herring Gull	<i>Larus argentatis</i>	Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Rock Pigeon	<i>Columba livia</i>	Eastern Meadowlark	<i>Sturnella magna</i>
Mourning Dove	<i>Zenaida macroura</i>	Common Grackle	<i>Quiscalus quiscula</i>
Chimney Swift	<i>Chaetura pelagica</i>	Brown-headed Cowbird	<i>Molothrus ater</i>
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	Baltimore Oriole	<i>Icterus galbula</i>
Downy Woodpecker	<i>Picoides pubescens</i>	House Finch	<i>Carpodacus mexicanus</i>
Hairy Woodpecker	<i>Picoides villosus</i>	American Goldfinch	<i>Carduelis tristis</i>
Northern Flicker	<i>Colaptes auratus</i>	House Sparrow	<i>Passer domesticus</i>
Pileated Woodpecker	<i>Dryocopus pileatus</i>		
Eastern Wood-Pewee	<i>Contopus virens</i>		
Alder Flycatcher	<i>Empidonax alnorum</i>		
Willow Flycatcher	<i>Empidonax traillii</i>		
Eastern Phoebe	<i>Sayornis phoebe</i>		
Great Crested Flycatcher	<i>Myiarchus crinitus</i>		
Eastern Kingbird	<i>Tyrannus tyrannus</i>		
Warbling Vireo	<i>Vireo gilvus</i>		
Red-eyed Vireo	<i>Vireo olivaceus</i>		
Blue Jay	<i>Cyanocitta cristata</i>		
American Crow	<i>Corvus brachyrhynchos</i>		
Tree Swallow	<i>Tachycineta bicolor</i>		
Barn Swallow	<i>Hirundo rustica</i>		
Black-capped Chickadee	<i>Poecile atricapillus</i>		
Tufted Titmouse	<i>Baeolophus bicolor</i>		
Red-breasted Nuthatch	<i>Sitta canadensis</i>		
White-breasted Nuthatch	<i>Sitta carolinensis</i>		
House Wren	<i>Troglodytes aedon</i>		
Marsh Wren	<i>Cistothorus palustris</i>		
Veery	<i>Catharus fuscescens</i>		
Hermit Thrush	<i>Catharus guttatus</i>		
Wood Thrush	<i>Hylocichla mustelina</i>		
American Robin	<i>Turdus migratorius</i>		
Gray Catbird	<i>Dumetella carolinensis</i>		
Brown Thrasher	<i>Toxostoma rufum</i>		
European Starling	<i>Sturnus vulgaris</i>		
Cedar Waxwing	<i>Bombycilla cedrorum</i>		
Yellow Warbler	<i>Dendroica petechia</i>		
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>		
Pine Warbler	<i>Dendroica pinus</i>		
Blackpoll Warbler	<i>Dendroica striata</i>		
Black-and-white Warbler	<i>Mniotilta varia</i>		
Ovenbird	<i>Seiurus aurocapilla</i>		

Table 2 – Additional Bird Species Expected to Breed in the SEQ

American Bittern	<i>Botarus lentiginosus</i>	Least Flycatcher	<i>Empidonax minimus</i>
Red-tailed Hawk	<i>Buteo jamaicensis</i>	Common Raven	<i>Corvus corax</i>
American Kestrel	<i>Falco sparverius</i>	Brown Creeper	<i>Certhia americana</i>
Killdeer	<i>Charadrius vociferus</i>	Carolina Wren	<i>Thryothorus ludovicianus</i>
Wilson's Snipe	<i>Gallinago delicata</i>	Winter Wren	<i>Troglodytes troglodytes</i>
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	Eastern Bluebird	<i>Siala sialis</i>
Eastern Screech-Owl	<i>Megascops asio</i>	Northern Mockingbird	<i>Mimus polyglottos</i>
Great Horned Owl	<i>Bubo virginianus</i>	Black-throated Blue Warbler	<i>Dendroica caerulescens</i>
Barred Owl	<i>Strix varia</i>	Northern Waterthrush	<i>Seiurus noveboracensis</i>
Belted Kingfisher	<i>Ceryle alcyon</i>	Indigo Bunting	<i>Passerina cyanea</i>

Table 3 – Possible or Unlikely Breeding Species in the SEQ

American Black Duck	<i>Anas rubripes</i>	Horned Lark	<i>Eremophila alpestris</i>
Great Blue Heron	<i>Ardea herodias</i>	N. Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>
Turkey Vulture	<i>Cathartes aura</i>	Bank Swallow	<i>Riparia riparia</i>
Sharp-shinned Hawk	<i>Accipiter striatus</i>	Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
Cooper's Hawk	<i>Accipiter cooperii</i>	Winter Wren	<i>Troglodytes troglodytes</i>
Red-shouldered Hawk	<i>Buteo lineatus</i>	Blue-grey Gnatcatcher	<i>Polioptila caerulea</i>
Virginia Rail	<i>Rallus limicola</i>	Black-throated Blue Warbler	<i>Dendroica caerulescens</i>
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	Black-throated Green Warbler	<i>Dendroica virens</i>
Barred Owl	<i>Strix varia</i>	American Redstart	<i>Setophaga ruticilla</i>
Common Raven	<i>Corvus corax</i>	Northern Waterthrush	<i>Seiurus noveboracensis</i>

Table 4 – Priority Bird Species for the SEQ

American Black Duck	<i>Anas rubripes</i>	Whip-poor-will	<i>Caprimulgus vociferus</i>
Pied-billed Grebe	<i>Podilymbus podiceps</i>	Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>
American Bittern	<i>Botarus lentiginosus</i>	Eastern Wood-Pewee	<i>Contopus virens</i>
Least Bittern	<i>Ixobrychus exilis</i>	Loggerhead Shrike	<i>Lanius ludovicianus</i>
Osprey	<i>Pandion haliaetus</i>	Horned Lark	<i>Eremophila alpestris</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Sedge Wren	<i>Cistothorus platensis</i>
Northern Harrier	<i>Circus cyaneus</i>	Veery	<i>Catharus fuscescens</i>
Sharp-shinned Hawk	<i>Accipiter striatus</i>	Wood Thrush	<i>Hylocichla mustelina</i>
Northern Goshawk	<i>Accipiter gentilis</i>	Brown Thrasher	<i>Toxostoma rufum</i>
Red-shouldered Hawk	<i>Buteo lineatus</i>	Golden-winged Warbler	<i>Vermivora chrysoptera</i>
Sora	<i>Porzana carolina</i>	Black-throated Blue Warbler	<i>Dendroica caerulescens</i>
Upland Sandpiper	<i>Bartramia longicauda</i>	Cerulean Warbler	<i>Dendroica cerulea</i>
American Woodcock	<i>Scolopax minor</i>	Canada Warbler	<i>Wilsonia canadensis</i>
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	Vesper Sparrow	<i>Pooecetes gramineus</i>
Long-eared Owl	<i>Asio otus</i>	Grasshopper Sparrow	<i>Ammodramus savannarum</i>
Short-eared Owl	<i>Asio flammeus</i>	Henslow's Sparrow	<i>Ammodramus henslowii</i>
Common Nighthawk	<i>Chordeiles minor</i>	Bobolink	<i>Dolichonyx oryzivorus</i>

6.0 Species Accounts

Each of the six SEQ study areas has its own distinctive features and unique places. But each also shares some common habitat types. So, for the most part, many of the common birds encountered during field work were found, at varying abundance, in each study area. As a result, bird species are not reported here according to study area (that data can be found in Appendix B). Instead, Table 5, **Species Accounts**, presents a summary of the status and habitat requirements (Murin and Pfeiffer, 2002) of each bird species encountered or considered in this study.

Table 5 – Species Accounts

Species	Breeding Status ¹	Habitat and Ecology in SEQ (or Vermont)	Note
Geese and Swans			
Canada Goose	Possible	Occasional in SEQ. Breeding range in Vermont has been expanding.	
Ducks			
Wood Duck	Confirmed	Widespread cavity nester across Vermont, preferring deciduous swamps, but often visible nesting and swimming at water's edge in small ponds and marshes with brushy cover.	Female with young observed in Muddy Brook Basin – in wetland along the brook at Route 116.
American Black Duck	Possible	Nests sporadically across the state in wetlands with emergent vegetation and other cover.	Priority species.
Mallard	Breeding	Generally breeds in open water, wetlands, flooded fields, farmland, and public parks.	
Grebes			
Pied-billed Grebe	Remote	Nests sparingly in marshes	Priority species.
Cormorants			
Double-crested Cormorant	Visitor	One of Vermont's few nesting seabirds, now tending large Lake Champlain rookeries. Widespread but sparse on flat water elsewhere.	Does not nest or use SEQ properties, but was observed flying overhead.
Bitterns and Herons			
American Bittern	Expected	Widespread across Vermont in cattail marshes of any size.	Priority species.
Least Bittern	Remote	Highly elusive. Resides in cattail and sedge marshes.	Priority species.
Great Blue Heron	Possible	Vermont's most common and widespread wader, frequenting almost any shallow water.	
Green Heron	Breeding	Habitat includes swamps across much of Vermont.	Observed in marsh along Muddy Brook at Route 116.
Black-crowned Night Heron	Visitor	May nest in Vermont, but a colony on New York's Four Brothers Islands probably accounts for sightings in SEQ.	Five birds (four adults and one immature) observed in wetland along Muddy Brook at Route 116.
Vultures			
Turkey Vulture	Possible	Recently expanded into Vermont, nesting around rocky slopes and cliffs. Feeds over open country across the state.	

¹ With some exceptions, birds observed in their proper habitat were assumed to be breeding.

Table 5 – continued

Hawks and Falcons			
Osprey	Possible	Recovering and increasing in Vermont.	Priority species.
Bald Eagle	Remote	Flybys have been sighted in SEQ.	Priority species.
Northern Harrier	Breeding	Widespread but sparse nester in suitable grassland habitat and marshes, largely in the Champlain Valley and Northeast Kingdom.	Pair observed in Great Swamp study area, with female carrying food. Priority species.
Sharp-shinned Hawk	Possible	Widespread in low numbers during nesting season in mixed woods with dense evergreen cover.	Priority species.
Cooper's Hawk	Possible	Less common than Sharp-shinned Hawk throughout the year, and more inclined to nest in deciduous woods.	Priority species.
Red-shouldered Hawk	Possible	Nests sparingly in deciduous or mixed woods near wetlands across Vermont.	Priority species.
Red-tailed Hawk	Expected	Vermont's most evident hawk throughout the year. Nests primarily in open and semi-open country across Vermont.	
American Kestrel	Expected	Nests in tree cavities adjacent to open country across Vermont, often seen perched on power lines.	
Grouse and Relatives			
Ruffed Grouse	Confirmed	Prefers mixed or deciduous woods, often with birch or aspen and dense undergrowth.	Female with young observed in The Bowl.
Wild Turkey	Breeding	Extirpated with the extensive logging of Vermont in the 1800s. First reintroduced in 1969 and 1970 in the Taconics, now widespread in deciduous woods.	
Rails and Relatives			
Virginia Rail	Possible	Vermont's most common and vocal rail nests widely in cattail marshes.	
Sora	Possible	Less common and harder to see than Virginia Rail in the same cattail habitat. Sometimes forages along open water at marsh's edge.	Unlikely in SEQ. Priority species.
Shorebirds			
Killdeer	Expected	Generally nests in open places with sparse vegetation, including gravel driveways and construction sites. Often seen near water or in open fields.	
Spotted Sandpiper	Expected	Prefers shorelines of lakes, ponds, and larger streams.	
Upland Sandpiper	Possible	Threatened in Vermont, its numbers appear to be dwindling due to housing and commercial development in its grassland habitat. Nests sparsely in the Champlain Valley and other scattered locations.	Priority species. Low probability of nesting.
Wilson's Snipe	Expected	Nests in wetlands, especially with shrubby vegetation.	
American Woodcock	Breeding	Found in wet clearings with nearby thickets or wet woods.	Priority species.
Gulls			
Ring-billed Gull	Visitor	First reported to have bred in Vermont in the mid-1900s. The majority now nest on Young Island in Grand Isle and New York's Four Brothers Islands.	Does not nest in SEQ but was observed flying overhead.
Herring Gull	Visitor	Most nest on Young Island in Grand Isle and occasionally other smaller islands on Lake Champlain.	Does not nest in SEQ but was observed flying overhead.

Table 5 – continued

Doves and Cuckoos			
Rock Dove	Breeding	Found throughout the state, usually not far from large structures such as barns, bridges, or commercial buildings.	
Mourning Dove	Breeding	Widespread nester in a variety of open or semi-open habitats. A member of the suburban ecosystem. Frequents bird feeders in winter.	
Black-billed Cuckoo	Expected	Widespread but spotty, preferring to nest in shrubby woodlands, edges, or overgrown pastures. Abundance may correlate with caterpillar outbreaks, including eastern tent caterpillar.	Sporadic nester. Priority species.
Yellow-billed Cuckoo	Possible	Scattered mostly in lowland areas of southern Vermont and northward into the Champlain Valley. Prefers thickets and other dense vegetation in either open woods, riparian zones, or overgrown fields.	Sporadic nester (and less common than Black-billed Cuckoo).
Owls			
Barn Owl	Remote	So rare and scattered are encounters with this species that little is known about its status in Vermont	Highly unlikely in SEQ.
Eastern Screech-Owl	Expected	A cavity nester limited largely to the deciduous lowlands of the Champlain Valley. Sometimes at home in rural residential areas.	
Great Horned Owl	Expected	The most widespread owl on the continent is more common in the Champlain lowlands and across southern Vermont; scattered elsewhere. Often nests in mature white pines in riparian areas and woodlands adjacent to openings for hunting.	
Long-eared Owl	Remote	Highly secretive and nocturnal, it prefers stands of conifers near openings for nesting and communal winter roosts. Little is known about its status, but most sightings are from the Champlain Valley.	Priority species.
Short-eared Owl	Remote	Floats low over grasslands, primarily in the Champlain Valley, often at dusk.	Priority species.
Nightjars			
Common Nighthawk	Possible	Confined largely to cities, where flat-topped buildings simulate flat, open gravel "habitat" for nesting.	Priority species.
Whip-poor-will	Possible	Prefers dry deciduous or mixed woods near openings. Numbers in decline.	Priority species.
Swifts and Hummingbirds			
Chimney Swift	Expected	Seen singly or in large, swirling colonies across the state, often in cities where chimneys provide suitable breeding "habitat." Otherwise, prefers tree cavities for nest sites.	
Ruby-throated Hummingbird	Breeding	Widespread in woodlands and residential settings with suitable nectar sources, notably red and orange flowers such as bee balm and jewelweed ("touch-me-not").	
Kingfisher & Woodpeckers			
Belted Kingfisher	Expected	Found throughout the state near flat water with adjacent trees or utility wires for perches. Nests in burrows, sometimes within Bank Swallow colonies.	

Table 5 – continued

Red-headed Woodpecker	Remote	Only known to nest in Bridport in recent years, but also seen at scattered locations around the state, mostly in the Champlain Valley.	Priority species.
Downy Woodpecker	Breeding	One of Vermont's most widespread birds, it nests in deciduous woods, mixed woods, or most any other place with trees.	
Hairy Woodpecker	Breeding	This widely distributed relative to Downy Woodpecker requires more extensive woodlands of all kinds for nesting.	
Northern Flicker	Breeding	Nests across Vermont in open country at deciduous forest edges or in small woodlots, orchards, and rural settings. Often feeds on the ground.	
Pileated Woodpecker	Breeding	Scattered in varied forest types with at least some mature trees, its presence is often revealed by large oval cavities formed during excavation for insects.	
Flycatchers			
Eastern Wood-Pewee	Breeding	Prefers deciduous or mixed woods, often with open understories.	Priority species.
Alder Flycatcher	Breeding	Common in alder swamps or similar brushy habitat in or along water in SEQ.	
Willow Flycatcher	Breeding	Common in open, brushy fields and edges of SEQ, occasionally near water but usually higher and drier than the habitat of its close relative, Alder Flycatcher.	
Least Flycatcher	Expected	Prefers a variety of deciduous habitats or mixed woods, including second growth.	
Eastern Phoebe	Breeding	Found nesting on homes, barns, wood sheds, bridges, and other structures. Prefers edges and open situations. Occurs throughout Vermont.	
Great Crested Flycatcher	Breeding	Prefers mature deciduous woods with cavities for nest sites, but uses younger woods as well in the SEQ.	
Eastern Kingbird	Breeding	Conspicuous in open country across Vermont and the SEQ.	
Shrikes			
Loggerhead Shrike	Remote	Endangered in Vermont, last known to nest in the late 1970s. This dwindling hunter prefers grasslands with shrubs and small trees for perches and caching prey. Recent sightings have been restricted to the Champlain Valley.	Once nesting in Vermont, now extirpated from much of its range. Priority species.
Vireos			
Warbling Vireo	Breeding	Sparse in SEQ. Normally found in stands of mature or middle-aged deciduous woods along lakes, ponds, and slow rivers.	
Red-eyed Vireo	Breeding	Widespread in deciduous and mixed woods of varied class and age. Often high in the canopy and hard to see.	
Jays, Crows, and Ravens			
Blue Jay	Breeding	One of the most widespread year-round Vermont residents. Found in most habitats of the SEQ.	

Table 5 – continued

American Crow	Breeding	Widespread across the SEQ, although less common in larger, unbroken forests.	
Common Raven	Possible	Has repopulated Vermont during the past few decades. Now found statewide, more commonly in large unbroken forests at higher altitudes and in the Northeast Kingdom.	
Larks and Swallows			
Horned Lark	Possible	Nests in expansive grasslands with some bare ground nearby, mostly in the Champlain Valley. Frequents recently plowed or harrowed fields.	Priority species.
Tree Swallow	Breeding	A cavity nester near open areas or water.	
Northern Rough-winged Swallow	Possible	The most solitary of the swallows is well distributed across Vermont, nesting near water in pre-existing burrows and a variety of crevices.	
Bank Swallow	Possible	A colonial nester in bare river banks, sand deposits, or town sand piles.	
Cliff Swallow	Possible	Almost haphazard in its distribution; turns up across Vermont colonizing farms, bridges, commercial buildings, maybe even cliffs. Can nest at a site one year and be gone the next.	
Barn Swallow	Breeding	Nests wherever it can find barns and other outbuildings, most often in agricultural settings. Will also colonize porches and garages at rural homes and the undersides of bridges.	
Chickadee, Titmouse, Nuthatches, and Creeper			
Black-capped Chickadee	Breeding	Perhaps the most evenly distributed year-round bird in the state, less so in the SEQ.	
Tufted Titmouse	Breeding	A cavity nester expanding its range northward into lowland deciduous and mixed woods. Has an aversion to deep woods and a preference for suburbia, city parks, and wooded residential areas.	
Red-breasted Nuthatch	Breeding	Widespread in coniferous and mixed woods across Vermont, a bit less common in the SEQ.	
White-breasted Nuthatch	Breeding	Prefers deciduous or mixed woods, often inhabiting forest edges, small patches of trees, or residential areas.	
Brown Creeper	Breeding	A cosmopolitan resident of various mature forest types – deciduous, mixed, and coniferous woods across the state. Uncommon in SEQ.	
Wrens and Gnatcatcher			
Carolina Wren	Expected	Prefers tangled, scrubby, brushy vegetation. More dependable toward the southern part of Vermont, but has been nesting northward in recent years.	A rare and sporadic nester.
House Wren	Breeding	Common in deciduous woods with low, scrubby understory in the SEQ, but has adapted well to backyard living.	
Sedge Wren	Possible	Endangered in Vermont. Most reports of this rarity are from the wet fields and swales of the Champlain Valley.	Rare breeder. Priority species.

Table 5 – continued

Marsh Wren	Breeding	Prefers cattail marshes around Vermont. Uncommon to rare in the SEQ.	More than one male found in the wetland along Muddy Brook at Route 116.
Blue-gray Gnatcatcher	Expected	Has expanded northward into Vermont's floodplain forests and other wet, wooded situations, primarily in the Champlain Valley and Connecticut River Valley.	
Thrushes			
Eastern Bluebird	Breeding	Widespread in open and semi-open areas, but apparently somewhat scarce in SEQ.	
Veery	Breeding	Prefers deciduous and mixed woods, at times favoring damp sites.	Priority species.
Hermit Thrush	Breeding	Uncommon in the SEQ; prefers mixed or coniferous woods, often at higher elevations, throughout the state	
Wood Thrush	Breeding	Rare to uncommon in deciduous or mixed woods, especially damp areas, in SEQ.	Declining across much of its range in the Northeast. Priority species.
American Robin	Breeding	Widespread and versatile, this thrush prefers dense conifers for nesting but adapts to whatever is available, including buildings.	
Mimics and Starlings			
Gray Catbird	Breeding	Well distributed throughout the SEQ in thick, brushy habitats, including deciduous woodland edges.	
Northern Mockingbird	Expected	Prefers thickets and other shrubby growths in open and semi-open country, primarily in the Connecticut River and Champlain Valleys.	
Brown Thrasher	Breeding	Thinly distributed in shrubby areas of open and semi-open areas and thick undergrowth in deciduous woodland edges.	Priority species.
European Starling	Breeding	This cavity-nester prefers open and semi-open areas, including farmland and parks.	
Waxwings			
Cedar Waxwing	Breeding	Widespread inhabitant of various woodland and open habitats, showing some preference for riparian and other wet areas.	
Warblers and Tanagers			
Blue-winged Warbler	Possible	Nests in fields overgrown with shrubs and small trees, and along shrubby wetlands, yet limited in Vermont, which is at the northern edge of its range. Most sightings are from lowland areas of southern Vermont.	
Golden-winged Warbler	Possible	Similar to Blue-winged Warbler in its habitat choices. The two species readily hybridize (interbreed). Most reports are from lower elevations of western Vermont except the Champlain Islands.	An unlikely breeder that warrants further attention. Priority species.
Yellow Warbler	Breeding	Widespread in the SEQ in or near shrubby wetlands and wet, brushy, overgrown fields.	

Table 5 – continued

Chestnut-sided Warbler	Breeding	Found in brushy growth at woodland edges and clearings. One of the few warblers to benefit from forest fragmentation.	
Black-throated Blue Warbler	Expected	Nests in shrub layers in deciduous and mixed woods across much of Vermont; less common in the Champlain Valley.	
Black-throated Green Warbler	Possible	Prefers to nest in mixed woods across the state, less commonly in the Champlain Valley. Widely distributed during migration.	
Pine Warbler	Breeding	Found occasionally in the SEQ in mature stands of white pine. Unlike the breeding distribution of many Vermont warblers, this bird prefers the Champlain and Connecticut River Valleys.	Surprisingly scarce in SEQ.
Prairie Warbler	Possible	Restricted to southern Vermont and southern sections of the Connecticut River and Champlain Valleys. Prefers fields overgrown with brush, shrubs, red cedar, or other small trees.	Unlikely breeder.
Blackpoll Warbler	Visitor	A common nester in dense spruce and fir at high elevations in the Green Mountains, less so in the foothills and the Northeast Kingdom.	A single singing male – clearly a migrant – was found in the SEQ.
Cerulean Warbler	Remote	Prefers to nest in mature, deciduous woods, often along swamps and floodplains. Still nests in Vermont but rarely seen; most sightings have been from the Champlain Valley and the Rutland region.	Proposed for protection under federal Endangered Species Act. Unlikely SEQ breeder. Priority species.
Black-and-white Warbler	Breeding	Found occasionally in mixed or deciduous woods.	
American Redstart	Breeding	Widespread in a variety of woods, preferring deciduous growth, including shrubby successional habitats, sometimes near water.	
Ovenbird	Breeding	One of Vermont's most widely distributed woodland birds; prefers deciduous woods in SEQ but can be found in mixed woods as well.	
Common Yellowthroat	Breeding	Widespread in shrubby wetlands and wet, overgrown fields and edges of the SEQ.	
Canada Warbler	Possible	Prefers shrubby deciduous growth, sometimes at edges. Widespread during migration but less common in the Champlain Valley during the breeding season.	Priority species.
Scarlet Tanager	Breeding	Widespread across Vermont, preferring mature deciduous or mixed woods, but uncommon in the SEQ.	
Sparrows and Relatives			
Eastern Towhee	Breeding	Sporadic to rare in dense brushy edges and thickets of the SEQ.	
Chipping Sparrow	Breeding	Widespread inhabitant of openings with scattered conifers for nest trees. Prefers suburban lawns, parks, and certain grassy woodland openings.	

Table 5 – continued

Clay-colored Sparrow	Breeding	A rare breeder and migrant preferring brushy or overgrown fields with scattered trees. Recently discovered nesting in Grand Isle; only sporadically seen elsewhere around the state.	Breeding confirmed in Calkins property, and counter-singing males were encountered in the Retrovest property.
Field Sparrow	Breeding	Prefers weedy, overgrown fields, mostly across southern Vermont and dropping in abundance northward.	Sparsely distributed in the SEQ.
Vesper Sparrow	Possible	Prefers fields with hedgerows and young trees for singing.	Priority species.
Savannah Sparrow	Breeding	Common in the SEQ. Frequents large hayfields and pastures.	
Grasshopper Sparrow	Possible	Threatened in Vermont; prefers fields with short or sparse grass and scattered patches of clover or similar clumps of taller growth. Loss of agricultural land threatens this species.	Threatened in Vermont. Priority species.
Henslow's Sparrow	Remote	A rare grassland species now extirpated from Vermont and unlikely to breed in the state.	Endangered in Vermont. Priority species.
Song Sparrow	Breeding	Nests in overgrown fields, hedgerows, residential areas, and at edges of wetlands, forests, and waterways – nearly anywhere but deep woods.	
Swamp Sparrow	Breeding	Encountered in cattail marshes (even small ones) and their brushy edges. Occasional in other wet, shrubby situations.	
White-throated Sparrow	Breeding	Uncommon to rare in the SEQ. Nests across Vermont in mixed or coniferous woods with shrubby undergrowth.	
Cardinals and Buntings			
Northern Cardinal	Breeding	Nests in dense, tangled shrubs, but is quite obvious in hedgerows, edges, and suburban and urban settings in the SEQ.	
Rose-breasted Grosbeak	Breeding	Nests in mature deciduous woods and less commonly in mixed woods of the SEQ.	
Indigo Bunting	Breeding	Prefers fields in the early stages of reforestation across Vermont.	
Blackbirds			
Bobolink	Breeding	A widespread but uncommon resident in the SEQ. Loss of habitat and early cutting of hay threaten this species.	A grassland priority species.
Red-winged Blackbird	Breeding	Common in wetlands and other open areas across the SEQ.	
Eastern Meadowlark	Breeding	Scattered in grasslands and farm country in the SEQ. Like other grassland species, under pressure from the conversion of farmland to housing.	
Common Grackle	Breeding	Widespread in open country, wetlands, or woodlands near water in the SEQ.	

Table 5 – continued

Brown-headed Cowbird	Breeding	Widespread in a variety of open and semi-open habitats, often at forest edges. Increased forest fragmentation has helped this species, which lay eggs in the nests of other songbirds.	
Baltimore Oriole	Breeding	Occasional in semi-open country and riparian woods in the SEQ.	
Finches			
House Finch	Breeding	First recorded in 1968, nearly thirty years after its importation to the eastern United States. Found statewide, though usually not far from its namesake and people.	
American Goldfinch	Breeding	Widespread in open and semi-open country of SEQ, particularly near overgrown fields with thistle, dandelion, goldenrod, and other food sources.	
House Sparrow	Breeding	As the name implies, rarely far from humans and homes. Particularly fond of urban settings and working farms.	

7.0 Priority Bird Species and their Habitats

From a bird's-eye-view, South Burlington's Southeastern Quadrant is a patchwork of attractive habitats: grassland areas associated with agriculture, overgrown fields (often associated with former farmland), forested areas, wetlands, streams and small ponds. Of course, the region has changed in the past two centuries. The pre-settlement landscape was dominated by forests, with grasslands and other openings. Then came settlers, their saws, and the dawn of agriculture in Vermont. It had huge ramifications for birds.

7.1 Grasslands

The rise of agriculture, particularly in the lowlands of the Champlain Valley, opened the Vermont landscape not only to sheep and cows, but to a suite of bird species that are now endangered, threatened, declining or extinct in many regions of the continent. These include Upland Sandpiper, Bobolink, Northern Harrier, Sedge Wren, and Henslow's Sparrow, to name only a few. Although once largely forested, the St. Lawrence Plain now represents the largest contiguous area of open grasslands and wet shrublands in eastern Canada and the northeastern United States (Rosenberg, 2000). To be sure, forested areas are critical to many bird species, including many at risk on the continent and in Vermont (some even in the SEQ). But owing to widespread threats to grasslands and their avian inhabitants, agricultural grasslands should have the highest conservation priority in the SEQ. High-quality grassland habitat is indeed scarce in the SEQ and was somewhat inaccessible during field investigations owing to a lack of permission from landowners to survey. Table 6 lists high-priority grassland bird species.

Table 6 – Priority Grassland Species

Species	Breeding Status/Probability in SEQ			
	Breeding ¹	Expected ²	Possible ³	Remote ⁴
Northern Harrier	X			
Upland Sandpiper			X	
Short-eared Owl				X
Loggerhead Shrike				X ⁵
Horned Lark			X	
Sedge Wren			X	
Vesper Sparrow			X	
Grasshopper Sparrow			X	
Henslow's Sparrow				X ⁵
Bobolink	X			

¹ A bird encountered in its proper habitat is considered to be breeding.

² Not encountered but nevertheless expected to be breeding

³ A species less likely to be breeding.

⁴ Rare or unlikely to be breeding.

⁵ Extirpated from Vermont.

7.2 Shrublands

The abandonment of farmland (undesirable for grassland bird species), often gives rise to early successional shrubland habitat – what in the SEQ might commonly be called wet, overgrown fields. Ironically, the loss of agriculture grasslands to these shrubby fields benefits a second tier of bird species of high conservation priority. These include Golden-winged Warbler, American Woodcock, Brown Thrasher and Common Nighthawk. Some of this habitat qualifies as seasonal or permanent wetlands, which are important to

priority waterfowl, such as American Black Duck, and other species, such as American Bittern. As a result, these early successional habitats are a second-tier conservation priority in the SEQ. Table 7 lists priority shrubland bird species encountered or suspected as being present in the SEQ.

Table 7 – Priority Shrubland Species

Species	Breeding Status/Probability in SEQ			
	Breeding ¹	Expected ²	Possible ³	Remote ⁴
American Woodcock	X			
Common Nighthawk			X	
Brown Thrasher	X			
Golden-winged Warbler			X	

¹ A bird encountered in its proper habitat is considered to be breeding.

² Not encountered but nevertheless expected to be breeding

³ A species less likely to be breeding.

⁴ Rare or unlikely to be breeding.

7.3 Forests

Remnant or regenerating riparian or deciduous woodlands offer habitat for certain species that, while not as critical as grassland and shrubland species in the SEQ, are nevertheless of conservation concern. These include Eastern Wood-pewee, Wood Thrush, and Veery, all of which were encountered in the SEQ, among others. Additionally, one species of high and immediate conservation priority, Cerulean Warbler, is a possible inhabitant of the SEQ as its riparian areas mature. Accordingly, deciduous riparian and other deciduous or mixed forests represent a third-tier conservation priority in the SEQ. Table 8 lists priority forest bird species encountered or suspected as being present in the SEQ.

Table 8 – Priority Forest Species

Species	Breeding Status/Probability in SEQ			
	Breeding ¹	Expected ²	Possible ³	Remote ⁴
Sharp-shinned Hawk			X	
Cooper's Hawk			X	
Northern Goshawk			X	
Red-shouldered Hawk			X	
Black-billed Cuckoo		X		
Long-eared Owl			X	
Whip-poor-will			X	
Red-headed Woodpecker				X
Eastern Wood-Pewee	X			
Veery	X			
Wood Thrush	X			
Black-throated Blue Warbler		X		
Cerulean Warbler				X
Canada Warbler			X	

¹ A bird encountered in its proper habitat is considered to be breeding.

² Not encountered but nevertheless expected to be breeding

³ A species less likely to be breeding.

⁴ Rare or unlikely to be breeding.

7.4 Other Aquatic Habitats

Finally, wetlands are a threatened and vanishing component of the national landscape. They are critical to wildlife, including such bird species as American Black Duck, American Bittern, and Northern Harrier. Almost by default, they are of conservation priority. Ponds and streams of are of similar high conservation priority in the SEQ. Table 9 lists high-priority wetland or aquatic bird species encountered or suspected as being present in the SEQ.

Table 9 – Priority Aquatic Species

Species	Breeding Status/Probability in SEQ			
	Breeding ¹	Expected ²	Possible ³	Remote ⁴
American Black Duck			X	
Pied-billed Grebe				X
American Bittern		X		
Least Bittern				X
Osprey			X	
Bald Eagle				X
Northern Harrier	X			
Sora				X
Short-eared Owl				X

¹ A bird encountered in its proper habitat is considered to be breeding.

² Not encountered but nevertheless expected to be breeding

³ A species less likely to be breeding.

⁴ Rare or unlikely to be breeding.

8.0 Planning Recommendations

Birds constitute only one group of organisms among the wildlife in the SEQ. They coexist with other wildlife ranging from beavers to butterflies. It should be pointed out, however, that the conservation of one group of organisms isn't always consistent with the conservation of other groups. Cutting trees to create habitat for white-tailed deer or eastern cottontail rabbits, for example, is inconsistent with the protecting of habitat for woodland warblers and other songbirds.

Nevertheless, the wildlife and natural community conservation strategies outlined in Arrowwood Environmental's principle assessment of the SEQ, *Wildlife and Natural Communities Assessment of the South East Quadrant, South Burlington, Vermont*, are consistent with conservation goals for birds in the SEQ (and will not be repeated here in detail). Instead, planning recommendations in this section will augment those in the Arrowwood study.

In general, bird conservation strategies in the SEQ should strike a balance that favors the establishment or preservation of agricultural and other grasslands and, to a lesser extent, shrublands. Wetlands and woodlands, particularly wooded riparian areas, also have a significant role in the ecology of birds in the SEQ. Yet most of the priority species in the SEQ are associated with grasslands and early successional shrubland habitats. Another overriding goal worthy of consideration would be to arrest or reverse declines in existing species of concern on SEQ and perhaps to reestablish some species. Accordingly, with the Arrowwood study as the prime guidance, below are additional conservation strategies.

8.1 Grasslands

Grasslands represent the highest avian conservation priority in the SEQ. Unfortunately, grassland habitat supporting or potentially supporting many high priority bird species is severely limited in the SEQ. Moreover, the fate of grasslands depends to a large extent on national and even global forces buffeting Vermont's agricultural sector, notably dairy farming. As a result, while grasslands are of the highest conservation priority related to the avifauna of the SEQ, their size may be so limited – and the City's options relatively scarce – that conservation strategies are a challenge. Nevertheless, to the extent possible, and where appropriate, the City of South Burlington should¹:

- Encourage late or mid-summer haying in order to avert or minimize loss of nests, nestlings and fledgling grassland bird species, particularly Savannah Sparrow, Eastern Meadowlark and Bobolink. Establishment of late, warm-season grasses as a hay crop may appeal to hobby farmers and absentee landowners (who sometimes rely on rented or borrowed equipment).
- Reclaim abandoned fields as grasslands through brush removal and prescribed grazing.
- Determine the viability of converting portions of the city-owned Calkins area to grasslands (composed of late, cool-season grasses), and whether they could support priority species such as Sedge Wren, Grasshopper Sparrow as well as higher numbers of Bobolinks and Eastern Meadowlarks.
- Monitor for Northern Harrier nesting each spring and, if necessary, cordon and protect nest sites from unwitting intrusions by golfers or other engaged in recreation (i.e. jogging, mountain biking, etc).

8.2 Early Successional Shrub Habitats

Farmland abandonment is most likely the greatest source of early successional shrub habitats in the SEQ. While grasslands remain a higher conservation priority, shrublands do support a few species of concern, including American Woodcock and Golden-winged Warbler (and perhaps some waterfowl, including American Black Duck). Because game and non-game species share these habitats, their conservation may enjoy a broad public constituency composed of wildlife watchers and hunters.

However, not all shrublands are created equally. For example, abandoned farmland progressing to dense, uniform growth of woody saplings (i.e. speckled alder, birch, etc.) may not support Golden-winged Warblers, which require herbaceous growth along with patches of woody shrubs. In any event, the conservation and management of SEQ shrublands would first require a landscape-level analysis as to their suitability for priority nesting species.

8.3 Riparian and Forested Areas

While forested areas are of high conservation value for other wildlife species, they are somewhat less critical to priority bird species in the SEQ. However, because avian

¹ Some recommendations adapted from Rosenberg, 2000.

conservation options are somewhat limited in grasslands, forests are where management strategies can perhaps have a more significant impacts on bird populations in the SEQ.

While forest cover in the SEQ is highly fragmented and reduced from its original extent, it does host certain priority species worthy of protection, including Eastern Wood-pewee, Veery, Wood Thrush and perhaps Black-billed Cuckoo and Cooper's Hawk, among others. Patches of floodplain and hardwood forest can also support one of the highest-priority nesting songbirds in the Eastern United States – Cerulean Warbler. Although this species was not encountered in the SEQ during field studies, it does nest in the northern Champlain Valley and is certainly possible in the SEQ. Finally, remnant forest patches are critical habitat to neotropical migrant songbirds that are transient through the SEQ in spring and fall. Accordingly, the conservation recommendations outlined in the Arrowwood report are consistent with sound strategies for woodland bird species in the SEQ. Forested areas of the highest priority for priority bird species are Cheese Factory Swamp and the woodlands at the western edge of The Bowl, Great Swamp, Van Sicklen Woods in the Muddy Brook Corridor, and wooded areas in the central portion of Calkins.

8.4 Wetlands

Beyond birds, wetlands are almost always of high conservation priority for huge variety of reasons. The SEQ's marshes tend to be too small to support a suite of bird species encountered in marshes of greater size elsewhere in the Champlain Valley. Nevertheless, a priority grassland species, Northern Harrier, may depend on adjacent marshes for prey species. Another priority wetland species, American Black Duck, was not encountered during field investigations but may indeed nest in the SEQ.

The marshes at the intersection of Route 116 and Muddy Brook (the "Muddy Brook Marshes") are among the most significant for wetland birds in the SEQ. Marsh Wren, often associated with wetlands of greater size, most likely nests there. Black-crowned Night-Heron, uncommon in Vermont, feeds in these marshes. It is quite likely that other notable bird species inhabit the wetlands. However, lack of access precluded a complete investigation of this area. One additional recommendation to the Arrowwood report would be to perform a fluvial geomorphic assessment of existing or planned culverts along Muddy Brook – with wetlands, wildlife and sound hydrology as guiding concerns.

9.0 Conclusion

Birds are among the most visible and vocal members of the community of wildlife occupying South Burlington's Southeast Quadrant. And Vermonters enjoy birds and other "watchable wildlife" at a participation rate higher than that in all other states (U.S. Department of the Interior, 2001). Wildlife studies sometimes focus too much attention on avian habitat requirements. Yet South Burlington is to be congratulated for its broad view of wildlife and natural communities as embodied in the Arrowwood Environmental report.

To be sure, land-use decisions must balance the demands South Burlington's residents and prospective residents with the spectrum of natural communities and their inhabitants – from sedges to salamanders to sparrows. Yet birds, perhaps owing to their synthesis of

color, flight and song, are the lens through which so many of us view the state of our environment. Indeed, they are fairly good indicators of environmental quality. And it is reassuring to note that the recommendations in the Arrowwood report are consistent with the habitat requirements of birds in the SEQ.

Yet South Burlington should note that maximizing species diversity isn't always the overriding goal in wildlife management. A better goal would be to maximize "biological integrity" – in this case, to realize which habitats and wildlife are exceptional and irreplaceable in South Burlington, and to take concrete steps toward preserving or restoring them. In the case of birds, with grassland comprising the highest priority, it may very well be the case that the available habitat potential is not of the size to support the highest priority species, such as Henslow's Sparrow. But the SEQ does indeed host other priority species, such as Northern Harrier, Bobolink, and Wood Thrush, which most certainly warrant attention and protection. And it is certainly possible that additional priority species could occupy an SEQ whose future is subject to wise land-use and wildlife planning.

One next step would be to evaluate certain properties within the SEQ for their potential to either be retained as critical wildlife habitats or restored for the benefits of key priority species. In the case of birds, South Burlington has a skilled and dedicated corps of birders and no doubt a great number of casual birdwatchers as well. Their participation in any future wildlife planning in the SEQ would be prudent and highly beneficial to the city.

Appendix A

Site Visits

(Printout from a Microsoft Access database.)

Visit	Date	Study Site	Study Area	Lat	Long	Elevation	Start Time	End Time	Start Temp	End Temp	Wind	Cloud Cover	Distance	Note
1	6/3/2004	Calkins	Calkins	44.44129	73.17428	138	4:40	7:45	44	58	calm	50-25	3.5 miles	road noise interfered with ability to hear distant birds at North Swamp, but probably did not affect results
2	6/3/2004	Nowland Farm Road	Great Swamp	44.42879	73.18262	116	8:10	8:20	60	60	calm	75		quick stop
3	6/9/2004	Retrovest	Spear Street	44.41944	73/19618	116	4:35	6:10	65	67	moderate	10	2.2 miles	humid
4	6/10/2004	Bandel Northbound	The Bowl	44.41059	73.16480	129	4:55	6:55	54	58	windy	40	1.5 miles	gradual clearing during morning walk from Knoland Farm Road (east of Dorset) south toward Great Swamp
5	6/10/2004	Great Swamp	Great Swamp	44.42848	73.18467	115	7:15	8:05	60	60	moderate	40	1.3 miles	
6	6/16/2004	Muddy Brook North	Muddy Brook Corridor	44.42805	73.14648	101	5:18	6:32			calm	10	0.75 miles	walk north from Van Sicklen Road near Muddy Brook
7	6/16/2004	Muddy Book & Route 116	Muddy Brook Basin	44.41023	73.15212	97	6:55	7:30			calm	10		quick stop at wetland
8	6/16/2004	Small Pond	Muddy Brook Corridor	44.43923	73.14836	112	7:55	8:20						

Appendix B

Field Data

Bird encounters from field notes entered into a Microsoft Access database.
See Appendix A for details on each site visit.

SEQ Birds					
Visit	Common Name	Lat	Long	Elevation	Comment
1	American Robin				
1	Song Sparrow				
1	Common Yellowthroat				
1	Savannah Sparrow				
1	Tree Swallow				
1	Gray Catbird				
1	Northern Cardinal				
1	Chestnut-sided Warbler				
1	Willow Flycatcher				
1	Eastern Kingbird				
1	Eastern Meadowlark	44.44129	73.17428		
1	Red-winged Blackbird				
1	Yellow Warbler				
1	Herring Gull				
1	Ring-billed Gull				
1	Northern Harrier				male; south of Dorset Street parking
1	Chipping Sparrow				
1	Eastern Phoebe				
1	European Starling				
1	House Finch				
1	Mourning Dove				
1	Common Grackle				
1	Canada Goose				
1	White-breasted Nuthatch				
1	House Wren				
1	Black-capped Chickadee				
1	Baltimore Oriole	44.43319	73.16716		male; only individual encountered
1	American Goldfinch				
1	Bobolink	44.43040	73.16585		two males
1	Blackpoll Warbler				migrant
1	Warbling Vireo				just east of Calkins
1	American Crow				
1	Brown-headed Cowbird				
1	American Goldfinch				
1	Blue Jay				
1	Hairy Woodpecker				
1	Cedar Waxwing				
1	Wood Thrush	44.44194	73.16702	100	
1	Red-eyed Vireo				
1	White-throated Sparrow				
1	Black-crowned Night-Heron				flyover going NW, north of 44.44194 x 73.16702
1	Alder Flycatcher	44.44439	73.16634		

SEQ Birds					
Visit	Common Name	Lat	Long	Elevation	Comment
1	Field Sparrow	44.44439	73.16634		
1	Pine Warbler				pinetrees near "North Swamp"
1	Red-breasted Nuthatch				pinetrees near "North Swamp"
1	Wild Turkey				North Swamp flyover
1	Great Crested Flycatcher				North Swamp
1	Mallard				
2	Brown Thrasher				
2	Northern Harrier				pair; female carrying food, apparently to nest
2	Alder Flycatcher				
2	Willow Flycatcher				
3	Common Yellowthroat				
3	Song Sparrow				
3	Northern Cardinal				
3	Savannah Sparrow				agitated pair; probably near a nest
3	Eastern Kingbird				
3	Willow Flycatcher				
3	Bobolink				
3	American Crow				
3	Clay-colored Sparrow	44.42278	73.19059	107	one male, later heard counter-singing with another
3	Field Sparrow				
3	Wild Turkey				
3	Yellow Warbler				
3	Black-crowned Night-Heron				flyover heading southeast
3	Red-eyed Vireo				woods at nw corner of property
3	Eastern Wood-Pewee				woods at nw corner of property
3	American Robin				woods at nw corner of property
3	Hairy Woodpecker				woods at nw corner of property
3	Black-capped Chickadee				woods at nw corner of property
3	Mourning Dove				woods at nw corner of property
3	Tufted Titmouse				along northern border of property
3	Eastern Towhee				
3	American Goldfinch				
3	Swamp Sparrow				
3	American Woodcock				
3	Field Sparrow	44.41811	73.18931	122	in field returning
3	Yellow Warbler				
3	Red-winged Blackbird				
9	Barn Swallow				incidental along Knoland Farm Road
4	Gray Catbird				
4	American Robin				
4	House Wren				
4	Common Yellowthroat				
4	Savannah Sparrow				
4	Red-winged Blackbird				
4	Mourning Dove				
4	Song Sparrow				
4	American Crow				
4	Brown-headed Cowbird				
4	Yellow Warbler				
4	Wild Turkey				
4	Tree Swallow				

SEQ Birds					
Visit	Common Name	Lat	Long	Elevation	Comment
4	Red-eyed Vireo				white pine and poplar stand west of start
4	Scarlet Tanager				
4	House Wren				
4	Black-and-white Warbler				
4	Common Grackle				
4	Great Crested Flycatcher				
4	Blue Jay				
4	Double-crested Cormorant				flyover
4	Black-capped Chickadee				northwest of powerline
4	Great Crested Flycatcher				
4	Blue Jay				
4	Rose-breasted Grosbeak				
4	Ovenbird				
4	Pine Warbler				
4	Eastern Wood-Pewee				
4	Scarlet Tanager				
4	Black-and-white Warbler				
4	Pileated Woodpecker				
4	Downy Woodpecker				
4	American Crow				
4	Red-eyed Vireo				
4	Swamp Sparrow				back at powerline going southeast
4	Alder Flycatcher				
4	Song Sparrow				
4	Wood Thrush				
4	American Goldfinch				
4	Northern Cardinal				
4	Brown-headed Cowbird				
4	Black-and-white Warbler				
4	Black-capped Chickadee				
4	Brown Thrasher				agitated adult (probably near nest)
4	Ruffed Grouse				adult wth young
4	Cedar Waxwing				
4	Bobolink				
4	Barn Swallow				
4	Eastern Phoebe				
5	Alder Flycatcher				in hayfield heading south
5	Savannah Sparrow				
5	Bobolink				
5	Black-capped Chickadee				in hardwoods
5	Red-eyed Vireo				
5	Ovenbird				
5	Common Grackle				
5	Eastern Wood-Pewee				
5	Pileated Woodpecker				
5	Common Yellowthroat				
5	Hairy Woodpecker				
5	House Wren				
5	Eastern Kingbird				back at start
6	Song Sparrow				
6	American Robin				

SEQ Birds					
Visit	Common Name	Lat	Long	Elevation	Comment
6	Yellow Warbler				
6	Willow Flycatcher				
6	Alder Flycatcher				
6	Red-winged Blackbird				
6	Common Yellowthroat				
6	Red-eyed Vireo				
6	Hermit Thrush				
6	Gray Catbird				
6	Northern Cardinal				
6	Veery				
6	Eastern Kingbird				
6	Blue Jay	44.42998	73.14576	116	wooded patch northbound
6	Yellow Warbler				
6	White-throated Sparrow				
6	Black-capped Chickadee				
6	House Wren				
6	Swamp Sparrow				
6	Common Yellowthroat				
6	Willow Flycatcher				
6	American Crow				
6	Ring-billed Gull				
6	Brown-headed Cowbird				
6	Eastern Kingbird				
6	Common Grackle				
6	Black-capped Chickadee				wet hemlock
6	Veery				
6	Downy Woodpecker				
6	Cedar Waxwing				
6	Blue Jay				
6	American Crow				back toward Van Sicklen
6	Herring Gull				flyover
6	American Goldfinch				
6	Canada Goose				flyover
6	Brown Thrasher				
7	Black-crowned Night-Heron				4 adults, 1 immature west of Rte. 116
7	Green Heron				2-3
7	Wood Duck				with young
7	Marsh Wren				at least 3 individuals
7	Eastern Kingbird				
7	Tree Swallow				
7	Red-winged Blackbird				
7	Bobolink				
7	Yellow Warbler				
7	Willow Flycatcher				
7	Savannah Sparrow				
8	Barn Swallow				
8	Red-winged Blackbird				
8	American Robin				
8	Northern Flicker				
8	Eastern Kingbird				
8	Savannah Sparrow				

SEQ Birds					
Visit	Common Name	Lat	Long	Elevation	Comment
8	Common Yellowthroat				
8	Canada Goose				with young
8	Eastern Meadowlark				
8	Song Sparrow				
8	Spotted Sandpiper				
8	Bobolink				
-	Chimney Swift				at Calkins 16Jun
-	House Sparrow				at Calkins 16Jun

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