

# Migratory and Breeding Bird Survey Of the Big Lake Natural Area, Alberta



Big Lake Environment  
Support Society

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January, 2004



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<http://www.bless.ab.ca>

## Executive Summary

The Big Lake Natural Area (BLNA) northwest of Edmonton and just outside of St. Albert is a group of habitats that is being affected by large-scale development and proposals for alternate land use. It is unknown whether this change in habitat utilization has had a substantial effect on the use of the area by waterfowl and upland avian species for either migratory or breeding purposes. Baseline data is necessary to determine species diversity and abundance in the area and to implement a more strategic timeline for monitoring habitat change and creating an integrated conservation plan. The Big Lake Natural Area is a globally recognized Important Bird Area (IBA) and measures are being taken to determine whether the notable congregatory species and nesting colonies of Franklin's Gulls will continue to be present at the lake or whether recent decreases in water levels and development have caused a long-term decline.

Recent drought conditions appear to have contributed to the level of diversity in the Big Lake Natural Area, reducing the surface area of surrounding wetlands forcing many birds to use the BLNA. Similar Shannon-Weaver diversity indices were calculated for many of the habitats in the BLNA, partly owing to their close proximity. Lower than expected values were calculated for what should be productive areas i.e. the white spruce forest, possibly due to habitat fragmentation and changing environmental factors. The previously present colony of Franklin's Gulls on the west side of the lake was no longer productive, despite the presence of the species in the BLNA; however, such colonies may remain viable even after years of absences.

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## Introduction

As part of the North American Waterfowl Management Plan (NAWMP) monitoring of waterfowl and upland avian species is deemed a necessary part of conservation (Prescott, 1995).

Big Lake (53° 36' N, 113° 43' W) is a wetland ecosystem located in central Alberta, Canada, bordered by the municipalities of Edmonton, Parkland County, Sturgeon County and St. Albert (please see map, Figure 1). The lake supports extensive stands of emergent vegetation. The depth in the central portions of its two basins is generally less than 4 meters, with minimum depths near the margins of 0.3 meters. The area determined for the designation of Big Lake to the Alberta Special Places program is 21.4 km<sup>2</sup>.

Big Lake fits into the category of medium freshwater wetland, covering at least 2.14 hectares of land with shorelines and emergent vegetation extending even farther, a high priority for NAWMP conservation in aspen parkland regions (Prescott, 1995). The NAWMP also recognizes a higher diversity of native vegetation than tame or developed land, and that the best method of maintaining biodiversity lies in habitat preservation and census to determine management practices (Prescott, 1995). In Canada, the importance of grass and parklands in the prairie region are noted as having the largest breeding duck populations in the country (Caswell and Dickson, 1997). As well, migratory populations have been known to make up nearly 75% of the present species in Canada owing largely to its high latitudes. This increases the importance of surveys in the spring and fall to monitor populations largely affected by weather alterations (Hussell, 1997).

In addition to the absence of systematic records of populations on Big Lake, there has been a recent influx of land development projects in the immediate surrounding area, making a monitoring project to note both species presence and abundance a necessity. Big Lake has been promoted for its great diversity and abundance of species, including large numbers of nesting Franklin's Gulls and migrating Tundra Swans, along with a variety of other species year-round. The desire for a management plan for the Big Lake Natural Area to take into account development pressures, habitat sites important to migration, nesting and species richness and the importance of wetlands in maintaining such diversity makes a comprehensive biological survey of the BLNA necessary.

It has been suggested that since the 1960s songbirds alone have declined up to 50% due to habitat fragmentation (Rowell and Rice, 1998), an unfortunate loss that makes species presence important to monitor, especially in an area as biologically diverse as the Big Lake Natural Area. Johnston (1990) emphasizes long term census projects to observe changes in avian populations that correspond to changes in habitat in order to alert organizations concerned with biodiversity and allow for implementation of proper strategy to compensate.

Big Lake as a natural area has been globally recognized as an important Bird Area (IBA), international recognition given to areas important to conservation efforts. The program was developed by Bird Life International and is supported through Bird Studies Canada and the Canadian Nature Federation (Kirk, 2001). This status was originally awarded to the BLNA for its congregatory species and waterfowl concentration on the lake and surrounding land used for agriculture, hunting, pasture, recreation and industrial purposes (IBA, 2003).

## Methods

Surveying of all habitat types in the BLNA was conducted during spring migration and summer breeding, systematically from May 9, 2003 until July 10, 2003 with opportunistic surveys occurring during early migration in late April and expected to continue through September. Habitats were surveyed from one-half hour before sunrise until 11:00h on days without significant precipitation, and an attempt was made to repeat surveys conducted on days with winds estimated to be above 2 on the Beaufort scale (Bilyk et al., 1998). Spring migration surveys occurred from May 9 through May 31, 2003, and summer breeding surveys from June 2 to July 10, 2003, similar intervals to those performed in previously conducted studies (Bilyk et al., 1998).

## Study area

The Big Lake Natural Area is located northwest of Edmonton, Alberta and west of the city of St. Albert in the Aspen Parkland ecoregion. The area of interest to this study encompasses both the main wetland itself (21.4 km<sup>2</sup>) and surrounding areas of small deciduous and coniferous woodlands, seasonal and semi-permanent wetlands, farmland, grassland and more developed landscapes along the shoreline and in close proximity to the lake and designated natural area (Figure 1).

Surveys were based on delineated habitat types that were determined through a grouping of similar vegetative features, along with a monitoring of seasonality of wetlands and comparison to previously conducted studies in this or similar mosaic landscapes. Defining features of each habitat are described in Table 1. These were in part delineated at the inception of the project, but also became dependent on rate of drying throughout the duration of the study, especially in areas of marshy vegetation.

**Figure 1 Map of the Big Lake Natural Area (BLNA).**

(outlined in red)





## Survey Techniques

Surveys were conducted either along the Natural Area boundary, where the shoreline makeup permitted, or at prescribed intervals where access to the lake was permissible and water levels beyond the lake allowed for decent visibility. Kayaking was also used as a method of examining mid-water reedbeds for nests and viewing areas of shoreline inaccessible on foot. Each site was assessed for landmarks to determine location, vegetation type and ground saturation to place it in a habitat grouping. At each visit, species seen and heard were identified with the aid of binoculars and spotting scope and abundance of each species was recorded. Playback recordings were not implemented. Surveys were completed by scanning the lake with binoculars to find closer groupings of waterfowl, then scanning with a spotting scope to identify those at greater distance. Birds that could not be identified using either of these tools were determined to be farther than the designated area allotted for the specific site being surveyed. Care was taken not to double count by noting the direction of species moving along the water and in the air and to remain far enough from the subjects to not cause a disturbance. Distance between shoreline sites was determined by both landmarks and diminished possibility of overestimation of abundance. Although the practice in some studies has been to double the number of "breeding territories" during breeding surveys to provide an estimation of bird numbers, this has also been found to over estimate populations and therefore was not used in this study (Johnston, 1990; Dunn and Bradstreet, 1997).

During breeding surveys, locations of nests were noted, and an attempt was made to identify species by the eggs or female seen leaving the nest. Eggs were counted, although due to the secretive nature of most nests and numerous instances of egg mortality these numbers were not included in population estimates or analysis. Nestlings and juveniles were included, with the assumption being made that these exceptions would compensate for each other. Data was recorded for migration data between May 9 and May 31, 2003 and breeding recorded between June 2 and July 10, 2003 as per Bilyk et al., 1998. Data was then transferred onto a spreadsheet separating sites by habitat classification, location and date and noting any relevant precipitation or wind level for the site.

## Analysis

Each habitat type was analyzed in terms of two measures of biodiversity, using similar methods to Prescott et al. (1995). The Shannon-Weaver diversity index was calculated for each of the habitat types, for migration, breeding and as an overall mean. As the value of H increases, it implies a higher level of diversity. Simple species richness averages were also noted for each of the nine habitats.

The Shannon-Weaver diversity index takes into account both species richness and evenness of individual abundance between species, allowing for a more accurate measure of biodiversity than a simple account of number of species present in a given habitat (Beals et al., 2000). However, despite this consideration, the index is only relevant when comparing species within a community and their relative abundance (Prescott et al., 1995).

### 1. Shannon-Weaver diversity index

Using the formula  $H' = \sum p_i \ln p_i$  where  $p_i$  is the proportion of the total number of species in the community made up of the  $i$ th species (Beals et al., 2000). The values for each species were summed for each day each site was surveyed, and then averaged for each site and subsequently for each habitat.

## 2. Species richness

The total numbers of species seen in all surveys across each habitat type within the census time frame were summed and recorded on a per-site basis to account for differences in sampling. It does not take into account the proportion and distribution of each species within the local community.

Each habitat was also analyzed for numbers of species present in each Order grouping; Gaviiformes, Ciconiiformes, Podicipediformes, Anseriformes, Falconiformes, Gruiformes, Charadriiformes, Piciformes, and the Order Passeriformes and abundance of individuals in those Orders in each habitat. Organized by date of the census, if more than one site was surveyed in a habitat, the bar graphs (Appendix 1) denote average numbers and date groupings if all sites were not surveyed on the same date. A list of birds heard or observed during migration as well as one during breeding season is included for each habitat. Bird species of special status were also noted, as well as those species for which nests were observed and plausibly or positively identified (Appendix 2).

**Table 1. Descriptions of habitat types identified in the Big Lake Natural Area.**  
(Adapted from Russell and Spiers, City of Edmonton and Bilyk et al., 1998)

Habitat Type	Description
Developed Mosaic	Primarily golf courses, consisting of carefully mowed grassland with interspersed manufactured wetland and treed areas. Remains a suitable habitat for wildlife despite anthropocentric influence.
Flooded Farmland	Previously managed farmland not currently growing crops but saturated for at least May and June. Growing natural but stunted vegetation.
Lake Margin Complex	Reeds and cattails ( <i>Scirpus sp.</i> and <i>Typha sp.</i> ) close to the lakeshore, followed by willow and shrub-like vegetation and forest, either deciduous or coniferous forest, usually associated with an upward slope in terrain. If these habitats are relatively narrow in width, the habitat is defined as lake margin complex.
Small Permanent Freshwater Wetland	Wetland under 1 hectare in area, in this case defining irrigation canals and storm water collection habitats, defined by extra organic materials and precise rather than progressive edge habitat.
Medium Permanent Freshwater Wetland	Wetlands between 1 and 8 hectares, Big Lake proper.
Seasonal Wetland/Native Grassland	Grassland not disturbed by cultivation or recent grooming. Often located near areas leading up to marsh-type wetland habitats. Habitat containing abundant <i>Typha</i> and <i>Scirpus</i> species, requiring at least seasonal saturation of soils and/or shallow flooding until the beginning of July.
Semi-permanent Freshwater Wetland	Wetlands that retain water until autumn for 7 out of 10 years.

Upland Deciduous Forest	Primarily deciduous forest, either behind a long shoreline or a tree-stand away from the water but within the Big Lake natural area. Farther from the lake than those areas considered lake margin complex.
Upland White Spruce Forest	Primarily coniferous forest, either behind a long shoreline or a tree-stand away from the water but within the Big Lake Natural Area. Farther from the lake than those areas considered lake margin complex.

## Results

Maps of study sites and graphs of species numbers and individual abundance are included for each habitat in Appendix 1, along with the analyses and ranking of each habitat. A total of 196 surveys were done in the 9 habitat types (Table 1) in the Big Lake Natural Area, 81 during spring migration and 115 during breeding season. All surveys were conducted between May 9 and July 10, 2003 with opportunistic species observations from April migration being taken into account in the cumulative species list (Appendix 2). In total, 119 species were observed over the 3 month survey period and incidental observation reports.

As much of the avian habitat included in the Big Lake Natural Area is an amalgamation of the described types; those including a higher proportion of wetlands had more diversity than upland-only habitats, although these in turn had higher diversity indices than seasonal types of habitats. In terms of both per-site species richness and the Shannon-Weaver diversity index (Table 3), the small permanent wetlands had the greatest variety and even spread of species of all nine Big Lake habitats. These wetlands tend to have a high ratio of edge to area, and provide a lot of different species with needed habitat for feeding, hiding, and breeding.

The developed mosaic habitat (largely golf courses), despite its groomed nature also offers a very favourable environment for both migratory and breeding avian species with a high diversity index ( $H' = 2.10$ ) as well as species richness of 24 and 30 species during migratory and breeding surveys, respectively. This habitat is much like the small permanent wetlands in having a high “edge effect” where many different species find niches.

The lake margin complex took up by far the largest portion of the natural area and being a habitat conglomerate had a high diversity rating with very high total species richness. Again, this habitat is characterized by a lot of “edge”, being defined as the border between the emergent reeds and grasses and open water. Many species in the Big Lake Natural Area use this habitat for breeding, nesting, feeding, and loafing.

The flooded farmland habitat had a higher diversity index during migration when its water supply was abundant. Once the migratory birds left and the water receded the flooded farmland habitat was not very attractive to many breeding species. This is evidenced by both its relatively low species richness value and low Shannon-Weaver diversity index (1.69) largely due to an uneven species presence.

Most of the species found in the medium permanent freshwater sites were waterfowl, not surprising considering the quantity of water available. There was a high diversity of waterfowl and some edge species that gave it a high species richness index although a relatively low diversity index.

The seasonal wetland/native grassland is more diverse in its grassland period, with the breeding season having 37 of the 45 total species found in that habitat. The Shannon-Weaver Diversity Index for this habitat is the lowest in the BLNA owing to poor evenness of species abundance.

Semi-permanent wetlands had medium diversity indices and per-site species richness, but collectively have the third highest species richness.

Both upland forest habitats have reduced species richness due to their specialized environment for Passeriformes species. Despite their lower species richness, these habitats have medium Shannon-Weaver diversity indices (2.01 and 1.93) indicating relatively few individuals of many species present.

**Table 2. The number of species recorded in each habitat type**

Habitat Type	Total Migratory Species	Total Breeding Species
Developed Mosaic	24	30
Flooded Farmland	22	10
Lake Margin Complex	50	71
Small Permanent Wetland	40	36
Medium Permanent Freshwater Wetland	42	43
Seasonal Wetland/Native Grassland	26	37
Semi-permanent Wetland	39	41
Upland Deciduous Forest	11	14
Upland White Spruce Forest	10	14

**Table 3. Measures of diversity of each of the habitats\***

Mean Species Richness/ Site; Total Species Richness	Shannon-Weaver Diversity Index (H')
Small Permanent Wetland (39.0); (53)	Small Permanent Wetland (2.17)
Developed Mosaic (39.0); (39)	Developed Mosaic (2.10)
Medium Permanent Freshwater Wetland (36.5); (59)	Lake Margin Complex (2.04)
Semi-permanent Wetland (35.3); (55)	Upland White Spruce Forest (2.01)
Lake Margin Complex (34.1); (78)	Semi-permanent Wetland (1.94)

Seasonal Wetland/Native Grassland (28.0); (45)	Upland Deciduous Forest (1.93)
Upland Deciduous Forest (25.0); (25)	Medium Permanent Freshwater Wetland (1.92)
Flooded Farmland (25.0); (25)	Flooded Farmland (1.69)
Upland White Spruce Forest (16.0); (16)	Seasonal Wetland/Native Grassland (1.68)

\* - Ranked in order from most to least diverse according to per-site and total species richness and the Shannon-Weaver Diversity Index.

## Discussion and Recommendations

Out of the 115 species observed or heard in the Big Lake Natural Area during the spring and summer of 2003, 78 of those species were found in the lake margin complex habitat alone. Because of the composite nature of this habitat, its diversity illustrates the importance of maintaining proper edge habitats around wetlands to enable a greater diversity of species to utilize resources in the area. In addition to species diversity, this habitat also housed the largest number of species considered by Alberta Environment as "sensitive" in the province. The medium freshwater permanent wetland, seasonal wetland/native grassland, semi-permanent wetland and small permanent wetland habitats also require habitat protection for their sensitive species as well as species richness.

In general, wetland size has been noted to contribute to greater diversity of species (Bilyk et al. 1998; Prescott et al., 1995) but in the 2003 Big Lake Natural Area the small permanent wetlands proved to house a greater diversity of species by Shannon-Weaver's definition. This diversity index takes into account both species richness and species evenness by measuring the proportion of individuals within species in a defined habitat (Beals et al., 2000, Kinzig et al., 2001). The relatively shallow nature of Big Lake, especially prevalent in 2003 due to low precipitation in the area in 2002 (Environment Canada, 2003), may have influenced species observations and contributed to the lower diversity index experienced in the medium as compared to other habitats like the small permanent wetland habitats. Duck nesting habitats are greatly affected by changes in surface area of wetlands, and especially nest density is affected by habitat degradation that may be caused by a decrease in water levels (Laperle, 1974). Water levels have also been found to affect composition of species in wetland areas, so a monitoring of both species composition and abundance over a period of years is an essential to protect from unnecessary declines in species numbers (Laperle, 1974; Johnston. 1990).

Despite the fact that Shannon-Weaver indices are of the most used in biodiversity ranking (Beals et al., 2000), Kinzig et al. (2001) note that there are many factors, including ecosystem productivity, area disturbance, and species nesting that are not taken into account by any known index. Biodiversity is known to be affected by changes in habitat, especially habitat fragmentation which is thought to cause a decline in species diversity (Rowell and Rice, 1998). This result can be seen in the two upland forest habitats, which did not yield the diversity expected, but whose presence is integral to biodiversity in the BLNA because of the specialized and unique habitats they offer. As an example, the white-breasted nuthatch was found only in the upland white spruce forest habitat, and the downy woodpecker and yellow-bellied sapsucker were observed only in the upland deciduous forest habitat.

It is assumed that stable and increasing populations of avian species denote healthy populations and preserved habitats (Caswell and Dickson, 1997) although to adequately determine the success of the Big Lake Natural Area a continuing program of monitoring is necessary.

Similar to the Beaverhill Lake study done by Bilyk et al. (1998), many of the habitats observed at Big Lake are in extremely close proximity. This explains the similar H' values for all of the observed habitats. A difference in sampling density affects the number of species observed, but is also representative of the proportion of area covered by each habitat type. The accuracy of this type of sampling is dependent on environmental factors, including water levels, conditions while sampling and general weather over the season in aspen parkland and surrounding areas may affect avian preferences toward a certain area for migration stops or breeding.

The colony nests of Franklin's Gulls were not present in the BLNA in the summer of 2003. The region west of the lake known at one time to host the Franklin's Gulls was quite dry during the breeding season this year (pers. obs.), even though precipitation in the Alberta aspen parkland increased in May, June, July and August 2003 from 2002 (Environment Canada, 2003). This may be a result of a depleted water table due to years of below average precipitation, and/or due to attempts to drain this area for farming/industrial purposes. Colonial nesting species are known to be quite vulnerable to habitat change and disturbances, which is an issue in the BLNA, but they also have been found to choose habitats uniquely, contributing to the possibility that the gulls may return to the site if habitat conditions are restored over the next few years (Hanneman and Heckbert, 2001). As nesting colonies of Black Terns were observed in the semi-permanent wetland habitat of Big Lake, there still remains suitable habitat for colonial nesters in the immediate area. A study to determine if drainage patterns in the wetlands just to the west of the BLNA have been affected by construction of drainage canals should be considered. Continuation of observations and correlation with habitat change and maintenance of the edge habitats to prevent habitat fragmentation and loss remain the most important and significant steps toward conservation and maintenance of diversity in the BLNA.

## **Acknowledgments**

This work was funded by grants from the Alberta Community Development Fund, the Alberta STEP program, PetroCanada and TransCanada Pipelines through the Canadian Nature Federation's Important Bird Area Community Action Fund.

Mike Barr of Ducks Unlimited Canada provided in-kind support in the field design of the project and the review of this paper.

This project was developed and produced by Miles Constable of the Big Lake Environmental Support Society (BLESS), the designated stewards of the Big Lake Natural Area. Louise Horstman, President of BLESS also contributed significant time to the project.

Thanks go out to George Newton of the Federation of Alberta Naturalists for advice on funding applications, and to the members of BLESS who kindly donated equipment to enable the survey to be completed.

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## APPENDIX I Data Analyses

The approximate locations of each site surveyed for each habitat are delineated on maps of the Big Lake area (adapted from Alberta Community Development, 2001). Species lists are separated into migratory (species seen or heard in the habitat between May 9 and May 31, 2003) and breeding (species seen or heard in the habitat between June 2 and July 10, 2003). Bar graphs represent numbers of species within each bird Order and abundance of individuals within each habitat, respectively. The bird families used are as follows:

<b>Table 4. Avian Orders used in the survey.</b>	
<b>Avian Order</b>	<b>Common Avian Categories</b>
Gaviiformes	Loons
Podicipediformes	Grebes
Ciconiiformes	Bitterns, Herons
Anseriformes	Swans, geese, dabbling ducks, diving ducks
Falconiformes	Osprey, eagles, harriers, hawks, falcons
Gruiformes	Rails, coots
Charadriiformes	Plovers, avocets, phalaropes, gulls and terns
Piciformes	Woodpeckers
Passeriformes	Flycatchers, towhees, sparrows, longspurs, buntings, crows, jays, magpies, catbirds, warblers, sparrows, blackbirds, cowbirds, chickadees, waxwings, vireos, thrushes, finches

Species with a \* by their name denote those ranked as "sensitive" by the "General Status of Alberta Wild Species 2000" Alberta Environment/Alberta Sustainable Resource Development. Other species listed are considered to be "secure".

## Developed Mosaic Habitat

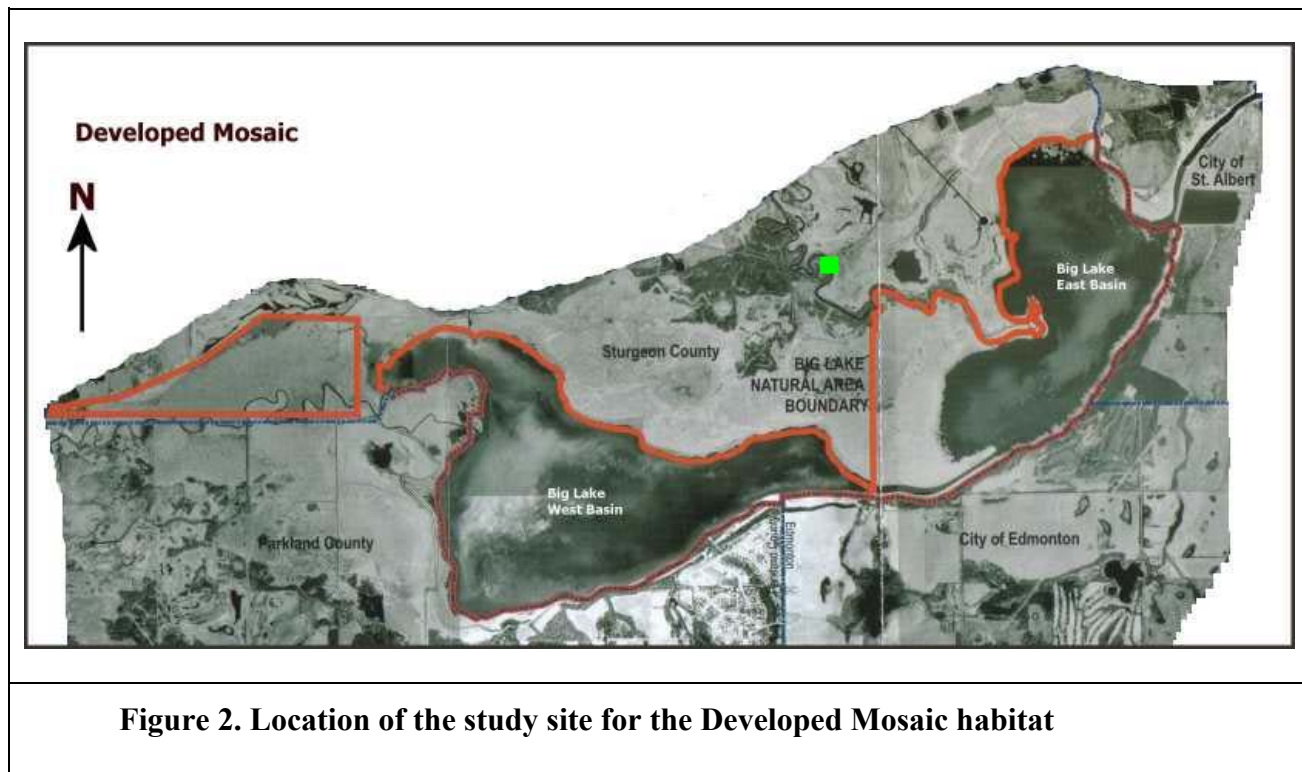
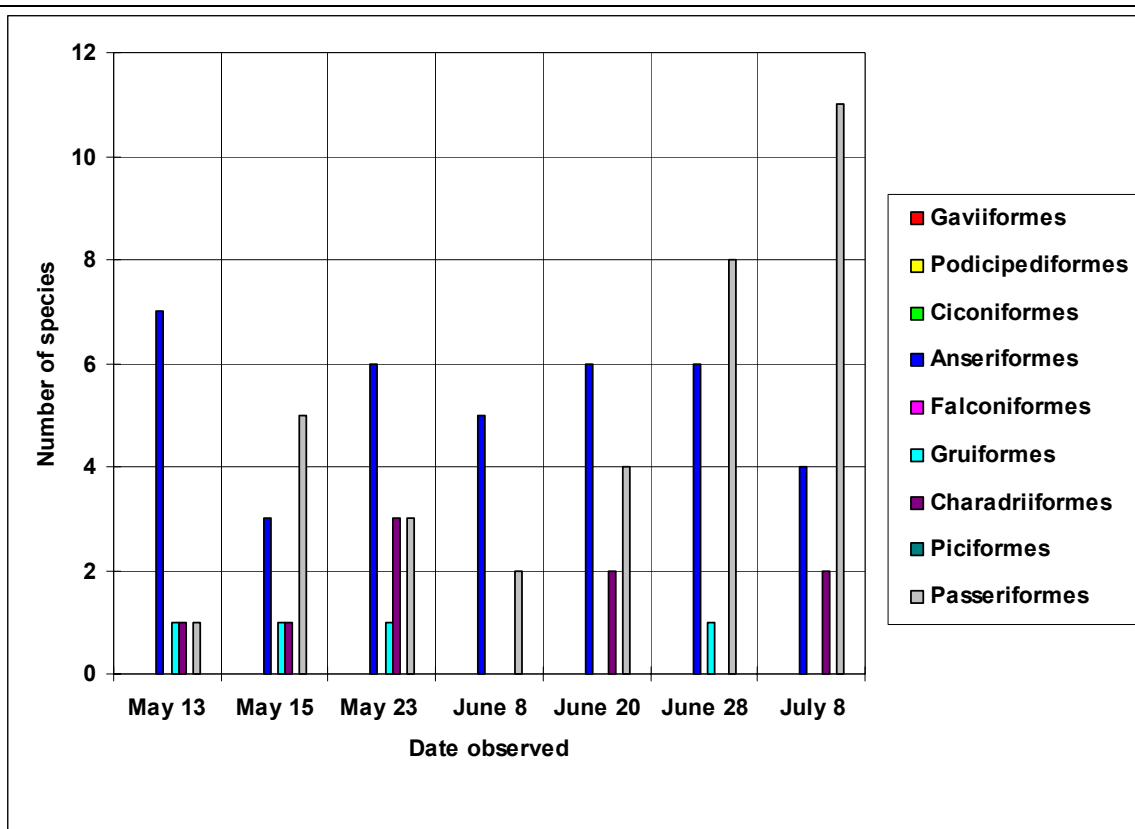


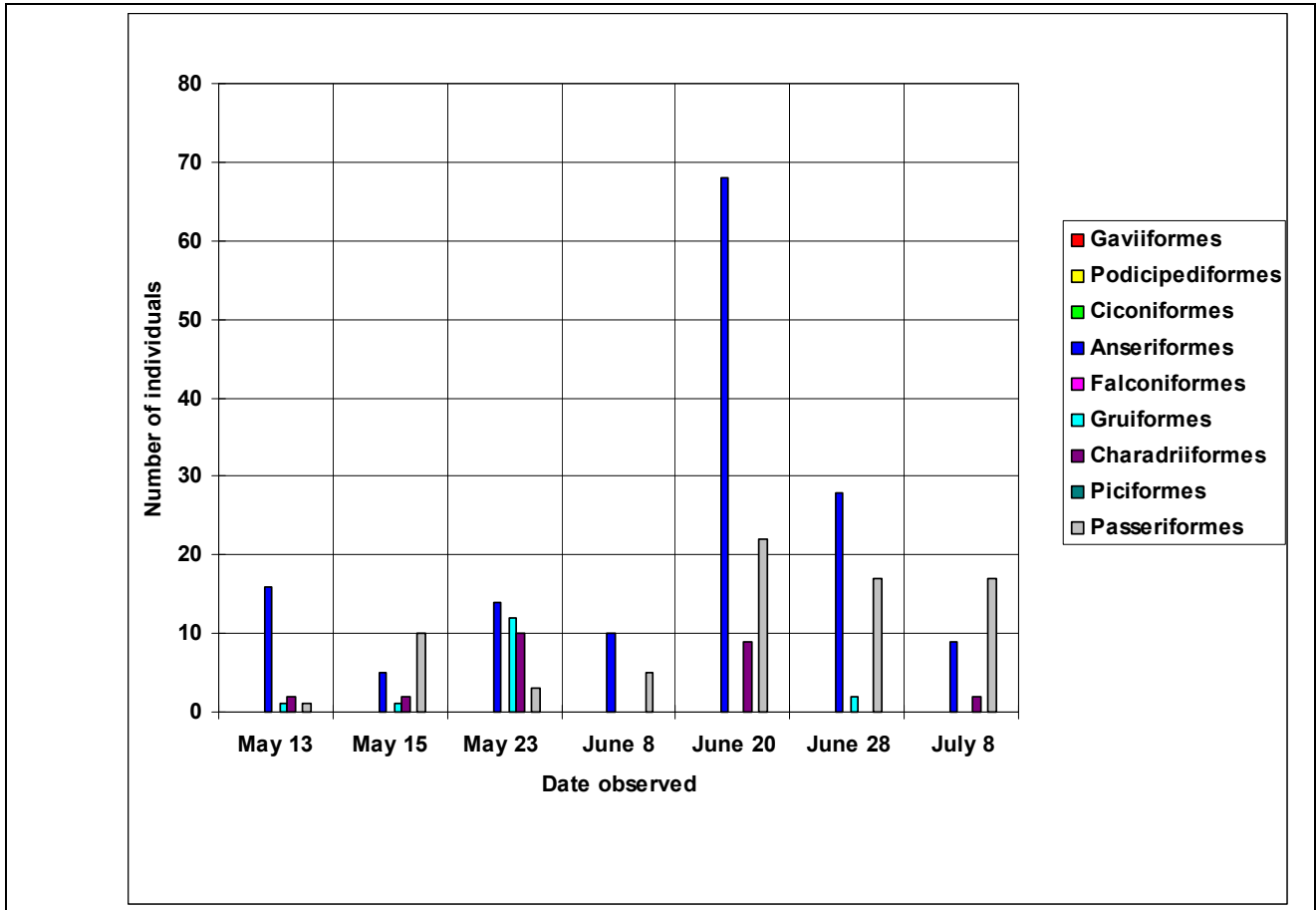
Figure 2. Location of the study site for the Developed Mosaic habitat

Developed Mosaic	
Migratory Species (24)	Breeding Species (30)
<p><b>Anseriformes</b>            Canada Goose            Cinnamon Teal            Blue-winged Teal            Northern Shoveler            American Wigeon            Gadwall            Canvasback            Redhead            Lesser Scaup            Bufflehead            Ruddy Duck</p> <p><b>Gruiformes</b>            American Coot</p> <p><b>Charadriiformes</b>            Killdeer            Willet            Lesser Yellowlegs            Common Snipe            Franklin's Gull</p>	<p><b>Anseriformes</b>            Canada goose            Mallard            Blue-winged Teal            Northern Shoveler            Gadwall            Canvasback            Redhead            Lesser Scaup            Common Goldeneye            Ruddy Duck</p> <p><b>Gruiformes</b>            American Coot</p> <p><b>Charadriiformes</b>            Killdeer            Ring-billed Gull            Black Tern*</p> <p><b>Passeriformes</b>            Alder Flycatcher</p>

<p><b>Passeriformes</b>  Black-billed Magpie  American Crow  Common Yellowthroat  Song Sparrow  White-throated Sparrow  Red-winged Blackbird  Brown-headed Cowbird</p>	<p>American Crow  American Robin  Gray Catbird  Yellow Warbler  Common Yellowthroat  Clay-coloured Sparrow  Le Conte's Sparrow  Song Sparrow  White-throated Sparrow  Red-winged Blackbird  Yellow-headed Blackbird  Brewer's Blackbird  Common Grackle  Brown-headed Cowbird  American Goldfinch</p>
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**Figure 3. Numbers of species by Order in the Developed Mosaic habitat**



**Figure 4. Abundance of individuals by Order in the Developed Mosaic habitat**

**Summary of observed species and abundance during migration and breeding season:**

Despite its managed nature, the developed mosaic habitat proves to be quite a stable environment for both migratory and breeding species. In general, quite a diversity of species were seen in the area but at a low abundance, especially during spring migration. The diversity is shared by both upland and waterfowl species, but the abundance owes much to Anseriformes species (ducks and geese).

## Flooded Farmland Habitat

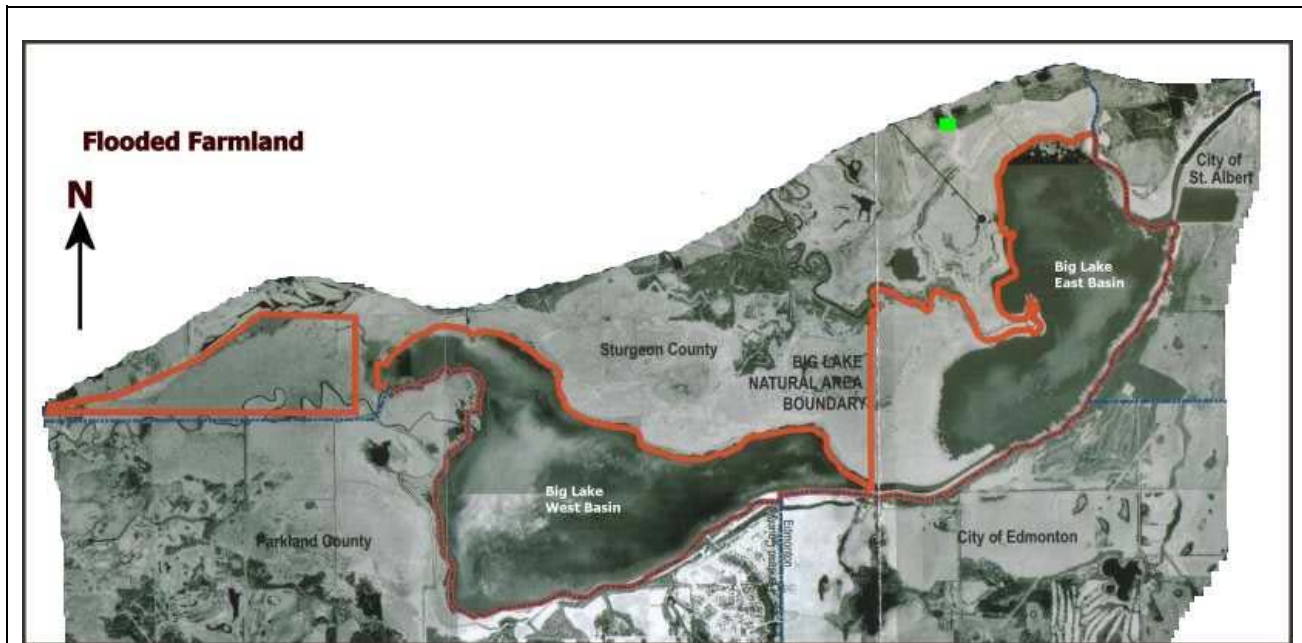
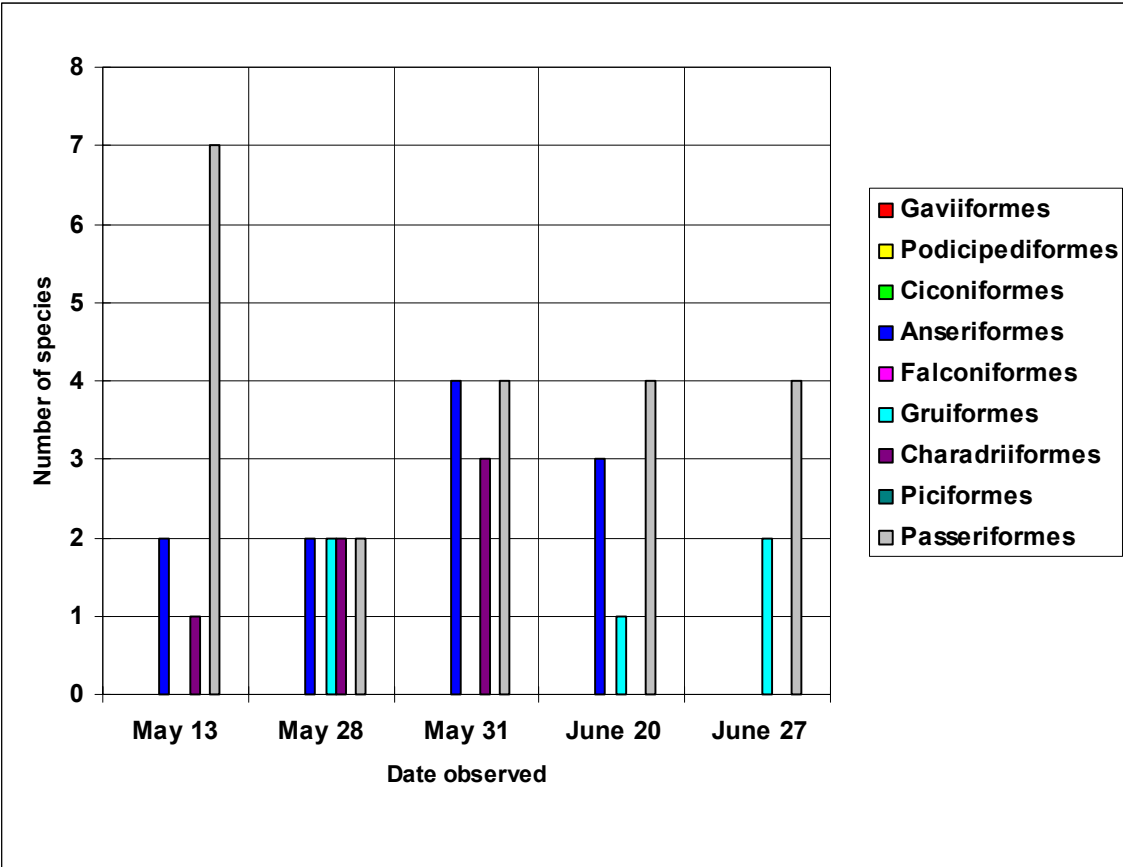


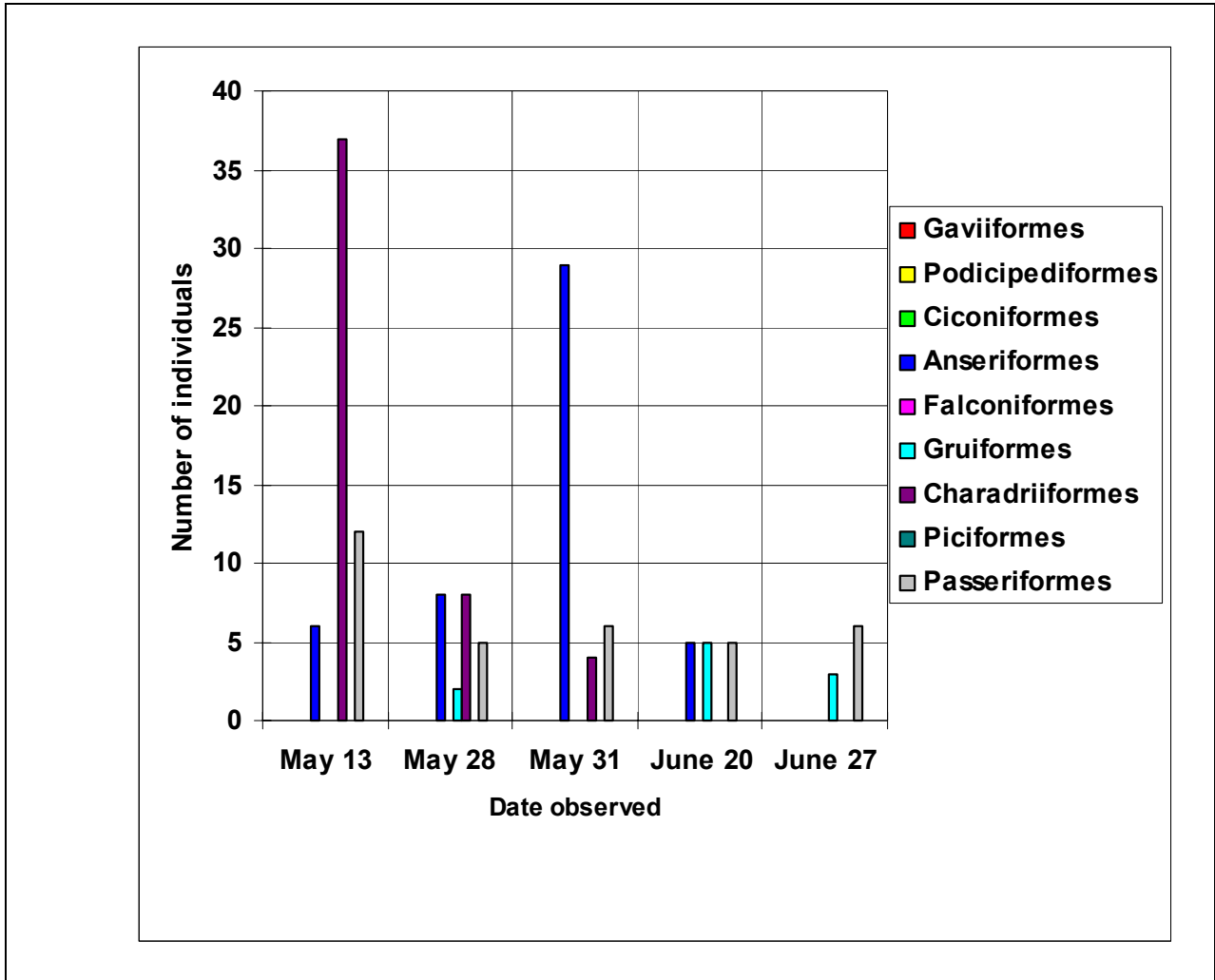
Figure 5. Location of the study site for the Flooded Farmland habitat

Flooded Farmland	
Migratory Species (22)	Breeding Species (10)
<b>Anseriformes</b> Canada Goose Mallard Blue-winged Teal Northern Shoveler Gadwall Canvasback	<b>Anseriformes</b> Mallard Blue-winged Teal Gadwall
<b>Gruiformes</b> Sora Rail American Coot	<b>Gruiformes</b> American Coot
<b>Charadriiformes</b> Killdeer Spotted Sandpiper Pectoral Sandpiper Common Snipe Common Tern Franklin's Gull	<b>Passeriformes</b> Alder Flycatcher American Crow Common Raven Black-capped Chickadee Clay-coloured Sparrow Red-winged Blackbird

<p><b>Passeriformes</b>  Least Flycatcher  American Crow  Chipping Sparrow  Clay-coloured Sparrow  Savannah Sparrow  Song Sparrow  Red-winged Blackbird  Yellow-headed Blackbird</p>	
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**Figure 6. Numbers of species by Order in the Flooded Farmland habitat**



**Figure 7. Abundance of individuals by Order in the Flooded Farmland habitat**

**Summary of observed species and abundance during migration and breeding season:**

The Flooded Farmland habitat housed a diversity of upland birds (Passeriformes) but a much greater abundance of shorebirds, gulls, terns and waterfowl (Charadriiformes and Anseriformes). The flooded farmland habitat appears to be especially important for the migration of shorebirds (such as the pectoral sandpiper), gulls and terns. It has a reduced abundance of species and individuals in the breeding surveys, indicating the unsuitability of the habitat for nesting.

## Lake Margin Complex

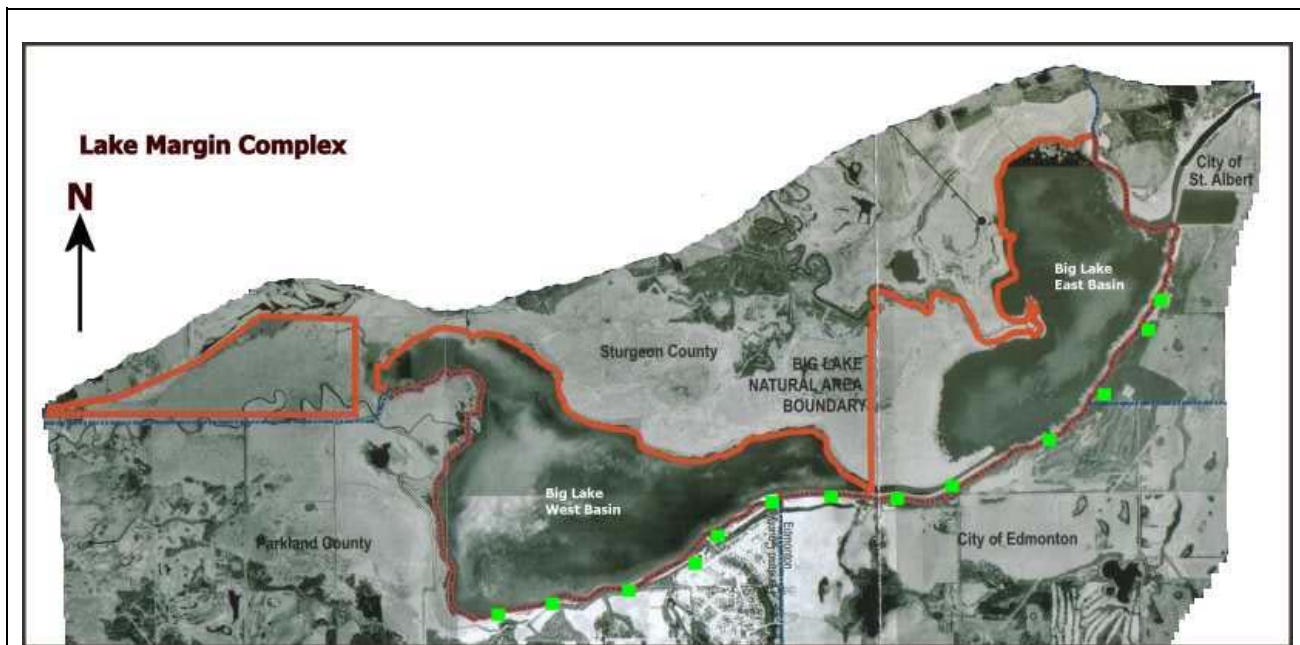


Figure 8. Location of the study sites for the Lake Margin Complex habitat

Lake Margin Complex	
Migrating Species (50)	Breeding Species (71)
<p><b>Podicipediformes</b>                      Horned Grebe*                      Red-necked Grebe                      Eared Grebe                      Western Grebe*</p> <p><b>Anseriformes</b>                      Tundra Swan                      Canada Goose                      Green-winged Teal                      Mallard                      Cinnamon Teal                      Blue-winged Teal                      Northern Shoveler                      Gadwall                      American Wigeon                      Canvasback                      Redhead                      Ring-necked Duck                      Lesser Scaup</p>	<p><b>Gaviiformes</b>                      Common Loon</p> <p><b>Podicipediformes</b>                      Pied-Billed Grebe*                      Horned Grebe*                      Eared Grebe                      Western Grebe*</p> <p><b>Ciconiiformes</b>                      American Bittern*                      Great Blue Heron*</p> <p><b>Anseriformes</b>                      Canada Goose                      Green-winged Teal                      Mallard                      Northern Pintail                      Blue-winged Teal                      Northern Shoveler</p>



Common Goldeneye Bufflehead Ruddy Duck	Gadwall American Wigeon Canvasback Redhead Ring-necked Duck Lesser Scaup Common Goldeneye Bufflehead Ruddy Duck
<b>Falconiformes</b> Red-tailed Hawk	<b>Falconiformes</b> Northern Harrier Red-tailed Hawk
<b>Gruiformes</b> Sora Rail American Coot	<b>Gruiformes</b> Sora Rail American Coot
<b>Charadriiformes</b> Killdeer Lesser Yellowlegs Spotted Sandpiper Common Snipe Franklin's Gull Ring-billed Gull Common Tern	<b>Charadriiformes</b> Killdeer Greater Yellowlegs Willet Spotted Sandpiper Common Snipe Franklin's Gull Ring-billed Gull Herring Gull Common Tern Forster's Tern* Black Tern*
<b>Passeriformes</b> American Crow Black-billed Magpie Common Raven Black-capped Chickadee Least Flycatcher Eastern Phoebe House Wren Ruby-crowned Kinglet American Robin Common Yellowthroat Yellow Warbler Chipping Sparrow Savannah Sparrow Fox Sparrow Song Sparrow White-throated Sparrow Red-winged Blackbird Yellow-headed Blackbird Common Grackle Brown-headed Cowbird	<b>Passeriformes</b> Alder Flycatcher Least Flycatcher Tree Swallow Barn Swallow Blue Jay Black-billed Magpie American Crow Common Raven Black-capped Chickadee House Wren Marsh Wren Ruby-crowned Kinglet American Robin Cedar Waxwing Gray Catbird Warbling Vireo Red-eyed Vireo

	Yellow Warbler Common Yellowthroat Chipping Sparrow Clay-coloured Sparrow Savannah Sparrow Le Conte's Sparrow Fox Sparrow Song Sparrow Lincoln's Sparrow Swamp Sparrow White-throated Sparrow Red-winged Blackbird Yellow-headed Blackbird Brewer's Blackbird Brown-headed Cowbird Northern Oriole American Goldfinch
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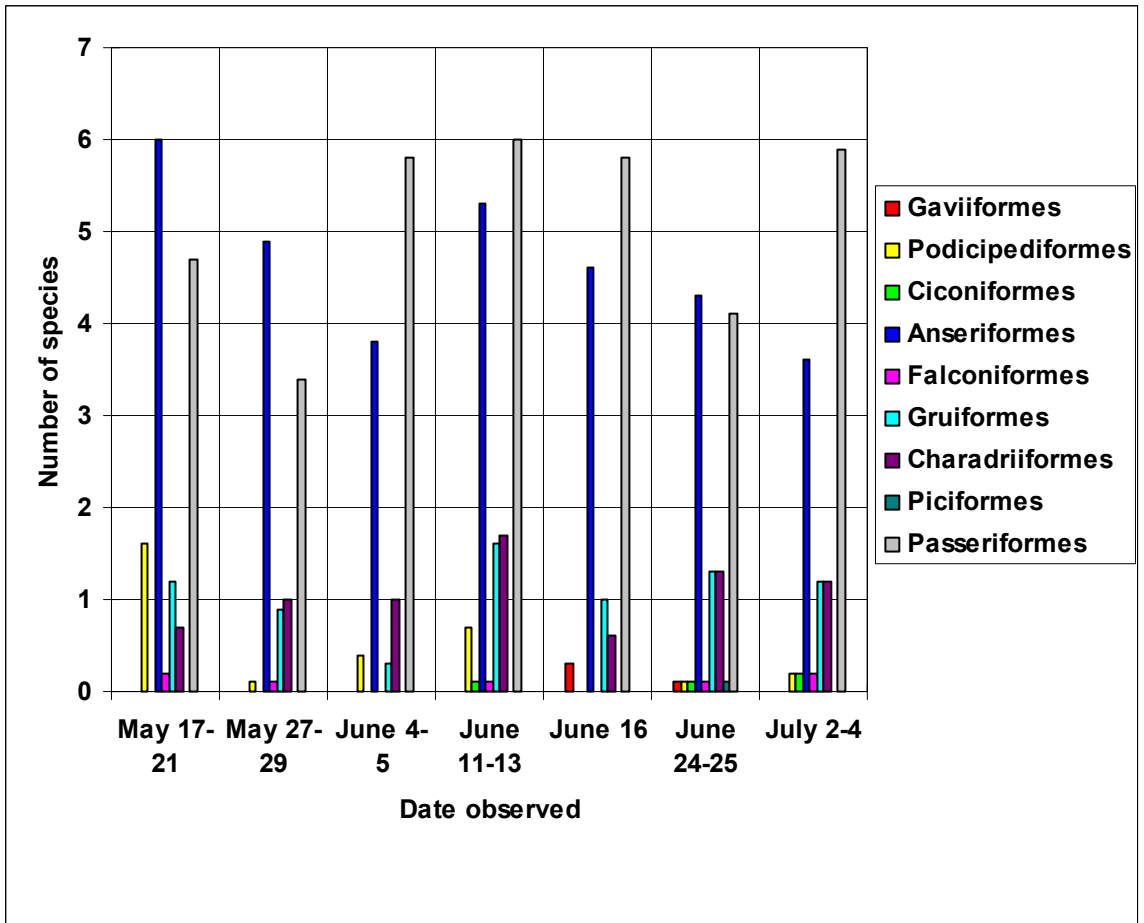
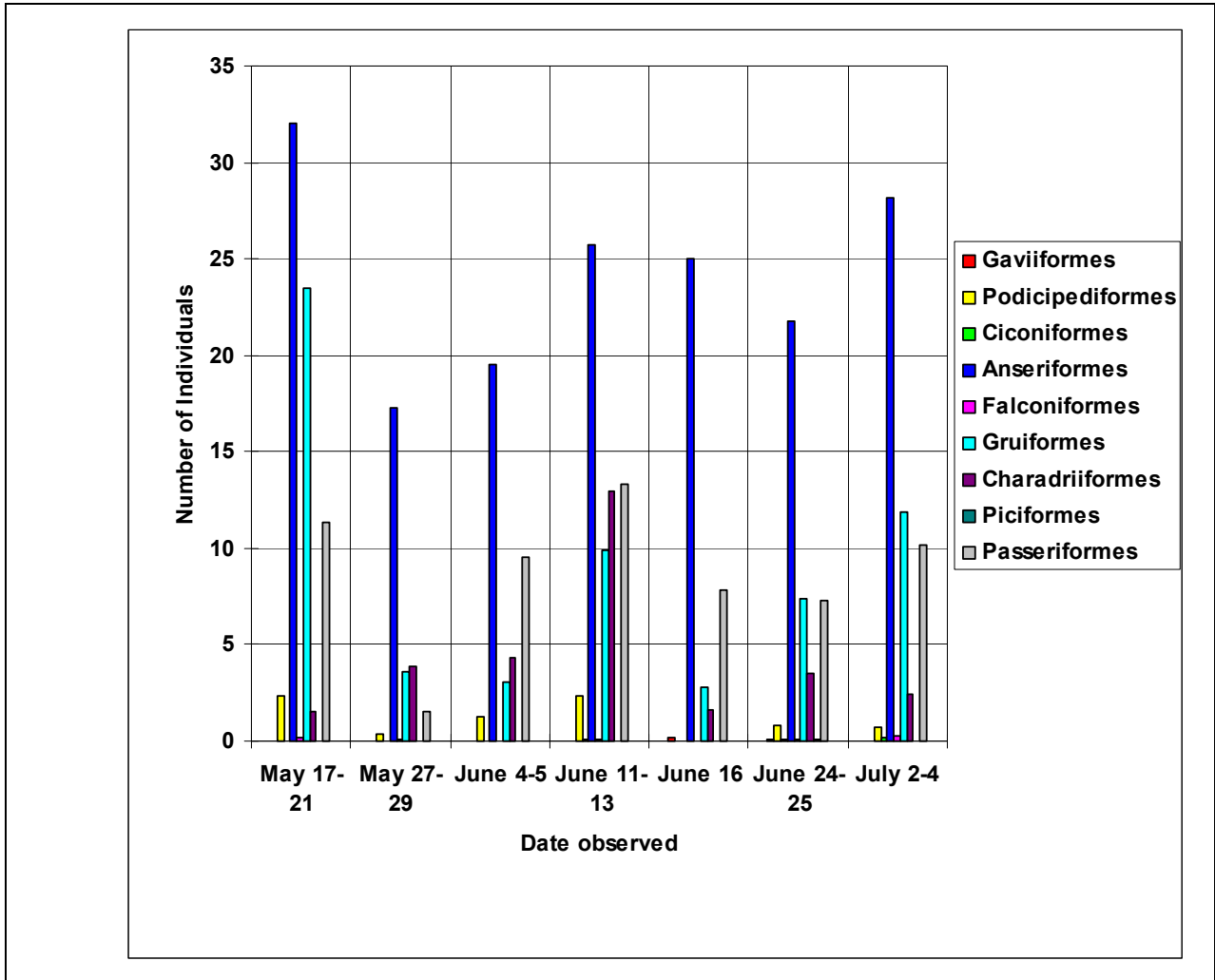


Figure 9. Numbers of species by Order in the Lake Margin Complex habitat

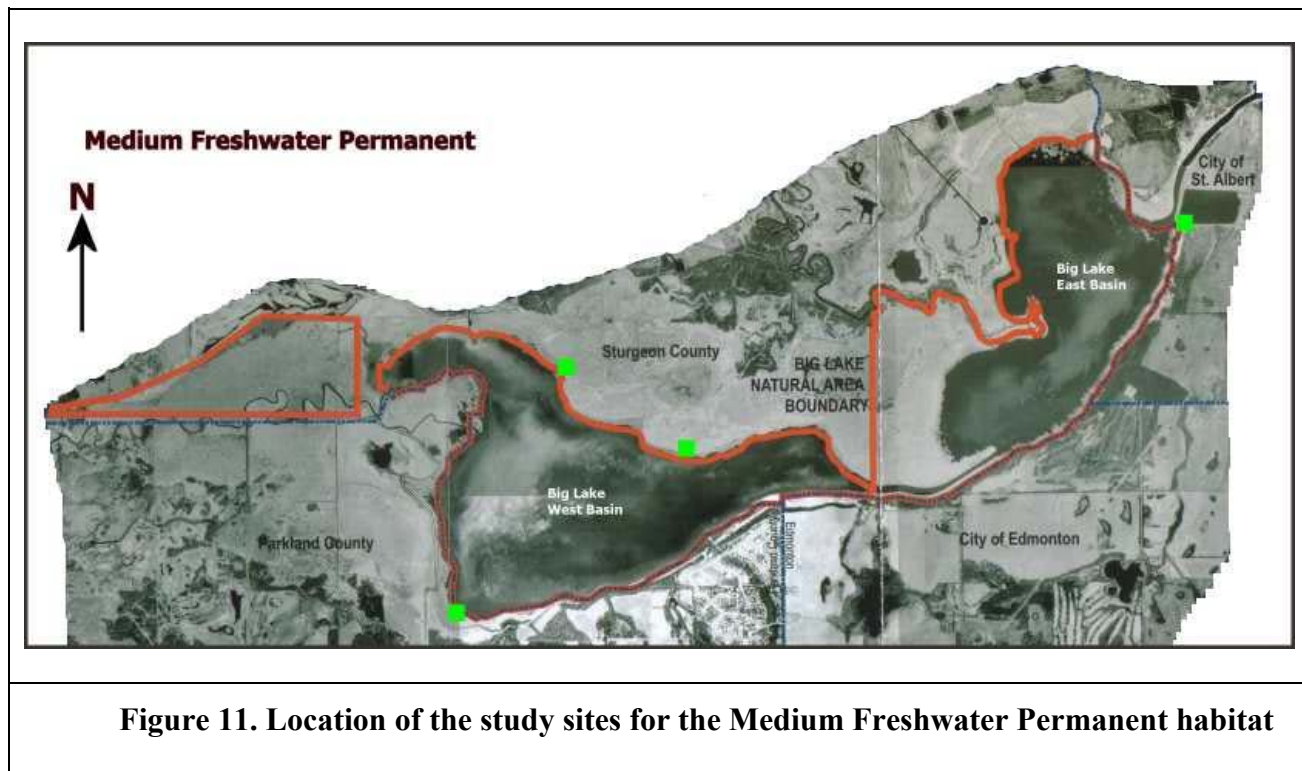


**Figure 10. Abundance of individuals by Order in the Lake Margin Complex habitat**

**Summary of observed species and abundance during migration and breeding season:**

In part due to the abundance of the Lake Margin Complex habitat and in part due to its composite nature, this habitat shows by far the greatest diversity and abundance of species in the Big Lake Natural Area. Upland birds and waterfowl (Passeriformes and Anseriformes) make up much of the diversity as well as abundance, but this was also a notable habitat for Falconiformes, specifically Red-tailed Hawks and Bald Eagles. This was likely due to suitable nesting habitat.

## Medium Freshwater Permanent Habitat



Medium Permanent Freshwater Wetland	
Migratory Species (42)	Breeding Species (42)
<p><b>Podicipediformes</b>                      Pied-Billed Grebe*                      Horned Grebe*                      Red-necked Grebe                      Eared Grebe                      Western Grebe*</p> <p><b>Anseriformes</b>                      Canada Goose                      Mallard                      Northern Pintail                      Blue-winged Teal                      Northern Shoveler                      Gadwall                      American Wigeon                      Canvasback                      Redhead                      Ring-necked Duck                      Greater Scaup                      Lesser Scaup</p>	<p><b>Gaviiformes</b>                      Common Loon</p> <p><b>Podicipediformes</b>                      Pied-Billed Grebe*                      Eared Grebe                      Western Grebe*</p> <p><b>Ciconiiformes</b>                      Great Blue Heron*</p> <p><b>Anseriformes</b>                      Green-winged Teal                      Mallard                      Northern Pintail                      Cinnamon Teal                      Blue-winged Teal                      Northern Shoveler                      Gadwall                      American Wigeon</p>

Common Goldeneye	Canvasback
Bufflehead	Redhead
Ruddy Duck	Lesser Scaup
<b>Falconiformes</b>	Common Goldeneye
Merlin	Bufflehead
	Ruddy Duck
<b>Gruiformes</b>	<b>Falconiformes</b>
Sora Rail	Bald Eagle*
American Coot	
	<b>Gruiformes</b>
<b>Charadriiformes</b>	Sora Rail
Killdeer	American Coot
Greater Yellowlegs	
Lesser Yellowlegs	<b>Charadriiformes</b>
Willet	Killdeer
Common Snipe	Lesser Yellowlegs
Franklin's Gull	Willet
Bonaparte's Gull	Spotted Sandpiper
Common Tern	Marbled Godwit
Forster's Tern*	Common Snipe
Black Tern*	Wilson's Phalarope
	Franklin's Gull
<b>Passeriformes</b>	California Gull
Tree Swallow	Herring Gull
American Crow	Common Tern
Marsh Wren	Black Tern*
Common Yellowthroat	
Savannah Sparrow	<b>Passeriformes</b>
Song Sparrow	American Crow
Red-winged Blackbird	Marsh Wren
Yellow-headed Blackbird	Warbling Vireo
Brown-headed Cowbird	Red-eyed Vireo
	Yellow Warbler
	Common Yellowthroat
	Savannah Sparrow
	Red-winged Blackbird

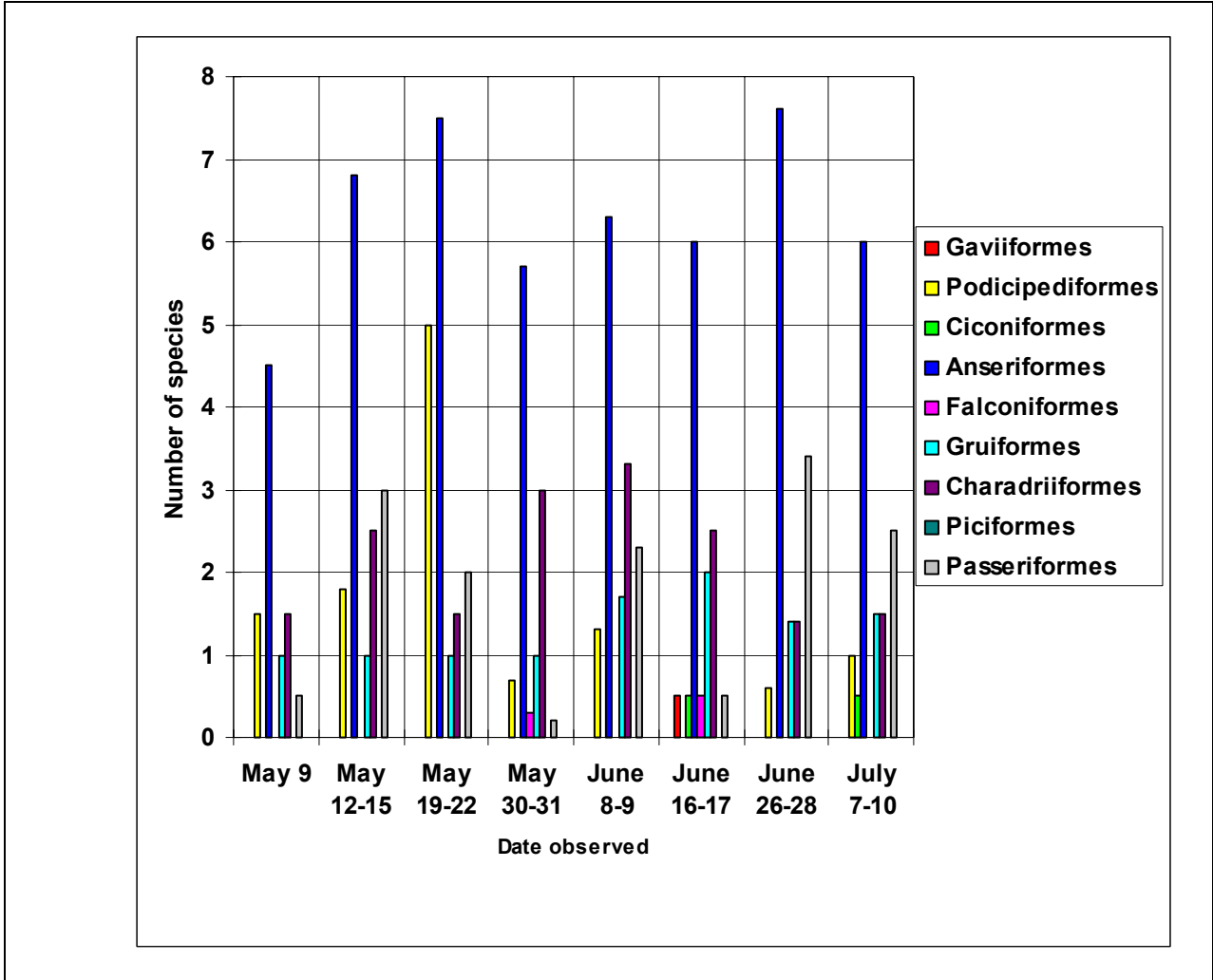
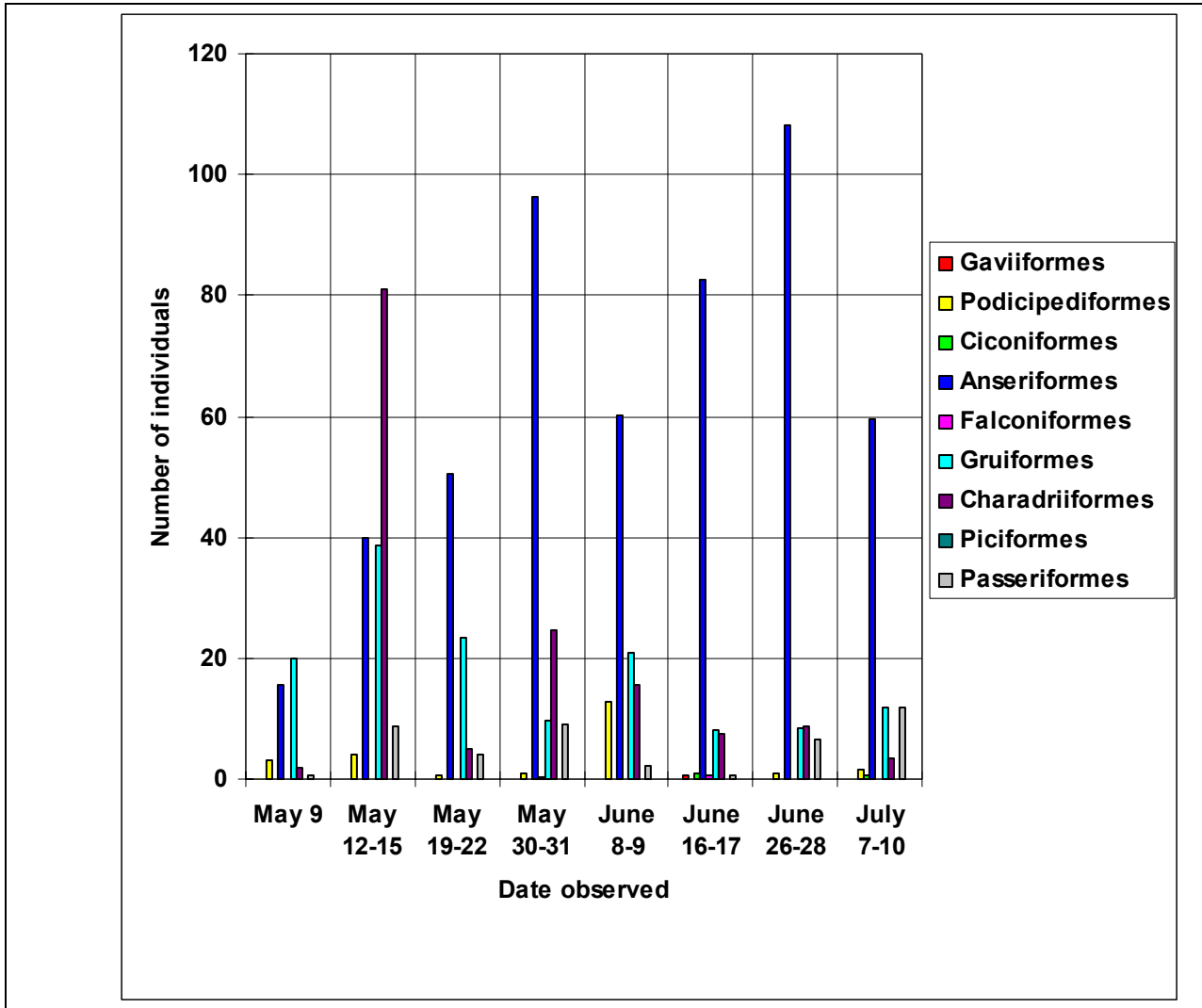


Figure 12. Numbers of species by Order in the Medium Freshwater Permanent habitat



**Figure 13. Abundance of individuals by Order in the Medium Freshwater Permanent habitat**

**Summary of observed species and abundance during migration and breeding season:**

The permanent wetland habitat appears to be important for species diversity, notably grebes (Podicipediformes) but is dominated in abundance of waterfowl (Anseriformes), especially in the breeding surveys. There is also a greater abundance of rails and coots (Gruiformes) than seen in other habitats.



## Seasonal Wetland/Native Grassland Habitat

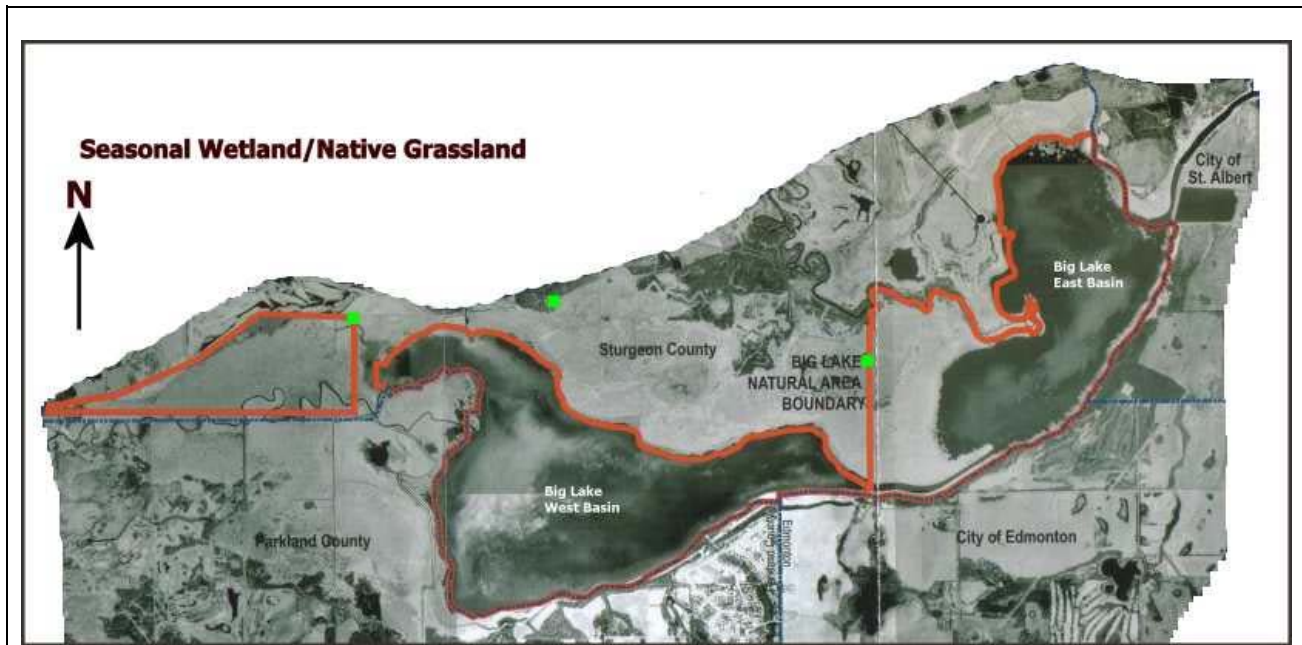


Figure 14. Location of the study sites for the Seasonal Wetland/ Native Grassland habitat

Seasonal Wetland/Native Grassland	
Migratory Species (26)	Breeding Species (37)
<p><b>Anseriformes</b>            Canada Goose            Green-winged Teal            Mallard            Cinnamon Teal            Blue-winged Teal            Northern Shoveler            Gadwall</p> <p><b>Gruiformes</b>            Sora Rail            American Coot</p> <p><b>Charadriiformes</b>            Killdeer            Lesser Yellowlegs            Willet            Common Snipe            Wilson's Phalarope            Franklin's Gull</p>	<p><b>Ciconiiformes</b>            American Bittern*</p> <p><b>Anseriformes</b>            Canada Goose            Mallard            Northern Pintail            Blue-winged Teal            Northern Shoveler            Gadwall            Redhead            Lesser Scaup            Ruddy Duck</p> <p><b>Falconiformes</b>            Red-tailed Hawk</p> <p><b>Gruiformes</b>            Sora Rail            American Coot</p>

<p>Bonaparte's Gull Common Tern Black Tern*</p> <p><b>Passeriformes</b> American Robin Yellow Warbler Chipping Sparrow Savannah Sparrow Song Sparrow White-throated Sparrow Red-winged Blackbird Yellow-headed Blackbird</p>	<p><b>Charadriiformes</b> Killdeer Spotted Sandpiper Common Snipe Wilson's Phalarope Franklin's Gull Ring-billed Gull Common Tern Forster's Tern* Black Tern*</p> <p><b>Passeriformes</b> Tree Swallow Black-billed Magpie American Crow Marsh Wren Ruby-crowned Kingbird American Robin Yellow Warbler Common Yellowthroat Clay-coloured Sparrow Savannah Sparrow Le Conte's Sparrow Song Sparrow Swamp Sparrow Red-winged Blackbird Yellow-headed Blackbird</p>
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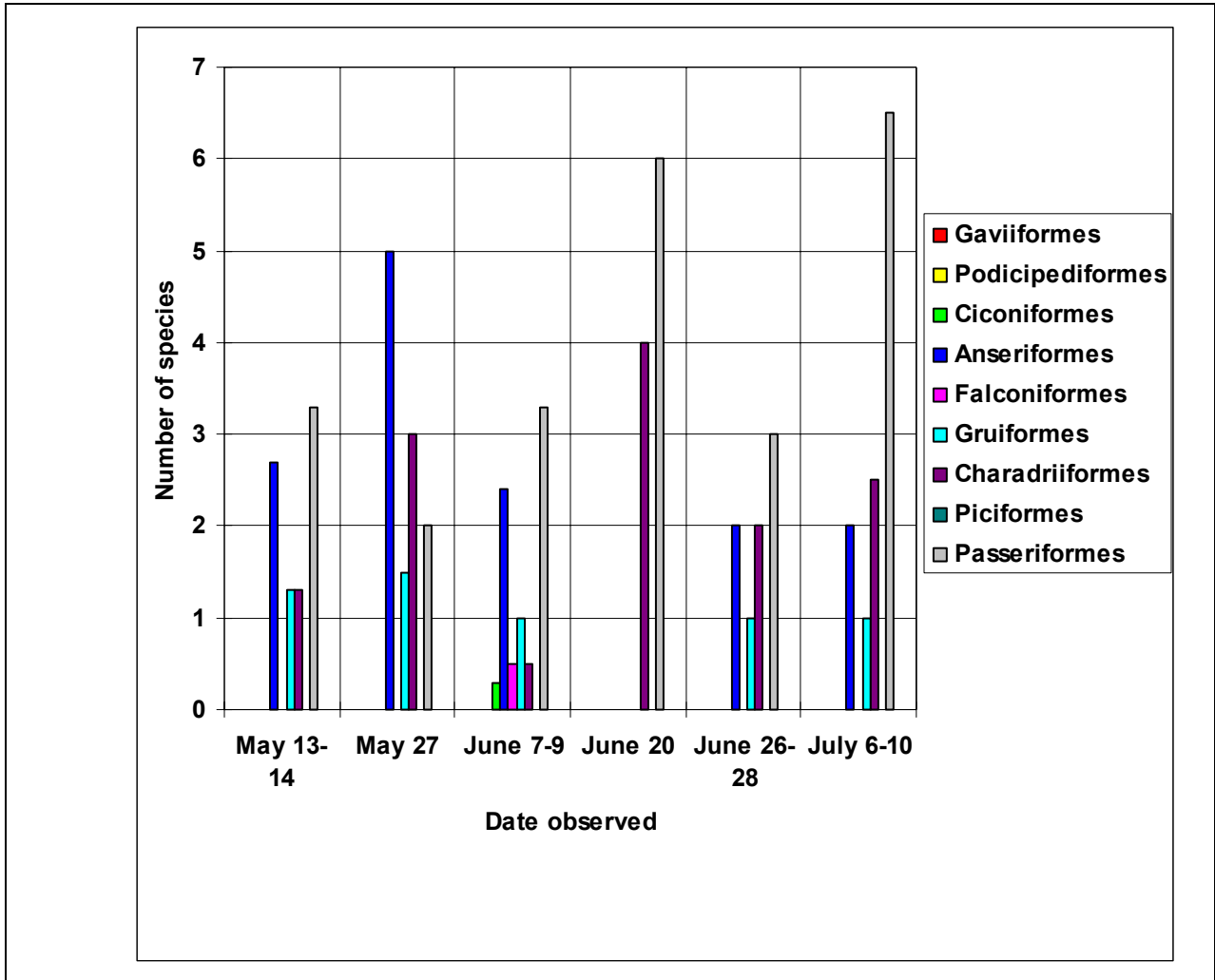
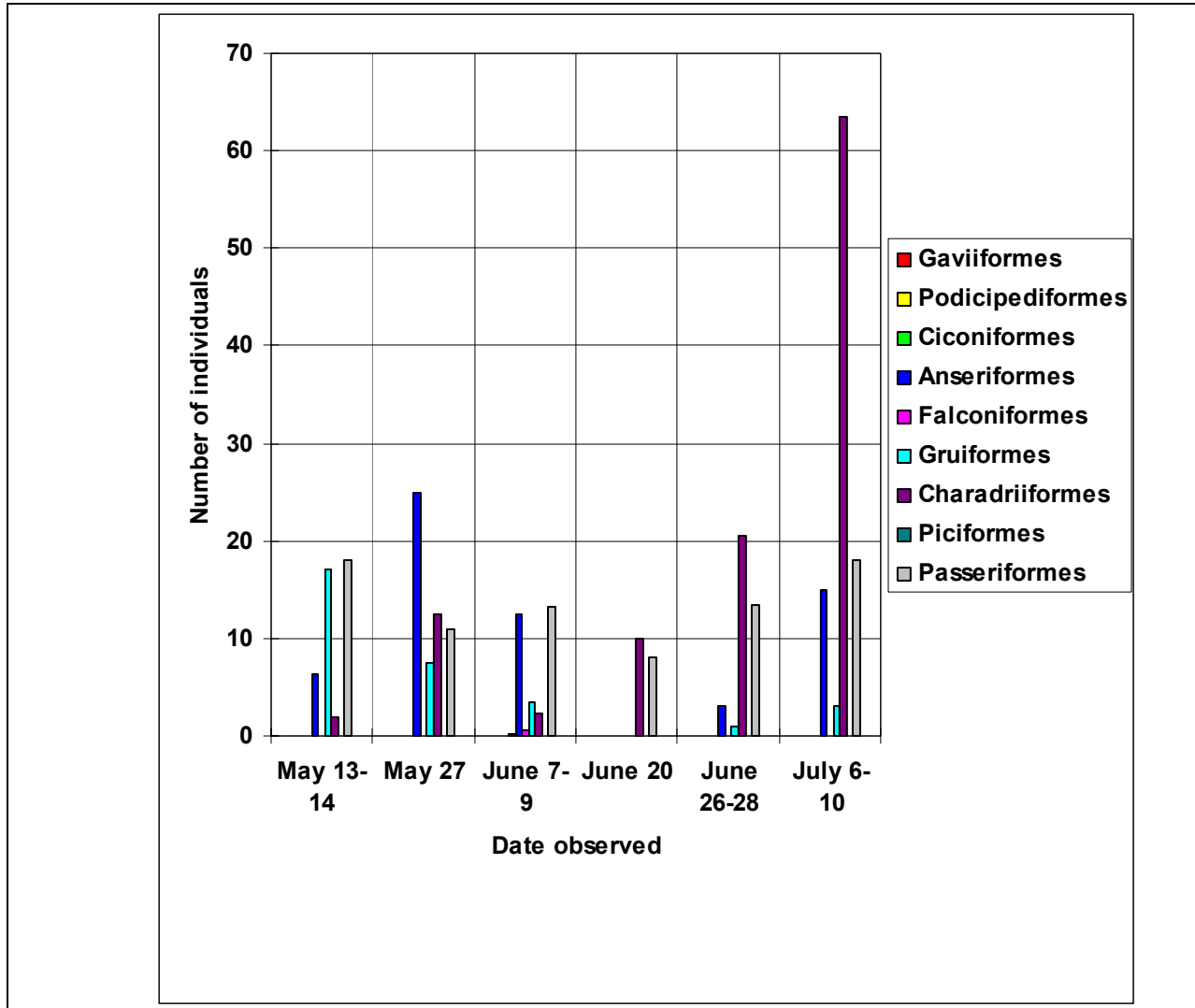


Figure 15. Numbers of species by Order in the Seasonal Wetland/Native Grassland habitat



**Figure 16. Abundance of individuals by Order in the Seasonal Wetland/Native Grassland habitat**

**Summary of observed species and abundance during migration and breeding season:**

The seasonal wetland/native grassland shows a marked diversity in shorebirds, gulls and terns (Charadriiformes) and relatively high numbers of species of “songbirds” (Passeriformes), with diminished numbers of waterfowl (Anseriformes), especially during the breeding season. Also notable is the consistency of rails and coots (Gruiformes) and the abundance of the two species in the breeding season when the native grassland is a more accurate description of the habitat.

## Semi-Permanent Wetland Habitat

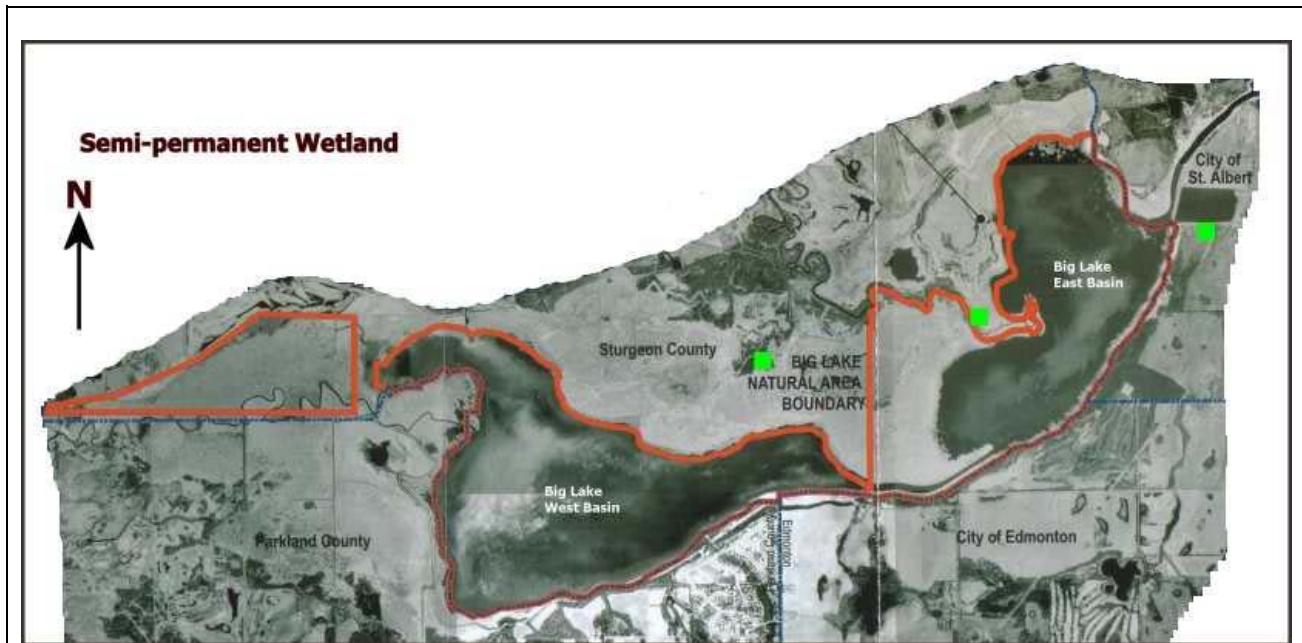


Figure 17. Location of the study sites for the Semi-permanent Wetland habitat

Semi-permanent Wetland	
Migratory Species (39)	Breeding Species (41)
<b>Anseriformes</b> Canada Goose Mallard Cinnamon Teal Blue-winged Teal Northern Shoveler Gadwall American Wigeon Canvasback Redhead Common Goldeneye Bufflehead Ruddy Duck  <b>Falconiformes</b> American Kestrel  <b>Gruiformes</b> Sora Rail American Coot	<b>Ciconiiformes</b> American Bittern*  <b>Anseriformes</b> Canada Goose Green-winged Teal Mallard Northern Pintail Blue-winged Teal Northern Shoveler Gadwall Canvasback Redhead Lesser Scaup Ruddy Duck  <b>Falconiformes</b> American Kestrel  <b>Gruiformes</b>

<p><b>Charadriiformes</b> Killdeer Lesser Yellowlegs Willet Common Snipe Wilson's Phalarope Common Tern Black Tern*</p> <p><b>Passeriformes</b> Tree Swallow Barn Swallow American Crow Common Raven Black-capped Chickadee Boreal Chickadee Sprague's Pipit* Yellow Warbler Common Yellowthroat Clay-coloured Sparrow Savannah Sparrow Song Sparrow Lincoln's Sparrow Swamp Sparrow White-throated Sparrow Red-winged Blackbird Yellow-headed Blackbird</p>	<p>Sora Rail American Coot</p> <p><b>Charadriiformes</b> Killdeer American Avocet Greater Yellowlegs Spotted Sandpiper Common Snipe Wilson's Phalarope Franklin's Gull Black Tern*</p> <p><b>Passeriformes</b> Alder Flycatcher Least Flycatcher Tree Swallow American Crow Common Raven House Wren Cedar Waxwing Yellow Warbler Common Yellowthroat Clay-coloured Sparrow Savannah Sparrow Le Conte's Sparrow Swamp Sparrow Red-winged Blackbird Yellow-headed Blackbird Common Grackle Brown-headed Cowbird American Goldfinch</p>
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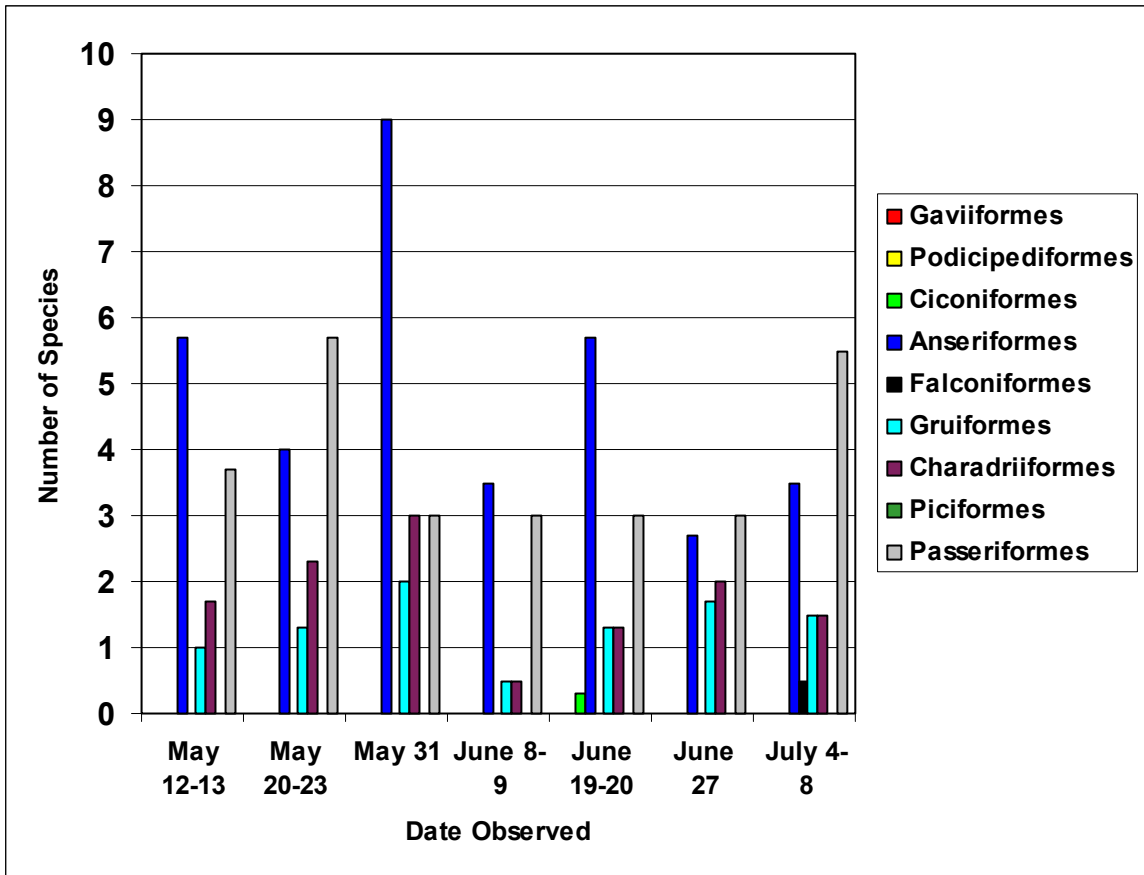
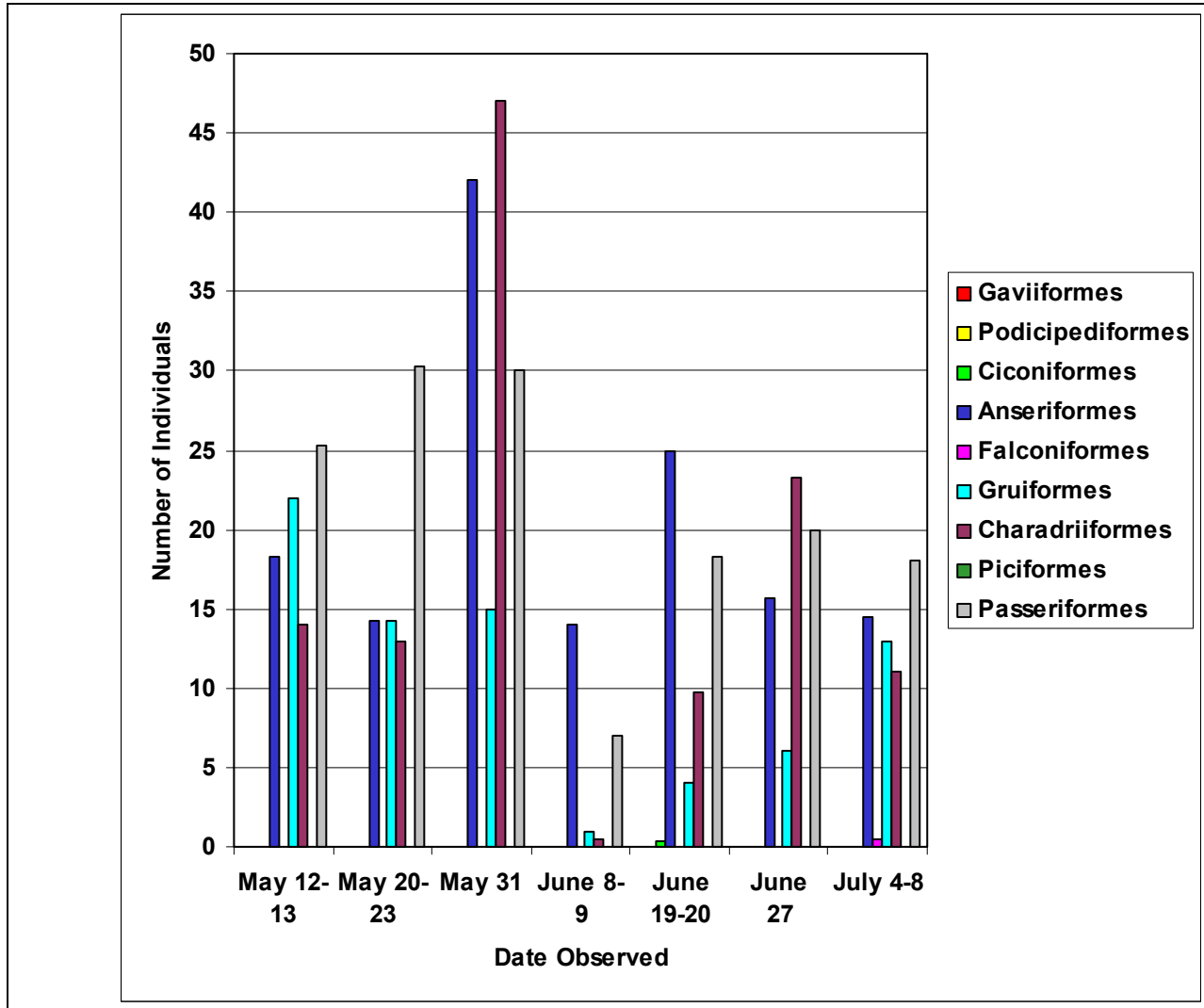


Figure 18. Numbers of species by Order in the Semi-permanent Wetland habitat



**Figure 19. Abundance of individuals by Order in the Semi-permanent Wetland habitat**

**Summary of observed species and abundance during migration and breeding season:**

The semi-permanent wetland habitats show huge diversity for a small number of sites. This habitat supports an especially large variety and abundance of shorebirds, gulls and terns (Charadriiformes), as well as very diverse songbirds (Passeriformes) and waterfowl (Anseriformes). There is a relatively consistent split between these families and Gruiformes, rather than a domination of one set of species.



## Small Permanent Wetland Habitat

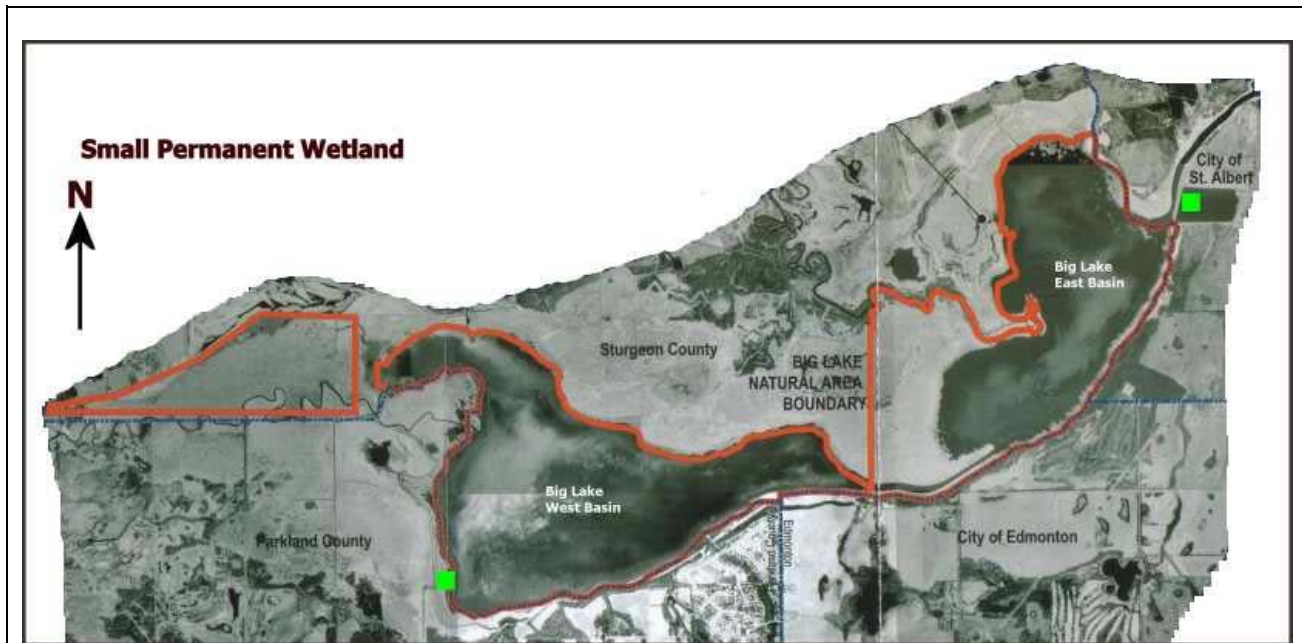


Figure 20. Location of the study sites for the Small Permanent Wetland habitat

Small Permanent Wetland	
Migratory Species (40)	Breeding Species (36)
<p><b>Podicipediformes</b> Pied-billed Grebe* Red-necked Grebe</p> <p><b>Anseriformes</b> Canada Goose Mallard Blue-winged Teal Northern Shoveler Gadwall American Wigeon Canvasback Redhead Ring-necked Duck Lesser Scaup Surf Scoter Common Goldeneye Bufflehead Hooded Merganser</p>	<p><b>Gaviiformes</b> Common Loon</p> <p><b>Podicipediformes</b> Red-necked Grebe Eared Grebe</p> <p><b>Ciconiiformes</b> American Bittern*</p> <p><b>Anseriformes</b> Mallard Blue-winged Teal Northern Shoveler Gadwall American Wigeon Canvasback Redhead Ring-necked Duck</p>

Ruddy Duck	Lesser Scaup
<b>Falconiformes</b>	Common Goldeneye
Bald Eagle*	Bufflehead
Northern Harrier	Ruddy Duck
<b>Gruiformes</b>	<b>Falconiformes</b>
Sora Rail	Bald Eagle*
American Coot	Merlin
<b>Charadriiformes</b>	<b>Gruiformes</b>
Killdeer	Sora Rail
Lesser Yellowlegs	American Coot
Spotted Sandpiper	<b>Charadriiformes</b>
Common Snipe	Greater Yellowlegs
Franklin's Gull	Spotted Sandpiper
Ring-billed Gull	Common Snipe
<b>Passeriformes</b>	Wilson's Phalarope
Tree Swallow	Franklin's Gull
American Crow	Ring-billed Gull
Black-capped Chickadee	Common Tern
House Wren	Black Tern*
Ruby-crowned Kinglet	<b>Passeriformes</b>
Yellow Warbler	Alder Flycatcher
Chipping Sparrow	Common Yellowthroat
Clay-coloured Sparrow	Yellow Warbler
Savannah Sparrow	Clay-coloured Sparrow
Fox Sparrow	Le Conte's Sparrow
Song Sparrow	Song Sparrow
White-throated Sparrow	Red-winged Blackbird
Red-winged Blackbird	Brown-headed Cowbird

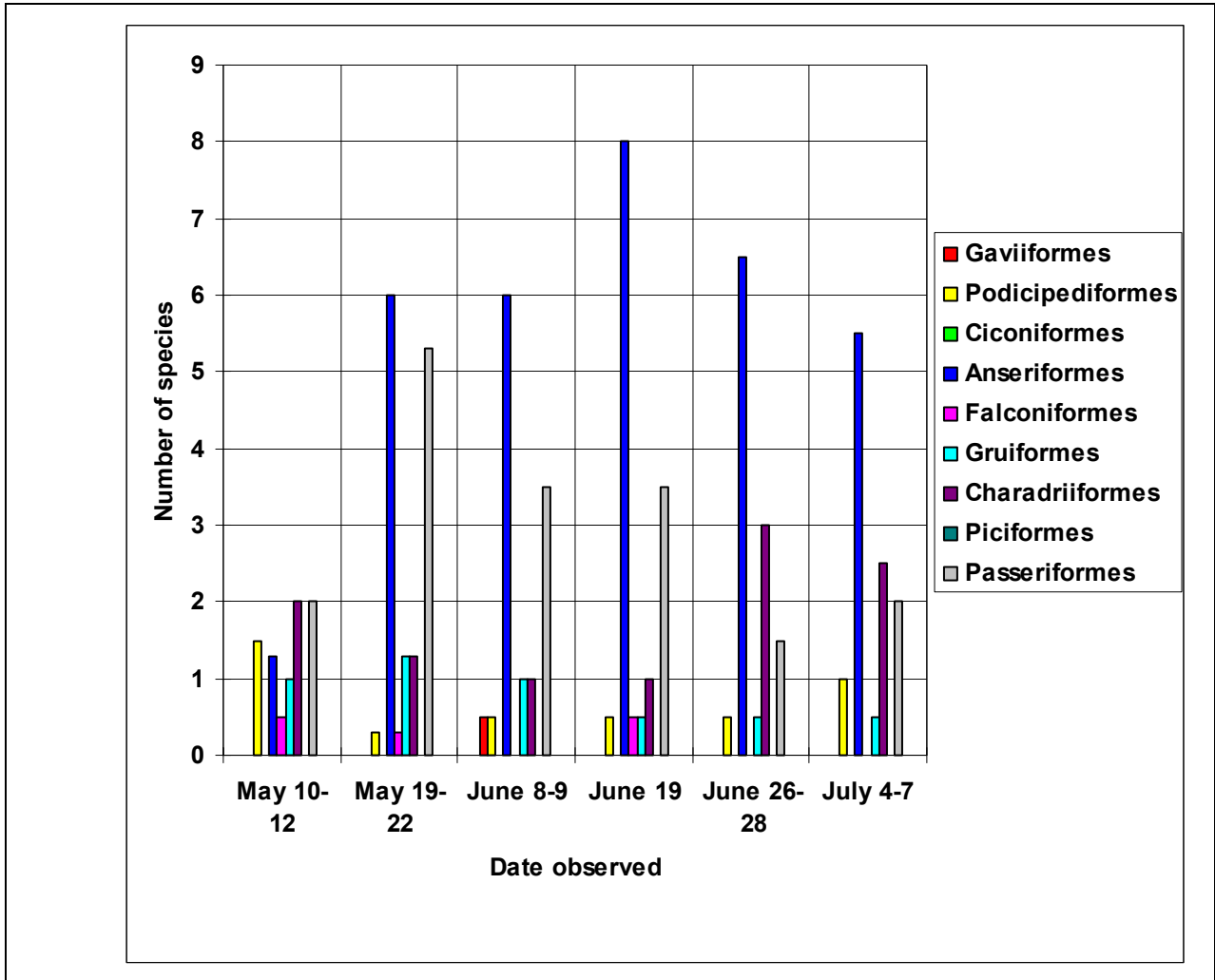
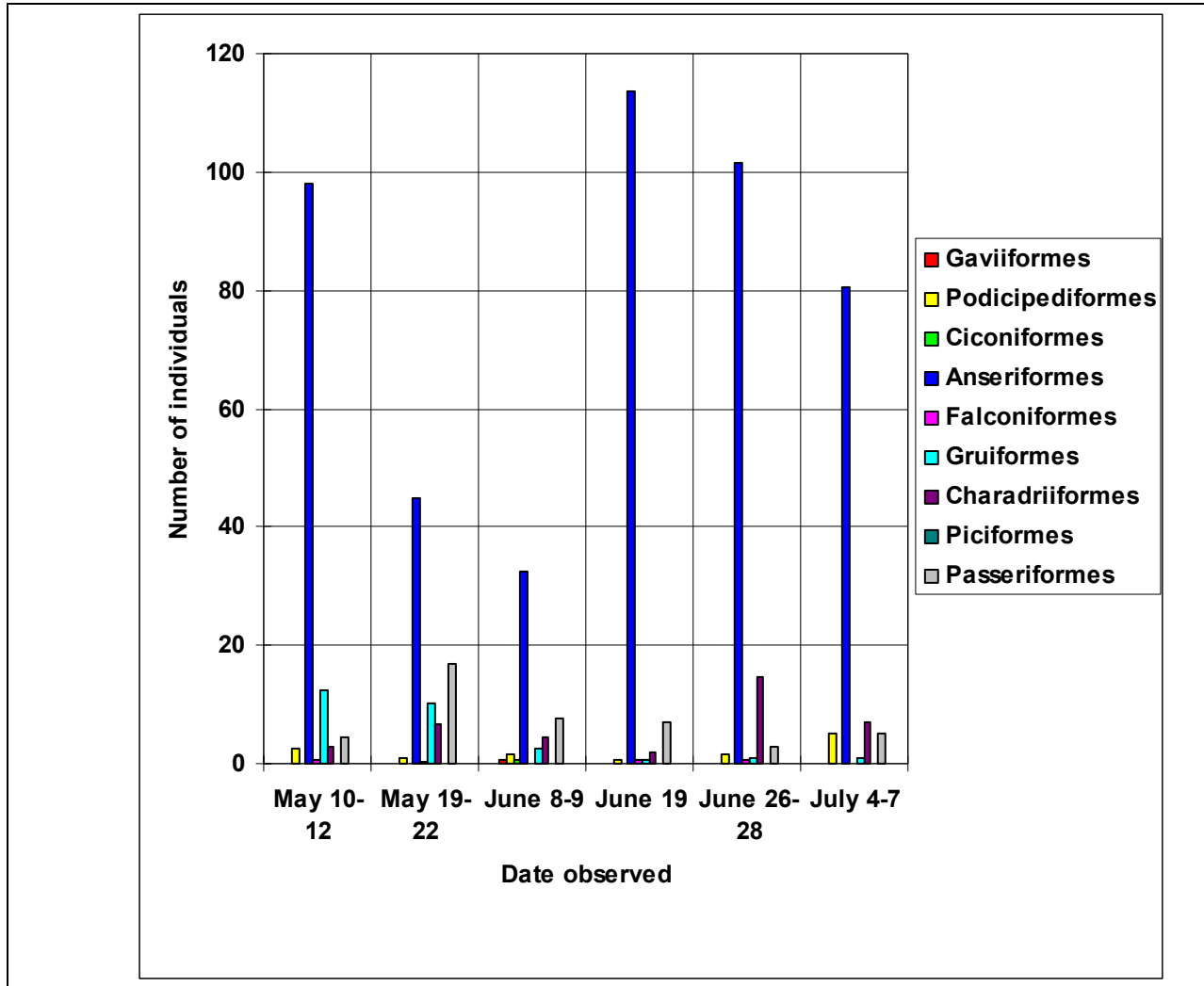


Figure 21. Numbers of species by Order in the Small Permanent Wetland habitat

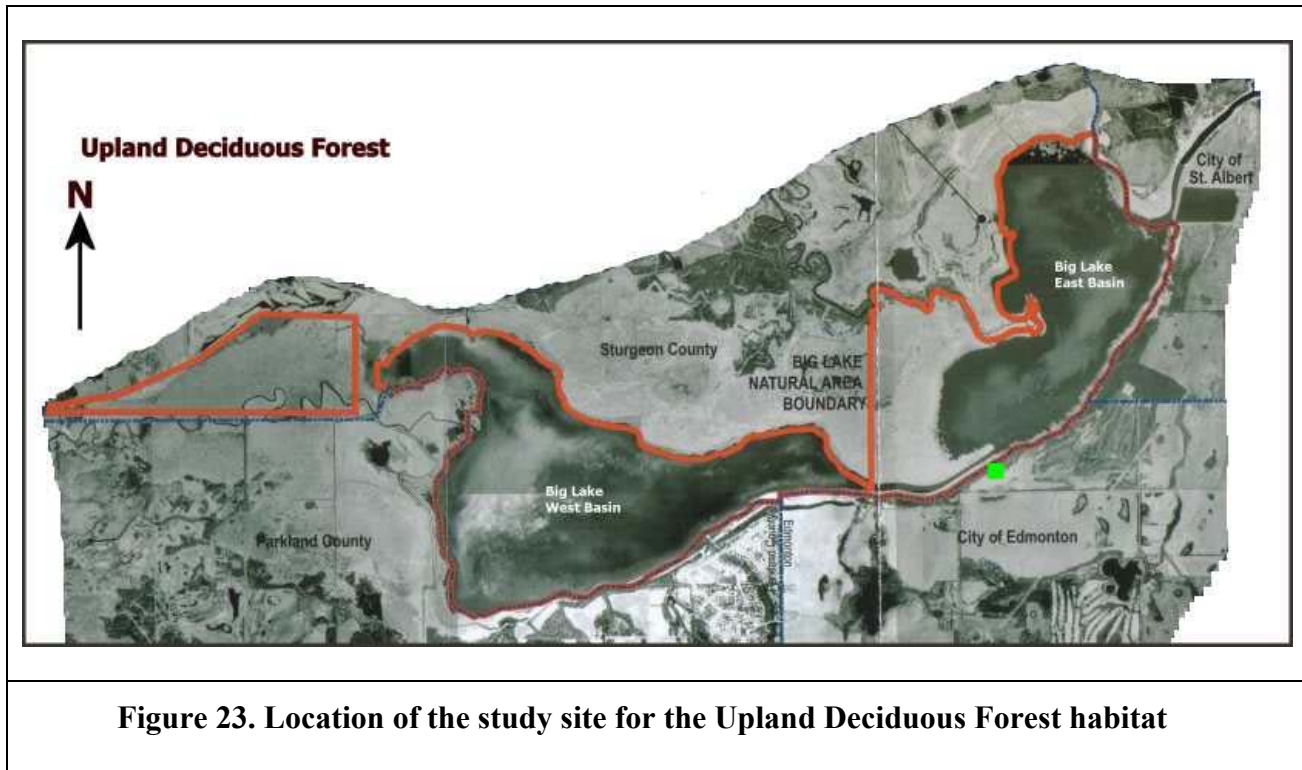


**Figure 22. Abundance of individuals by Order in the Small Permanent Wetland habitat**

**Summary of observed species and abundance during migration and breeding season:**

The Small Permanent Wetlands encompass much less edge habitat than do the semi-permanent habitat and are therefore dominated by waterfowl (Anseriformes). Other families are represented with a few individuals from many species and thereby create a large diversity in this habitat. The migratory and breeding populations are both largely diverse, but the breeding season is dominated by waterfowl.

## Upland Deciduous Forest Habitat



**Figure 23. Location of the study site for the Upland Deciduous Forest habitat**

Upland Deciduous Forest	
Migratory Species (11)	Breeding Species (14)
<p><b>Piciformes</b> Yellow-bellied Sap Sucker</p> <p><b>Passeriformes</b> Least Flycatcher Black-capped Chickadee Orange-Crowned Warbler Yellow Warbler Yellow-rumped Warbler Song Sparrow House Wren White-throated Sparrow Dark-eyed Junco Brown-headed Cowbird</p>	<p><b>Anseriformes</b> Canada Goose</p> <p><b>Falconiformes</b> Red-tailed Hawk</p> <p><b>Piciformes</b> Downy Woodpecker</p> <p><b>Passeriformes</b> Alder Flycatcher Eastern Phoebe American Robin Red-eyed Vireo Warbling Vireo Common Yellowthroat Clay-coloured Sparrow Fox Sparrow Lincoln's Sparrow</p>

	Red-winged Blackbird Yellow-headed Blackbird
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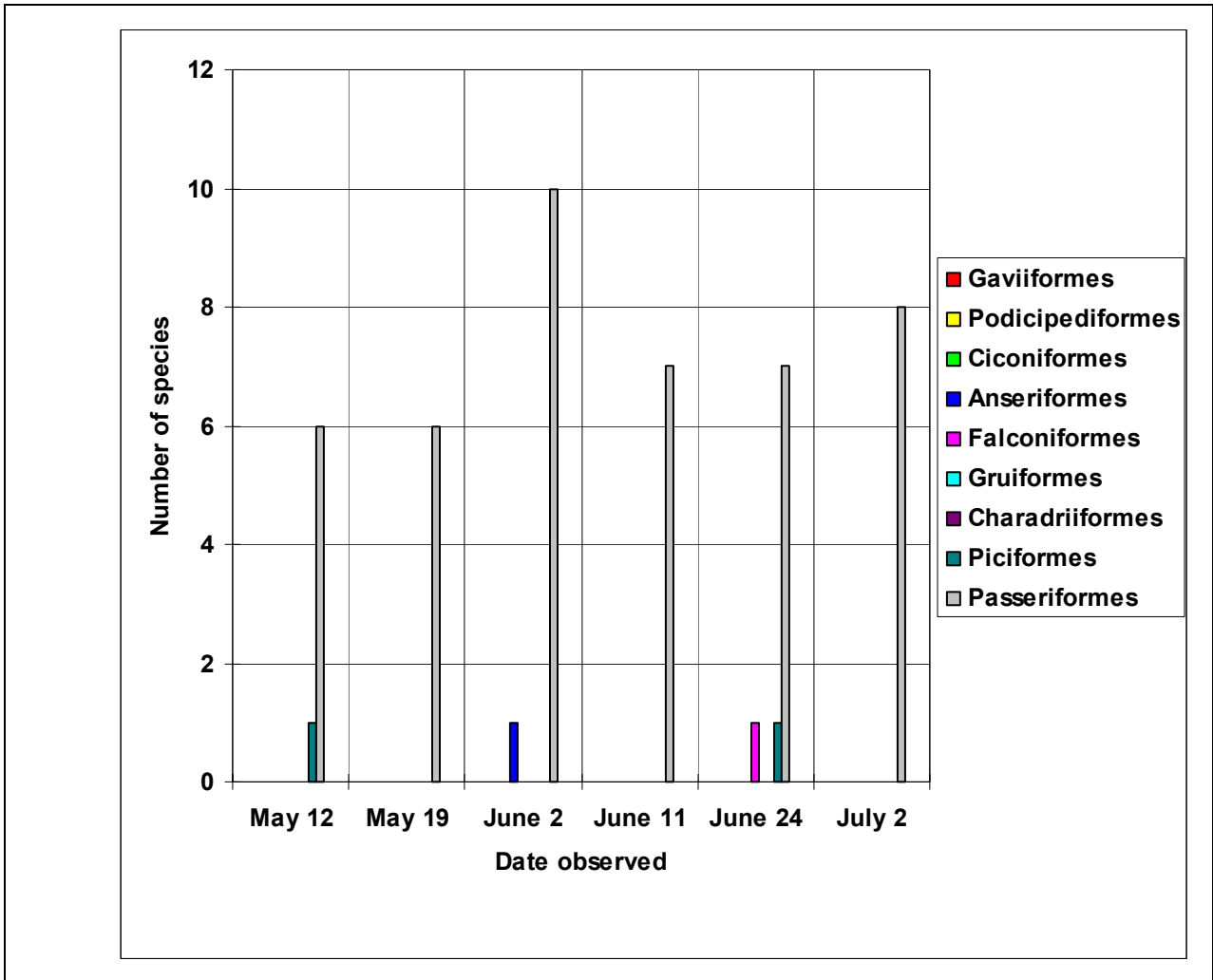
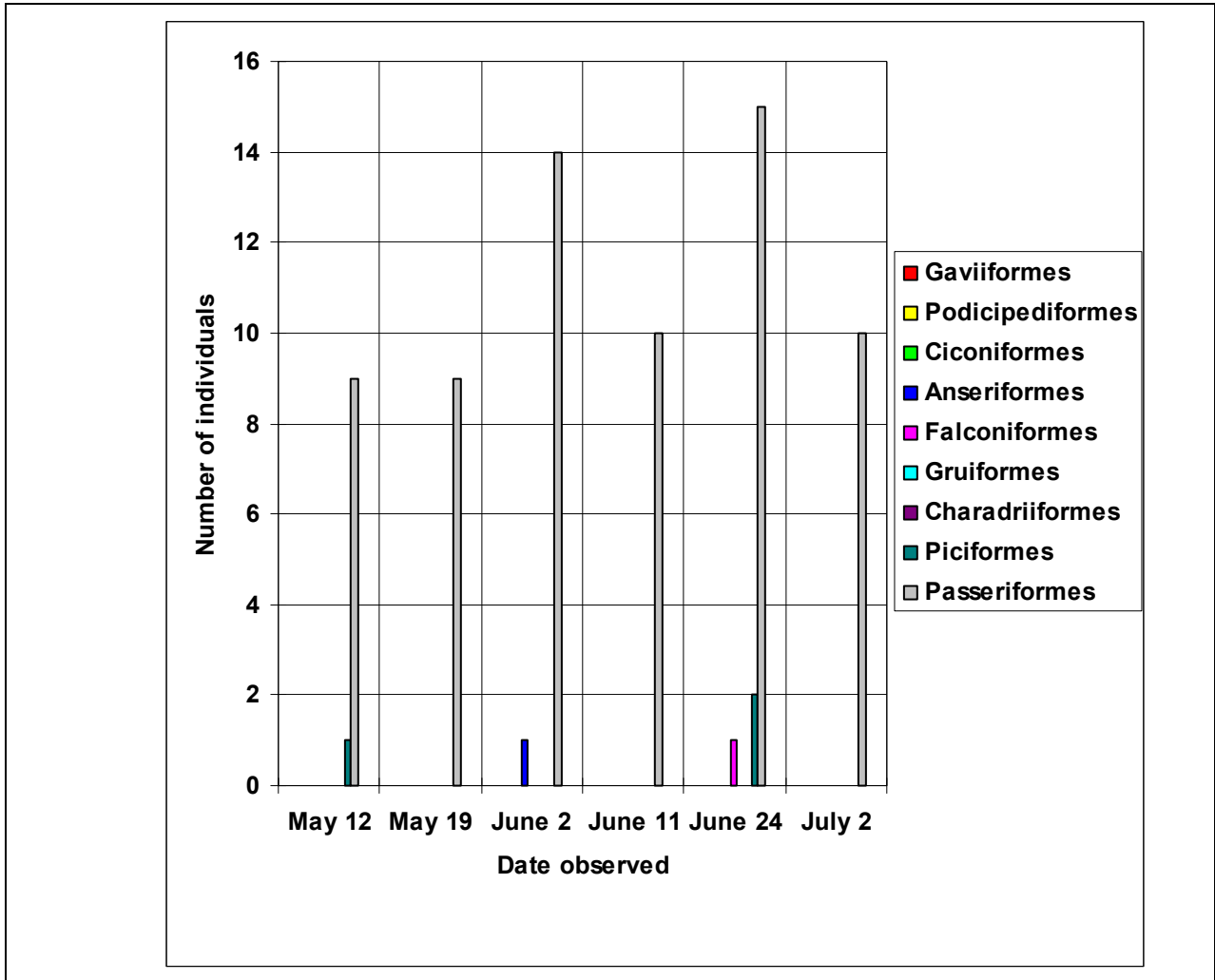


Figure 24. Numbers of species by Order in the Upland Deciduous Forest habitat



**Figure 25. Abundance of individuals by Order in the Upland Deciduous Forest habitat**

**Summary of observed species and abundance during migration and breeding season:**

Being in a wooded area, the species and individuals are mostly in the Passeriformes Order, with the proportions of species and abundance being similar. This is an important habitat for a variety of upland species that were not found in any other habitat (Dark-eyed Junco, Yellow-rumped and Orange-crowned Warblers).

## Upland White Spruce Forest Habitat

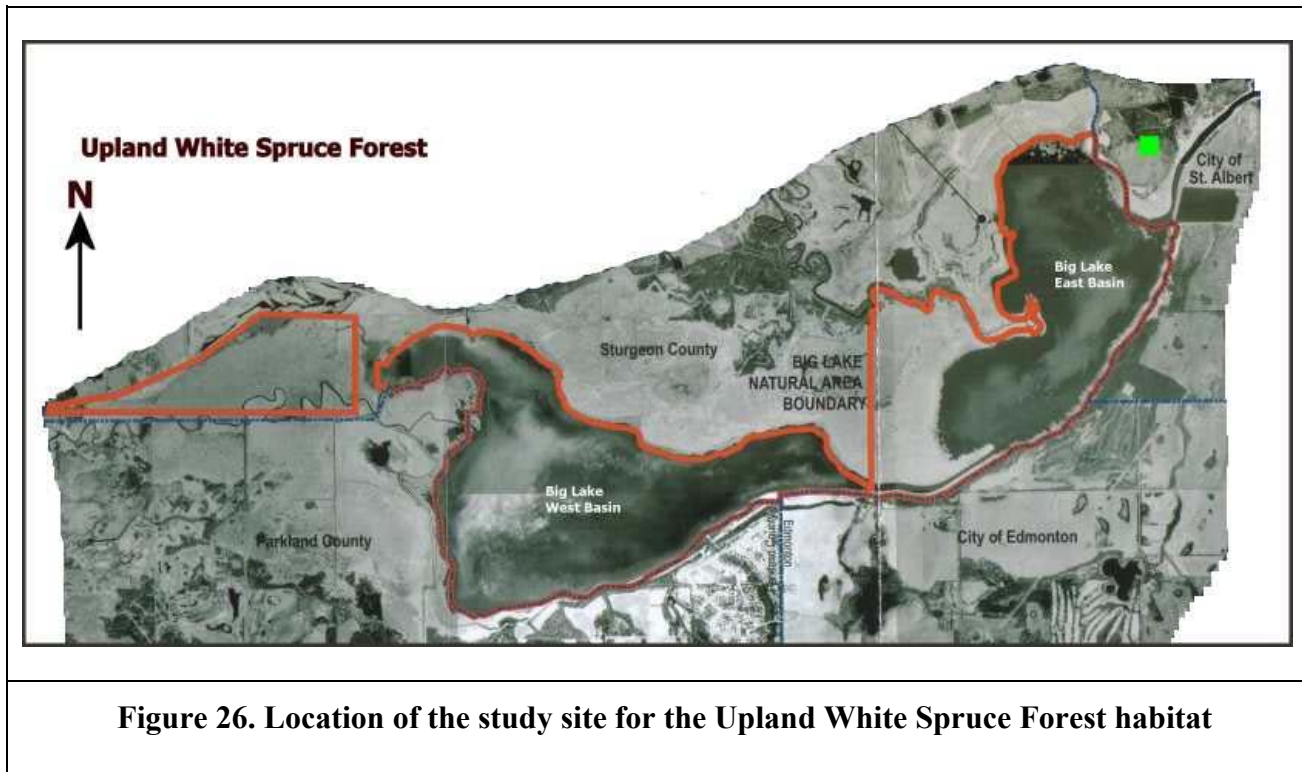


Figure 26. Location of the study site for the Upland White Spruce Forest habitat

Upland White Spruce Forest	
Migratory Species (10)	Breeding Species (14)
<b>Passeriformes</b> Least Flycatcher American Crow Black-capped Chickadee House Wren American Robin Yellow Warbler Chipping Sparrow Clay-coloured Sparrow Fox Sparrow Song Sparrow	<b>Anseriformes</b> Blue-winged Teal  <b>Charadriiformes</b> Killdeer  <b>Passeriformes</b> Least Flycatcher American Crow Black-capped Chickadee White-breasted Nuthatch House Wren Ruby-crowned Kinglet American Robin Red-eyed Vireo Yellow Warbler Chipping Sparrow Clay-coloured Sparrow Song Sparrow



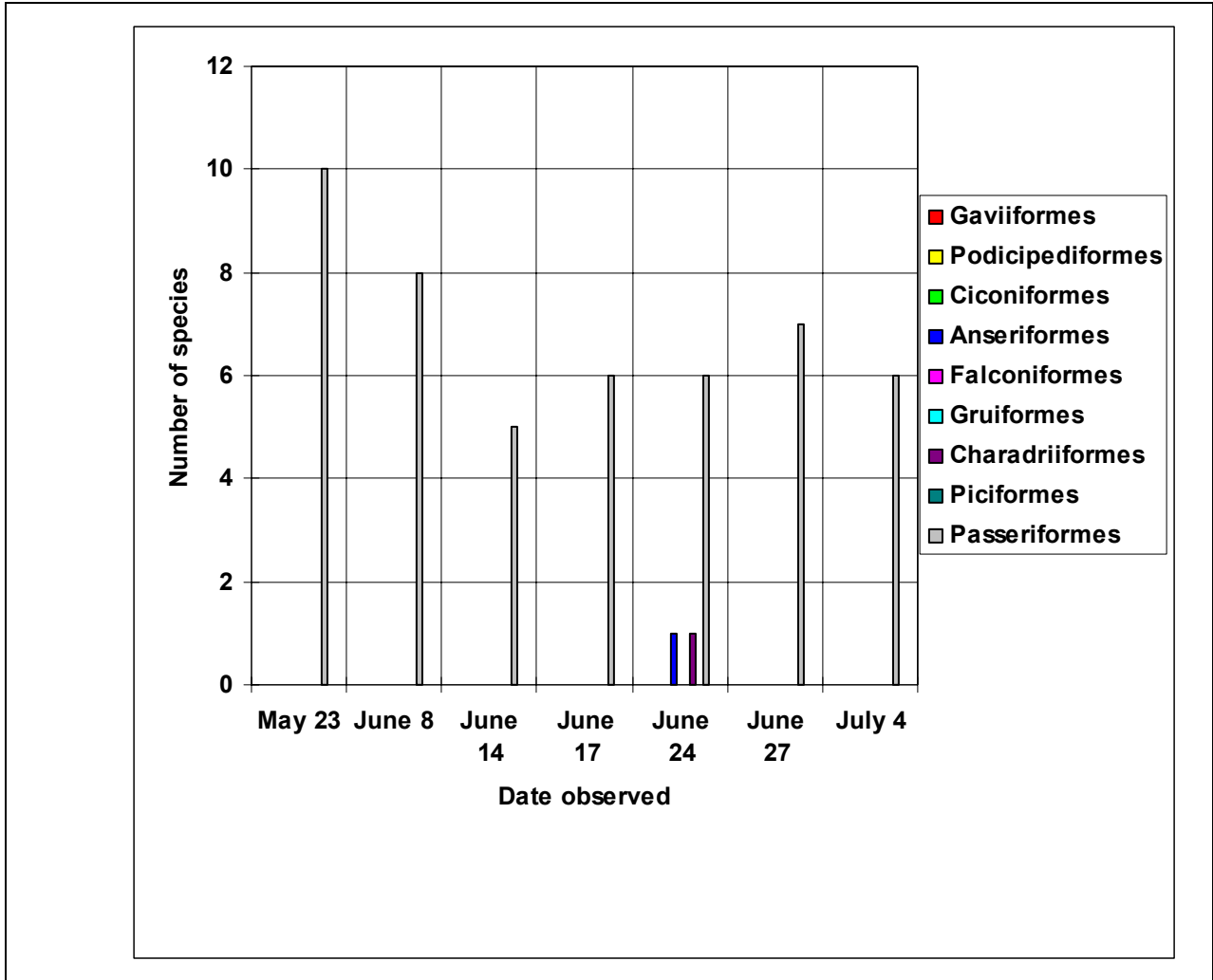
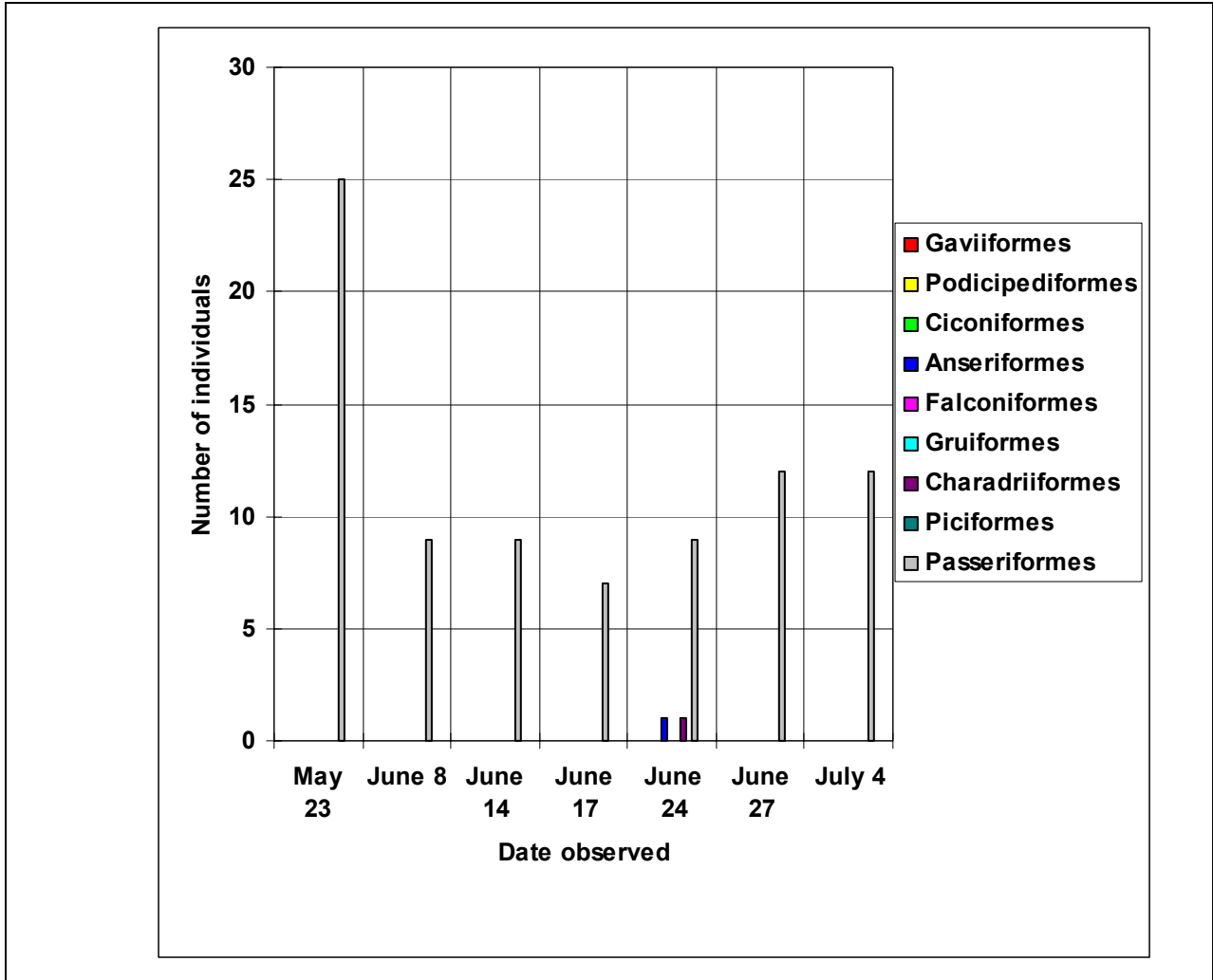


Figure 27. Numbers of species in each bird Order in the Upland White Spruce habitat



**Figure 28. Abundance of individuals by Order in the Upland White Spruce habitat**

**Summary of observed species and abundance during migration and breeding season:**

The white spruce forest habitat is dominated by Passeriformes and is notably diverse in species. This small area is the remnant of a mature white spruce forest that still provides habitat for such species as the White-breasted Nuthatch and the Ruby-crowned Kinglet.

## APPENDIX II Status of Species found on and around the Big Lake Natural Area

(status determined by Alberta Environment, 2000)

Order	Common Name	Scientific Name	Status	Trends	Presence	Notes
<b>Gaviiformes</b>	Common Loon	<i>Gavia immer</i>	Secure		Summer Breeding	
<b>Podicipediformes</b>	Pied-Billed Grebe	<i>Podilymbus podiceps</i>	Sensitive	Declining	Summer Breeding	
	Horned Grebe	<i>Podiceps auritus</i>	Sensitive	Declining	Summer Breeding	
	Red-Necked Grebe	<i>Podiceps grisegena</i>	Secure		Summer Breeding	Pairs spotted throughout, nesting suspected
	Eared Grebe	<i>Podiceps nigricollis</i>	Secure		Summer Breeding	Pairs spotted throughout, nesting suspected
	Western Grebe	<i>Aechmophorus occidentalis</i>	Sensitive	Local and uncommon. Believed stable	Summer Breeding	One pair spotted
<b>Ciconiiformes</b>	American Bittern	<i>Botaurus lentiginosus</i>	Sensitive	Suspected Declines	Summer Breeding	Possible nest, mating calls
	Great Blue Heron	<i>Ardea herodias</i>	Sensitive	Declining colony sizes and numbers	Summer Migratory / Breeding	Two pairs spotted, possible nest
<b>Anseriformes</b>	Tundra Swan	<i>Cygnus columbianus</i>	Secure		Migratory	
	Canada Goose	<i>Branta canadensis</i>	Secure		Summer Breeding	Several pairs spotted, several nests found, many broods seen
	Green-Winged Teal	<i>Anas crecca</i>	Secure		Summer Breeding	Several pairs spotted, possible nests
	Mallard	<i>Anas platyrhynchos</i>	Secure		Summer Breeding	Many pairs spotted, several nests with eggs found

Order	Common Name	Scientific Name	Status	Trends	Presence	Notes
	Northern Pintail	<i>Anas acuta</i>	Secure		Summer Breeding	Several pairs spotted throughout, suspected nesting
	Blue-Winged Teal	<i>Anas discors</i>	Secure		Summer Breeding	Many pairs spotted, nests found and broods seen
	Cinnamon Teal	<i>Anas cyanoptera</i>	Secure		Rare	Several pairs spotted, possible nests
	Northern Shoveler	<i>Anas clypeata</i>	Secure		Summer Breeding	Many pairs spotted, nests suspected
	Gadwall	<i>Anas strepera</i>	Secure		Summer Breeding	Pairs spotted throughout, nests suspected
	American Wigeon	<i>Anas americana</i>	Secure		Summer Breeding	Pairs spotted throughout, nests suspected
	Canvasback	<i>Aythya valisineria</i>	Secure		Summer Breeding	Many pairs spotted throughout, nest found
	Redhead	<i>Aythya americana</i>	Secure		Summer Breeding	Many pairs spotted throughout, nests suspected
	Ring-Necked Duck	<i>Aythya collaris</i>	Secure		Summer Breeding	Several pairs spotted
	Greater Scaup	<i>Aythya marila</i>	Secure		Migratory	
	Lesser Scaup	<i>Aythya affinis</i>	Secure		Summer Breeding	Many pairs spotted, several broods seen
	Surf Scoter	<i>Melanitta perspicillata</i>	Secure		Migratory	
	Common Goldeneye	<i>Bucephala clangula</i>	Secure		Summer Breeding	Many pairs throughout, many broods seen

Order	Common Name	Scientific Name	Status	Trends	Presence	Notes
	Bufflehead	<i>Bucephala albeola</i>	Secure		Summer Breeding	Many pairs spotted, two broods seen
	Hooded Merganser	<i>Lophodytes cucullatus</i>	Secure	Rare	Summer Breeding	
	Ruddy Duck	<i>Oxyura dominica</i>	Secure		Summer Breeding	
	White-Winged Scoter	<i>Melanitta fusca</i>	Sensitive	Significant declines	Summer Breeding	
<b>Falconiformes</b>	Osprey	<i>Pandion haliaetus</i>	Sensitive	Unknown	Summer Breeding	Several seen, one flying with medium-sized fish
	Bald Eagle	<i>Haliaeetus leucocephalus</i>	Sensitive	Recovering	Summer Migratory / Breeding	Several sightings in one area, possible nest
	Northern Harrier	<i>Circus cyaneus</i>	Secure		Summer Breeding	
	Red-Tailed Hawk	<i>Buteo jamaicensis</i>	Secure		Summer Breeding	Several spotted, one pair with nest and young
	American Kestrel	<i>Falco sparverius</i>	Secure		Summer Breeding	
	Merlin	<i>Falco columbianus</i>	Secure		Year-Round	
<b>Gruiformes</b>	Sora	<i>Porzana carolina</i>	Secure		Summer Breeding	Many mating calls, several spotted, nests and eggs found
	American Coot	<i>Fulica americana</i>	Secure		Summer Breeding	Many spotted, mating behaviour, nests and eggs found, broods seen

Order	Common Name	Scientific Name	Status	Trends	Presence	Notes
Charadriiformes	Killdeer	<i>Charadrius vociferus</i>	Secure		Summer Breeding	Many spotted, mating calls, nest with eggs found
	American Avocet	<i>Recurvirostra americana</i>	Secure		Rare Summer Breeding	
	Greater Yellowlegs	<i>Tringa melanoleuca</i>	Secure		Summer Migratory / Breeding	
	Lesser Yellowlegs	<i>Tringa flavipes</i>	Secure		Summer Breeding	Many groups spotted, suspected nesting
	Willet	<i>Catoptrophorus semipalmatus</i>	Secure		Rare Summer Breeding	Many spotted, mating displays
	Spotted Sandpiper	<i>Actitis macularia</i>	Secure		Summer Breeding	
	Marbled Godwit	<i>Limosa fedoa</i>	Secure		Rare Summer Breeding	
	Pectoral Sandpiper	<i>Calidris melanotos</i>	Secure		Migratory	
	Common Snipe	<i>Gallinago gallinago</i>	Secure		Summer Breeding	Mating displays common
	Wilson's Phalarope	<i>Phalaropus tricolor</i>	Secure		Summer Breeding	Many pairs spotted, protective/misleading behaviour, nests suspected
	Franklin's Gull	<i>Larus pipixcan</i>	Secure		Summer Breeding	
	Bonaparte's Gull	<i>Larus philadelphia</i>	Secure		Summer Breeding	

Order	Common Name	Scientific Name	Status	Trends	Presence	Notes
	Ring-Billed Gull	<i>Larus delawarensis</i>	Secure		Summer Breeding	
	California Gull	<i>Larus californicus</i>	Secure		Summer Breeding	
	Herring Gull	<i>Larus argentatus</i>	Secure		Migratory	
	Common Tern	<i>Sterna hirundo</i>	Secure		Summer Breeding	Many spotted, common feeding frenzies, nests suspected
	Forster's Tern	<i>Sterna forsteri</i>	Sensitive	Rare. Breeding locations very local	Rare Summer Breeding	Nesting colony found
	Black Tern	<i>Chlidonias niger</i>	Sensitive	Declining	Summer Breeding	Many spotted, protective behaviour, nests and eggs found
<b>Piciformes</b>	Yellow-Bellied Sapsucker	<i>Sphyrapicus varius</i>	Secure		Summer Breeding	
	Downy Woodpecker	<i>Picoides pubescens</i>	Secure		Year-Round	
<b>Passeriformes</b>	Blue Jay	<i>Cyanocitta cristata</i>	Secure		Year-Round	
	Black-Billed Magpie	<i>Pica pica</i>	Secure		Year-Round	
	American Crow	<i>Corvus brachyrhynchos</i>	Secure		Summer Breeding	
	Common Raven	<i>Corvus corax</i>	Secure		Year-Round	

Order	Common Name	Scientific Name	Status	Trends	Presence	Notes
	Alder Flycatcher	<i>Empidonax alnorum</i>	Secure		Summer Breeding	
	Least Flycatcher	<i>Empidonax minimus</i>	Secure		Summer Breeding	
	Eastern Phoebe	<i>Sayornis phoebe</i>	Secure		Summer Breeding	
	Tree Swallow	<i>Tachycineta bicolor</i>	Secure		Summer Breeding	Many spotted in a few locations, nests and nestlings found
	Barn Swallow	<i>Hirundo rustica</i>	Secure		Summer Breeding	
	Black-Capped Chickadee	<i>Parus atricapillus</i>	Secure		Year-Round	
	Boreal Chickadee	<i>Parus hudsonicus</i>	Secure		Year-Round	
	White-Breasted Nuthatch	<i>Sitta carolinensis</i>	Secure		Year-Round	
	House Wren	<i>Troglodytes aedon</i>	Secure		Summer Breeding	
	Marsh Wren	<i>Cistothorus palustris</i>	Secure		Summer Breeding	Several spotted, several dummy nests found
	Ruby-Crowned Kinglet	<i>Regulus calendula</i>	Secure		Summer Breeding	
	American Robin	<i>Turdus migratorius</i>	Secure		Summer Breeding	Many pairs seen
	Gray Catbird	<i>Dumetella carolinensis</i>	Secure		Summer Breeding	



Order	Common Name	Scientific Name	Status	Trends	Presence	Notes
	Sprague's Pipit	<i>Anthus spragueii</i>	Sensitive	Dramatic declines	Summer Breeding	
	Cedar Waxwing	<i>Bombycilla cedrorum</i>	Secure		Summer Breeding	
	Warbling Vireo	<i>Vireo gilvus</i>	Secure		Summer Breeding	
	Red-Eyed Vireo	<i>Vireo olivaceus</i>	Secure		Summer Breeding	
	Orange-Crowned Warbler	<i>Vermivora celata</i>	Secure		Summer Breeding	
	Yellow Warbler	<i>Dendroica petechia</i>	Secure		Summer Breeding	
	Yellow-Rumped Warbler	<i>Dendroica coronata</i>	Secure		Summer Breeding	
	Common Yellowthroat	<i>Geothlypis trichas</i>	Secure		Summer Breeding	
	Chipping Sparrow	<i>Spizella passerina</i>	Secure		Summer Breeding	
	Clay-Colored Sparrow	<i>Spizella pallida</i>	Secure		Summer Breeding	
	Savannah Sparrow	<i>Passerculus sandwichensis</i>	Secure		Summer Breeding	Many pairs spotted, suspected nesting
	Le Conte's Sparrow	<i>Ammodramus leconteii</i>	Secure		Summer Breeding	Several pairs spotted, 3 suspected nests
	Fox Sparrow	<i>Passerella iliaca</i>	Secure		Summer Migratory / Breeding	

Order	Common Name	Scientific Name	Status	Trends	Presence	Notes
	Song Sparrow	<i>Melospiza melodia</i>	Secure		Summer Breeding	Several pairs spotted, suspected nesting
	Lincoln's Sparrow	<i>Melospiza lincolnii</i>	Secure		Summer Breeding	
	Swamp Sparrow	<i>Melospiza georgiana</i>	Secure		Summer Breeding	
	White-Throated Sparrow	<i>Zonotrichia albicollis</i>	Secure		Summer Breeding	Several pairs spotted, suspected nesting
	Lark Sparrow	<i>Chondestes grammacus</i>	Secure		Rare	
	Dark-Eyed Junco	<i>Junco hyemalis</i>	Secure		Summer Breeding	
	Red-Winged Blackbird	<i>Agelaius phoeniceus</i>	Secure		Summer Breeding	Many pairs spotted, nests, eggs and nestlings found
	Yellow-Headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	Secure		Summer Breeding	Many pairs spotted, breeding behaviour, nests, eggs and nestlings found
	Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	Secure		Summer Breeding	
	Common Grackle	<i>Quiscalus quiscalus</i>	Secure		Summer Breeding	
	Brown-Headed Cowbird	<i>Molothrus ater</i>	Secure		Summer Breeding	Many pairs spotted, possible nesting
	Northern Oriole	<i>Icterus galbula</i>	Secure		Summer Breeding	

<b>Order</b>	<b>Common Name</b>	<b>Scientific Name</b>	<b>Status</b>	<b>Trends</b>	<b>Presence</b>	<b>Notes</b>
	American Goldfinch	<i>Carduelis tristis</i>	Secure		Summer Breeding	Many pairs spotted, suspected nesting