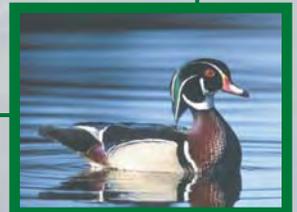


MANAGEMENT PLAN

Luther Marsh Wildlife Management Area

MANAGEMENT PLAN

2010 - 2019





**Grand River
Conservation Authority**



Ontario

**Ministry of
Natural Resources**

Luther Marsh Wildlife Management Area

2010–2019 MANAGEMENT PLAN

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Previous Plans:	Luther Marsh Management Plan	January 1, 1967
	Luther Marsh Master Plan	March 30, 1978
	Luther Marsh Management Plan	January 1, 1991

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Since the 1991 Management Plan, there have been many volunteers who have supported and implemented actions at Luther Marsh. One such volunteer is David Lamble. Mr. Lamble has spent many days across the Management Area banding and monitoring birds. His work has helped to establish a current and more accurate account of bird species. Luther Marsh benefits greatly from such volunteer work and their efforts are acknowledged and applauded.

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Section 1: The Context

Luther Marsh Wildlife Management Area is jointly owned and managed by the Ministry of Natural Resources and the Grand River Conservation Authority. It is arguably the most significant natural area in the Grand River watershed, and certainly the largest natural area in public ownership. It has been designated as a Wildlife Management Area, an Area of Natural and Scientific Interest (ANSI), Important Bird Area (IBA), and a Provincially Significant Wetland. This plan describes the Management Area, its use and management, and makes recommendations for the next decade of stewarding this natural gem of the Grand River headwaters.

1.1 GEOGRAPHIC CONTEXT

The Luther Marsh Wildlife Management Area is located in central southwestern Ontario straddling Wellington North Township (Wellington County) and East Luther - Grand Valley Township (Dufferin County). The nearest towns are Arthur, approximately 15 km to the west, and Orangeville, 25 km to the east, with Grand Valley much closer (Figure 1.1 and Appendix A, Map 1.1). The Management Area is large, covering an area of approximately 5,680 ha. The GRCA owns 5,066 ha, and the OMNR owns 614 ha.

1.2 HISTORIC CONTEXT

The history of Luther Marsh Management Area is presented in three sections: Settlement History, Management History, and History of Area Designations.

1.2.1 SETTLEMENT HISTORY

Settlement in the Luther Marsh area occurred half a century later than settlement in the southern Grand River area. This was partially caused by the direction of European settlement “flow”, and partly due to the swampy nature of the land. Until 1853, when the first large group of settlers arrived, the area was considered unbroken wilderness. Prospects for the early settlers, which were almost entirely from the British Isles, especially Protestants from Northern Ireland, were discouraging.

The area known as Luther was designated a township in 1860 and included the old District of Wellington. The name Luther was chosen by a surveyor who named the township after the prominent Catholic, Martin Luther. In 1881, the Township of Luther was divided into equal halves that were named, appropriately, East Luther and West Luther.

After early farming efforts struggled, farmers in the region turned to lumbering to bolster their prospects. In the mid-1860s, hundreds of experienced lumbermen were brought in from French Canada by the government to help the settlers. White pine was logged all winter and in the spring the logs were floated downstream to Galt and then shipped to Toronto. Over time, use of the area for firewood and timber resulted in forest cover being almost completely cleared. This resulted in aggravated spring flood conditions. Surplus water that used to lie for months retarded by roots in the swamp, now rushed unrestrained down the valley.

Still, the wetness of the soil and cool climate made land clearing and good crop yields difficult to achieve. It was only after an extensive fire in the early 1870s that removed large stands of timber and dried portions of the bog, that the clearing of land gained some momentum. Numerous municipal drains were dug to divert large volumes of water to the Grand River and its tributaries in a further effort to produce better-drained farm lands. Luther gradually became well-known for hay production and the high quality of its horses.

As forests and wetlands were increasingly converted to farm land at Luther and throughout the Grand River watershed, the natural capacity to moderate stream flows fell concurrently with the diminished natural habitats. Floods became more severe and drought or low flow conditions occurred more frequently. In 1905, it was suggested that immediate steps be taken to stop spring floods and to conserve water in the Luther swamp.



Figure 1.2 Luther Dam, 2006.

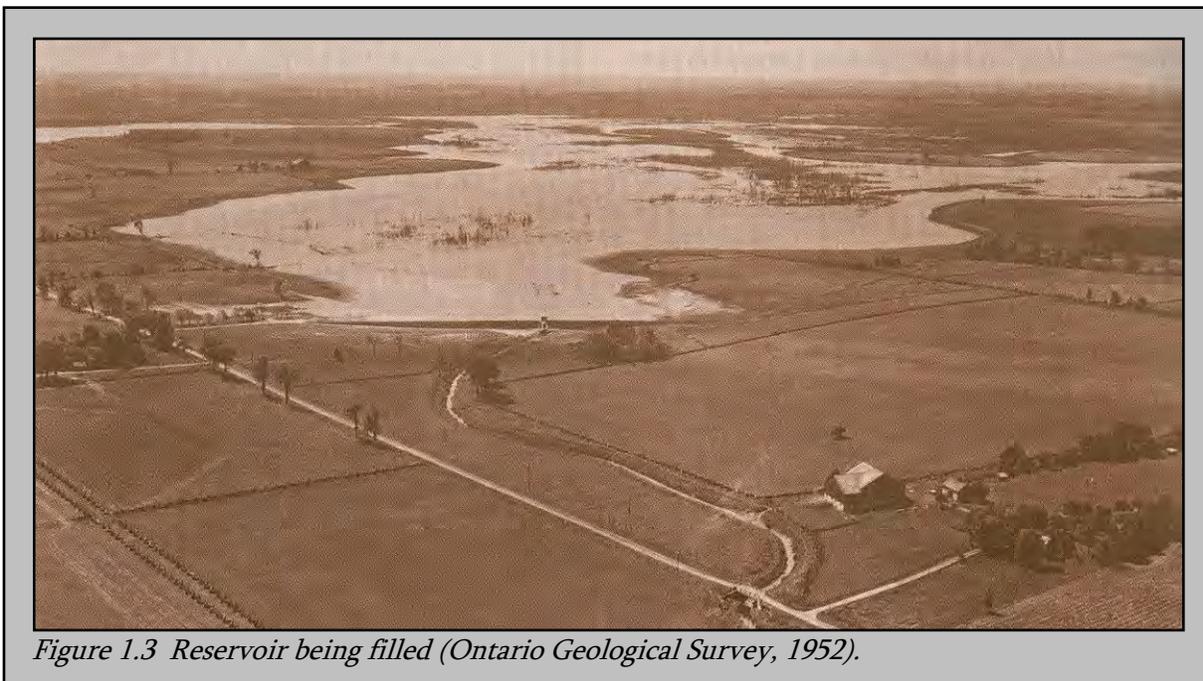


Figure 1.3 Reservoir being filled (Ontario Geological Survey, 1952).

1.2.2 MANAGEMENT HISTORY

A reservoir was created in 1952 by the Grand River Conservation Commission by construction of a 6 metre high by 280 metre long earthen embankment across Black Creek (Figure 1.2). It took two years to fully impound the water, inundating approximately 1,582 ha (Sandilands, 1984) (Figure 1.3). Much of the inundated areas were wetlands, primarily cedar and tamarack swamp, and sphagnum bog, with a small lake in the western portion with Black Creek meandering throughout. Higher ground within the reservoir, which now exists as islands, comprised the best farmland. The primary purpose of the reservoir was originally, and remains today, to augment low water flows in the Grand River, along with a minor flood control role.

The newly enlarged and reconfigured wetland attracted thousands of migratory waterfowl each autumn. This was one of very few large inland marshes in southern Ontario where hunting was allowed. Large numbers of hunters used the area during the waterfowl season and the Ontario Department of Lands and Forest (now the OMNR) expended considerable efforts enforcing game regulations. The Crown also started acquiring land adjacent to the marsh to be used for the purpose of wildlife management.

The reservoir originally offered habitat similar to many prairie pothole wetlands, and several western species of birds began to nest in the area when the prairie provinces experienced severe drought conditions. Among these were red-necked grebe, gadwall, American wigeon, canvasback, redhead and Wilson's phalarope. Luther Marsh was one of the few places in the province where these species could be seen regularly in the breeding season. Early in its history, Luther Marsh became well known among naturalists and hunters as an important wildlife area.

Related to its popularity to naturalists and hunters, in 1962 Luther Marsh was designated as a Wildlife Management Area (WMA). This designation was a provincial initiative to identify and protect significant remnants of wild country in public ownership for quality hunting and to provide for intensive management on these lands. They consist primarily of Crown lands located in southern Ontario, however, some WMAs include lands that are owned or managed by Ontario Parks, conservation authorities, municipalities, or private individuals. The Luther Marsh Wildlife Management Area is one of 41 WMAs in Ontario.

In 1966, the Grand River Conservation Commission, which was responsible for water management in the Grand River watershed, amalgamated with the Grand Valley Conservation Authority to form the present Grand River Conservation Authority. Together they had a mandate for reforestation and land management. The GRCA continued to acquire land as it became available to increase the size of the area available for wildlife conservation and management.

1967 Luther Marsh Management Plan (OMNR)

In January, 1967, the Ontario Department of Lands and Forests (DLF) wrote a short management plan for Luther Marsh. The plan recommended the acquisition of 847 ha, improved and safer hunting, reduced crop damage on private land and increased waterfowl production.

1968 Proposal for the Development and Management of the Luther Marsh Conservation Area (GRCA)

In April, 1968, the GRCA made nine proposals for the Luther Marsh Conservation Area, including the following:

1. Water control and stream flow has priority over all other development and management in the Luther Marsh Conservation Area.
2. The GRCA will manage the entire area ... according to a plan agreed upon by the GRCA and DLF.
3. The Province of Ontario will acquire lands necessary for management of the conservation area and turn this land over to the GRCA for development and management.
4. A Technical Advisory Committee will be set up. This committee will be made up of three representatives from GRCA and three from DLF, and other advisory personnel as required. The responsibility will be to propose a five-year development program for the conservation area on a continuing basis.
5. Set up a terms of reference for the Technical Advisory Committee.
6. All technical and managerial information will be made available to the Technical Advisory Committee.
7. Management of all Agreement Forests within the Conservation Area, presently managed by DFL, will be taken over by GRCA.

Technical Working Committee and the Steering Committee

On June 18, 1971 the OMNR and GRCA signed an agreement to manage Luther Marsh jointly. Following the agreement, the Luther Marsh Technical Working Committee was formed, thus implementing one of GRCA's 1968 development and management proposals. It was comprised of three staff members from each agency, and defined management goals, objectives and program for the Management Area.

Since 1971 the two agencies have worked together, formulating the Technical Working Committee and the Steering Committee. The Luther Marsh Technical Working Committee (LMTWC) was responsible for the overall management of the Management Area and was the decision making group until 2004. The Steering Committee was established in June 1974 by the OMNR and the GRCA to make policy recommendations for, and to direct the preparation of, the 1978 Luther Marsh Master Plan. Once the Master Plan was complete, the Steering Committee disbanded, leaving the LMTWC to implement the Master Plan. Since their creation, these committees have set appropriate management goals, objectives, and practices.

The Steering Committee was reinstated in the late 1980s to steer the 1991 Management Plan. The committee agreed to hire a consultant to develop a management strategy for the changing environment of the Management Area.

In 2004 the two committees began to operate as one: the Luther Marsh Steering Committee. The Management Area is jointly managed by the Grand River Conservation Authority (GRCA) and the Ministry of Natural Resources (OMNR) through the Luther Marsh Steering Committee.

1978 Master Plan

In 1978 the OMNR and GRCA jointly prepared a Master Plan for the Management Area. The plan defined the ultimate boundary of the project area and determined that the philosophy for the area was to be water and wildlife management oriented, while allowing compatible human usage. At that time the project area was approximately 5,260 ha (Master Plan, 1978).

Throughout the 1980s a number of the plan's recommendations were implemented, and several other significant developments occurred in the Management Area. These included the following:

- acquisition of an additional 250 ha of land, leaving 1,680 ha of private land still within the project boundary;
- completion of most of the internal management road system;
- construction of an interpretive kiosk and tower at the main entrance; and
- construction of the Damascus Reservoir.

1991 Luther Marsh Management Plan

In 1991 the Luther Marsh Management Plan was produced by Gore & Storrie Limited and Beak Consultants Limited for the GRCA and OMNR. Its purpose was to review the 1978 Master Plan

policies and recommendations and to prepare recommendations for a ten-year management period. The Steering Committee and a Public Advisory Committee (PAC) helped forge the updated plan. Input was solicited from known stakeholder groups and from the broader community through an extensive public consultation program.

Recent Management

There has been a substantial increase in restoration efforts, especially since 2000. Ducks Unlimited Canada (DUC) has built on their earlier restoration efforts, which included Pintail Pond, Mallard Pond and Wood Duck Pond (built in 1985) by restoring wetlands known as the Townline Road project (built in 2003) and the Rut 'n Strut wetland (built in 2006). The most significant wetland creation project at Luther Marsh since the 1950s is the Ducks Unlimited Monticello Project (2000), which flooded approximately 90 ha of poorly drained farm land, creating a spectacularly productive wetland habitat of 240 hectares. This project was made possible by the Ohio Department of Natural Resources, which committed \$100,000 in recognition of the significance of Luther Marsh to migratory waterfowl populations in Ohio. Ohio's awareness of Luther's significance was tracked through band returns from waterfowl banded at Luther Marsh since 1983, including banding efforts by Dave Lamble.

Beyond these wetland conservation projects, grassland habitat and reforestation efforts are also increasing. Conversion of rented farmland to natural habitat is being undertaken at an accelerated pace with funding provided by organizations such as Ontario Power Generation, Canadian Forest Service, Trees Ontario Foundation, Tree Canada Foundation & Berghoff, National Wild Turkey Federation and the Wright Family Foundation. The restoration of large areas of forest and grassland habitat and the creation of linkages between these areas will help protect a more diverse assemblage of native species. Rather than merely abandoning hay fields, grasslands will be restored with seed mixes containing species that are indigenous to the Luther area. In 2007 and 2008 prescribed burns were implemented on Prairie and Windmill Islands. Long-term success of such restoration efforts will be determined through periodic monitoring.

The pace of land acquisition also has accelerated recently, with three new parcels, totaling 65 hectares, added to the complex between 2004 and 2007. Several other parcels have been under active consideration and even negotiation.

In the 1990's the GRCA and OMNR signed an agreement by which all provincial lands and buildings at Luther Marsh came under GRCA management and revenues from associated farm land and building rental flowed to GRCA. This arrangement is efficient, although it does put a facilities management burden on GRCA's Luther Marsh staff, which time could otherwise be applied to land stewardship.

The OMNR's Luther Marsh Centre at East Bay can accommodate 16 people in dorm style. The Centre and the associated shooting range are used by OMNR and the Canadian Wildlife Service, among others, for training programs. The grounds are rented by dog trials clubs and others for weekend events, in season.

The drive shed at the Luther Marsh Centre was retrofitted in 2002 to accommodate a GRCA nature centre program that operated until 2008, mainly in the winter and early spring.

The Upper Grand District School Board's Community Environmental Leadership Program (CELP) education program has operated since 2006 at the site of the former GRCA staff house west of Bootlegger Bay. As of October 2009, the building on GRCA land was incomplete.

In the spirit of continuous improvement, hunting at Luther has been the subject of ongoing efforts to ensure a safer and higher quality experience. The following has been annually reviewed and revised: hunting zones, hunter distribution, signage and fees.

The major shifts in user patterns since 1991 include a much higher level of use for special events, such as dog trials, and the introduction of two outdoor education programs based in two facilities.

Historically, the Management Area was operated by three GRCA full time staff. This dropped to one in the mid and late 1990s. More recently, this has rebounded to two staff. GRCA on-site staff manage the day-to-day operation of the Management Area.

1.2.3 HISTORY OF AREA DESIGNATIONS

Luther Marsh is well recognized as an area of high natural significance, as reflected by the following designations. Designation locations are mapped on Map 1.4, in Appendix A.

Area of Natural Scientific Interest

As part of an ecological assessment of Site District 6E-5 in the early 1980s Luther Marsh was identified as a provincially significant Area of Natural and Scientific Interest (ANSI). The representation within Site District 6E-5 of Luther Marsh is summarized as follows:

Luther Marsh contains the only representation of upland forest on drumlinized till plain selected to date, on the Dundalk Till Plain. This is the only site selected in Site District 6E-5 that represents marsh habitats. Overall, Luther Marsh is a large, diverse and highly significant headwater wetland with associated upland features (esker and till plain). Wylde Lake Bog is considered to be one of the most significant features of the ANSI and represents the largest peatland within the Site District.

Two adjacent eskers have been identified as regionally significant Earth Science ANSIs: Mount View Esker and the Egerton Esker. A more northerly portion of the Egerton Esker that is within Grey County is a provincially significant Earth Science ANSI.

The Luther Marsh ANSI boundaries were transcribed onto 1:10,000 Ontario Base Maps in 1987 and subsequently refined in 2008 using 2006 digital ortho-rectified photography. Some expansions and

inclusions of cultural communities were made during the most recent boundary revisions, all of which were on GRCA properties.

Provincially Significant Wetland

All wetlands across the Luther Marsh Management Area were evaluated by Coulsen et al. (1986) as a Class 1 Provincially Significant wetland. The wetland boundaries in some parts of the Management Area were subsequently refined in 2008 using 2006 digital ortho-rectified photography.

Important Bird Area

Luther Marsh was designated as an Important Bird Area in 2001 by BirdLife International, a partnership of member-based organizations in over 100 countries that strives to conserve birds, their habitats and global biodiversity. The Canadian BirdLife co-partners are Nature Canada and Bird Studies Canada.

IBAs must have one or more of the following attributes:

- sites regularly holding significant numbers of an endangered, threatened, or vulnerable species;
- sites regularly holding an endemic species, or species with restricted ranges;
- sites regularly holding an assemblage of species largely restricted to a biome; and,
- sites where birds concentrate in significant numbers when breeding; in winter, or during migration.

Luther Marsh Wildlife Management Area meets the first and last criteria.

1.3 PLAN PURPOSE

The 1978 Luther Marsh Master Plan had the following plan purpose:

To identify those policies and outline those management programs which will be required to sustain and improve the natural resources of Luther Marsh and their public use during the next decade.

The 1991 Management Plan was essentially an update of the 1978 Master Plan. This plan is an update of the 1991 Management Plan with a similar purpose to that as stated above for the 1978 Master Plan.

1.4 GOALS

The 1991 Management Plan set four primary goals for the Management Area:

- to protect the provincially significant wetlands and other significant features and species;
- to maximize habitat diversity and wildlife production;
- to encourage passive human use of the natural resources without impairing their functions or quality; and
- to provide low flow augmentation to the Grand River.

The 2010-2019 Management Plan has the following goals for the Management Area:

- to protect the provincially significant wetlands and other significant features and species;
- to optimize habitat value and benefits to wildlife;
- to accommodate compatible human uses that do not impair significant features; and
- to provide low flow augmentation to the Grand River.

Section 2: Physical Conditions and Biological Resources

2.1 INTRODUCTION

Section 2 describes the physical and biophysical characteristics of the Luther Marsh Wildlife Management Area, including climate, topography, geology, hydrology, soils, vegetation, mammals, fish, amphibians, reptiles and birds.

2.2 PHYSICAL CONDITIONS

The climate, topography, geology, soils, and hydrology of the Luther Marsh Wildlife Management Area are outlined in the section 2.2.

2.2.1 CLIMATE

Luther Marsh is situated in the Dundalk Uplands climate region, which is the coldest area in off-shield southern Ontario. Temperatures and precipitation are comparable to those experienced in the Algonquin Park region. Snowmelt is traditionally two or three weeks later than in the southern parts of the Grand River watershed, a circumstance that moderates associated seasonal stream flows and reservoir storage. The growing season is short enough that corn was traditionally not a viable crop in the area until hardier hybrids were developed.

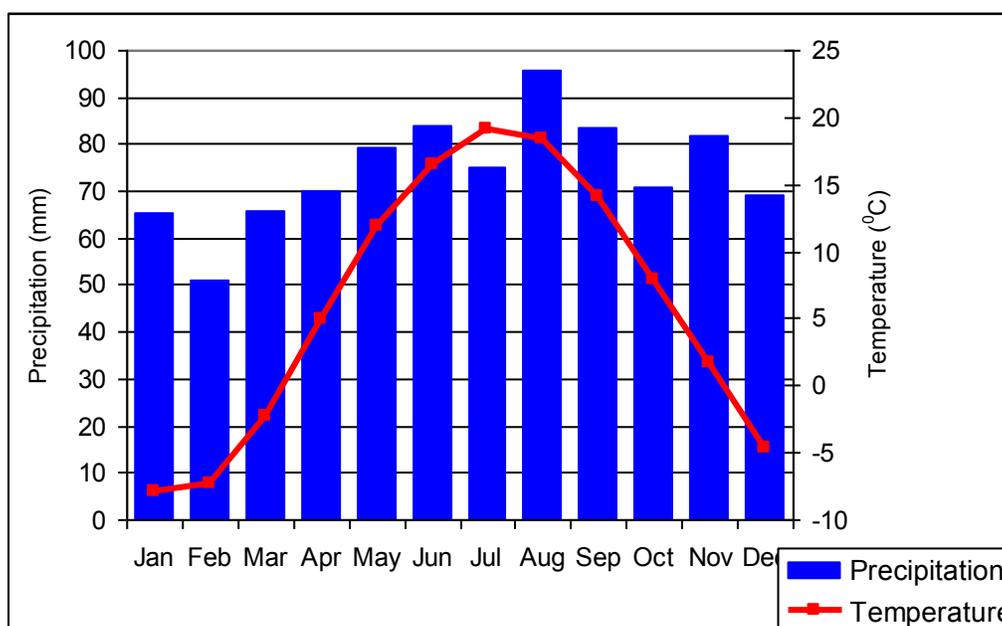


Figure 2.1 Monthly average temperature and precipitation data from the Orangeville Ministry of Environment office (Environment Canada, 2009).

Table 2.1 General Climate Summary from the Orangeville Ministry of Environment office (Environment Canada, 2009).

Temperature:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Daily Average (°C)	-8.0	-7.3	-2.3	4.9	11.8	16.5	19.1	18.3	14.0	7.8	1.6	-4.7	6.0
Daily Maximum (°C)	-3.9	-3.0	2.4	10.0	17.8	22.5	25.0	24.0	19.3	12.5	5.1	-1.2	10.9
Daily Minimum (°C)	-12.1	-11.7	-7.0	-0.3	5.7	10.6	13.1	12.5	8.6	2.9	-1.9	-8.1	1.0
Precipitation:													
Rainfall (mm)	24.2	20.8	42.0	61.7	78.9	83.9	75.3	95.6	83.7	67.8	66.6	31.2	731.5
Snowfall (cm)	41.1	30.1	23.8	8.3	0.4	0.0	0.0	0.0	0.0	3.2	15.2	38.1	160.2
Precipitation (mm)	65.2	50.9	65.8	69.9	79.3	83.9	75.3	95.6	83.7	71.0	81.8	69.3	891.7

2.2.2 GEOLOGY

Luther Marsh is underlain by Paleozoic deposits from the Silurian age. The uppermost layer is the Guelph Formation that is a brown or tan dolostone (Appendix A, Map 2.1). Underlying this is the Amabel Formation composed of a grey or blue-grey dolostone. There are no locations in the Management Area where bedrock is exposed.

The landscape is the result of the last major glaciation, the Wisconsinan. During several advances and retreats, the ice associated with glaciation deposited sediments with layers of sand, clay, till, gravel and hard pan deposits. In the vicinity of the marsh, the depth of these sediments is approximately 23 metres. However, the thickness does vary with depth increasing to 46 metres at Damascus and 30 metres at Monticello. From a regional context, Luther Marsh lies within an area known as the Dundalk Till Plain, a gently undulated plain characterized by many shallow troughs.

Surficial deposits include Tavistock till plain of the Huron-Georgian Bay Lobe and organic deposits of peat, muck and marl (Appendix A, Map 2.2). The silt and till deposited by the Georgian Bay ice lobe has a northwesterly source and is believed to have been deposited during the Port Bruce Stadial. Although some organic deposits are up to six metres, most peat and muck deposits are 1 to 3.5 metres deep.

One localized esker represents a significant geological feature within the Management Area (Map 1.4, Appendix A). The esker segment is representative of those deposited by Tavistock ice (Georgian Bay ice lobe) during the Port Bruce Stadial. Esker ridges and an esker outwash delta are visible. The Egerton Esker runs from the northwest corner of the Management Area into the lake. It re-emerges in the southern portion of Wylde Lake Bog. The esker is considered to be a regionally significant earth science ANSI. In addition, the presence of an esker within bog habitat is unusual.

2.2.3 SOILS

Soils are predominately of the Listowel soil series that is mostly loams or silt loams (Appendix A, Map 2.3). Soils are generally imperfectly drained, and low in phosphate. Other predominant soil series are Harriston and Brookston.

Much of the marsh area consists of peat and muck soils. Peat is an undecomposed to partly decomposed organic material with recognizable plant remains. Peat accumulates in bogs and seepage areas under very moist conditions. Bogs and swamps are representative of some of the peat deposits in the Management Area. Muck is soil that is formed in wetlands, shallow lakes, or pond bottoms, and is composed almost entirely of organic matter (the remains of plant tissues) (OMNR, 1993).

2.2.4 TOPOGRAPHY

The region around Luther Marsh was the first area to appear during the retreat of the ice field formed by the Wisconsin glaciation, and in that context named Ontario Island. The area is a large, flat region with generally poor drainage and many small depressions. Some areas that have remained natural still contain a rolling landscape, such as some areas north of the 10th Concession (Appendix A, Map 1.2). There is a total change in relief of only 20 metres over the entire Management Area (Sandilands, 1984). Most low-lying areas are filled with peat or muck. The Management Area is also located on the southeastern edge of the drumlinized Dundalk till plain. The average elevation of the Management Area is approximately 487 m above sea level.

2.2.5 HYDROLOGY AND WATER FEATURES

This section reviews key hydrological systems and water features within the Management Area, including drainage, lakes, and wetlands.

Drainage

Since the area is a poorly-drained, raised plateau, it has a very complex drainage system. Most of the watercourses within the Management Area consist of shallow, straight municipal drains. The reservoir itself drains into the Grand River by means of Black Creek (Appendix A, Map 2.4). As a result of the high altitude and flat topography, several streams originate within the Management Area. At one time, most of the lowland agricultural land (now flooded by the reservoir) was serviced by municipal drains. Many of these drains flow into the marsh, but those in the southeast corner flow into Boyne Creek, another tributary of the Grand River. A small portion of the southwest corner of the Management Area drains into the Irvine River that joins the Grand River in Elora. A creek originating on the western side is one of the many headwater streams of the Conestogo River. All of these drains and streams are part of the Grand River watershed, which empties into Lake Erie. The divide between the Grand River and Saugeen River watersheds is located just northwest of Luther Lake and some of the lands in the Management Area actually drain into the Saugeen River watershed. The Saugeen watershed empties into Lake Huron.

Luther Lake

Luther Lake is a constructed reservoir totaling approximately 1,582 ha, with an average depth of one metre and a maximum depth of up to 5.2 metres near the dam. Runoff into the lake is collected from a total surface catchment area of about 64 km², of which one third is open water. Storage capacity of Luther Lake is about 23,325 dam³ of water. Luther Lake augments flow in the Grand River to meet flow targets at Grand Valley as necessary for sewage treatment plant operation. It also contributes to reservoir storage at Belwood Lake, the next reservoir downstream, while also providing some flood control function.

Luther Lake is a warmwater system typical of a shallow wetland. It is mesotrophic to eutrophic, with prolific growths of aquatic vegetation. In areas protected from wind action, such as East Bay, and around most islands, emergent vegetation such as cattails, bulrushes and wild rice predominates. Open water areas are dominated by submergents, with over 80% of its area being 75% to 100% vegetated with several species of pondweeds, arrowheads, water-buttercups, water-milfoil, and bladderwort.

The water quality within Luther Lake is typical of an eutrophic water body with high nutrient levels, macrophytic growth and depressed oxygen levels under ice conditions. These conditions are almost certainly due to nutrient supply in the drainage area and recycling within the reservoir (Gore & Storrie Limited, Beak Consultants Limited, 1991). The soils originally flooded were high in nutrients and these acted as a source of nutrients to the overlying water, especially as deeper sediments become anoxic. Accordingly, farmland and wetlands draining to the reservoir also act to sustain high nutrients levels. High nutrient levels encourage macrophytic and planktonic growth that, in turn, accelerate nutrient recycling and nighttime oxygen depletion by respiration. The water quality in the lake supports warmwater fish species capable of thriving in relatively warm temperatures and low oxygen levels, such as brown bullhead (*Ameiurus nebulosus*) and minnow species.

Wylde Lake

Wylde Lake, an approximately 5 ha lake created prior to the creation of Luther Marsh Wildlife Management Area by peat extraction, is located in the middle of Wyle Lake Bog.

Ducks Unlimited Canada Wetland Enhancement Projects

The Monticello Project (Figure 2.2) is the largest wetland habitat initiative at the Management Area since the original reservoir was created in 1952, and involved the flooding of 90 hectares. The Monticello Project wetland was constructed in 2000 by Ducks Unlimited Canada (DUC), and is managed primarily for waterfowl. The wetland holds water for much of the year and has become a very productive wetland, providing valuable spring staging habitat for prairie waterfowl moving through the region, and nesting and feeding habitat for resident species (Weseloh, 2009).



Figure 2.2 Monticello Project

There are four satellite wetlands in the Management Area that were constructed by DUC in 1985 covering a total area of approximately 35 ha. These wetlands are also managed for waterfowl production and provide habitat for a variety of marsh species. They have been named after the species they were expected to attract: Pintail, Wood Duck, Mallard (Figure 2.3), and Blue-Winged Teal (Appendix A, Map 1.2).



Figure 2.3 Mallard Pond

The GRCA Townline Project, constructed by DUC in 2003, created three hectares of new wetland habitat.

The site is located west of Townline Road in the northern portion of the Management Area. There is now year round surface water at the site, providing excellent waterfowl and wildlife habitat.

The Rut 'n' Strut project is the most recent (2006) wetland feature created within the Management Area (Figure 2.4). The area was seeded with plants that would attract deer and turkey. A portion of a deer's life is called the "rut" and similarly for turkey, "strut", so the area became known as the Rut 'n' Strut project. It is also part of the Redstone Demonstration Site (Appendix A, Map 1.2). The wetland provides habitat for a variety of wetland and upland species due to its location within the Management Area. For example, a significant population of mink frogs have colonized the area's new ponds. Twelve heron nesting platforms were erected in the summer of 2006 to encourage heron

nesting and to augment the heronry on Luther Lake. This project was reviewed by DUC and GRCA engineering staff, financed by the Wetland Habitat Fund and administered by the GRCA.



2.3 BIOLOGICAL RESOURCES

Section 2.3 is divided into two subsections, Flora and Fauna, presenting a general overview and inventory of species.

In December 1984, Al Sandilands produced the “Annotated Checklist of the Vascular Plants and Vertebrates of Luther Marsh, Ontario.” Much of the information in section 2.3 has been adopted from that report. For more detailed information on the biological resources of Luther Marsh, refer to the Sandilands report.

2.3.1 FLORA

In 1980 Luther Marsh was selected as an outstanding natural area of provincial significance by the Ministry of Natural Resources because of Wylde Lake Bog, the forested eskers, upland forests on drumlinized till plain, representative examples of swamp and marsh and critical habitat for herons and ospreys. The diversity of the landscape results in a great diversity of plant communities and significant species.

The flora of Luther Marsh is strongly influenced by the climatic region in which it is situated, the history of agriculture and man-made plantations, as well as the existence of large bog complexes, swamp, marshland and forested eskers. Sandilands' (1984) synthesis of all botanical observations and collections records a total of 604 species that includes 420 native species and 184 introduced and naturalized species. It was concluded that the number of vascular flora species was not especially large given the size of the management area. The lower floral diversity was attributed to the relatively harsh climatic conditions of the Dundalk highlands which has prevented the establishment of any Carolinian species as well as the disturbed or cultural nature of many vegetation communities. However, Luther Marsh does support excellent representation of bog and fen communities. One species of note is the Marsh Valerian (*Valeriana sitchensis* var. *uliginosa*), ranked as S2 (Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province). This species is found in sedge meadow and fen communities along the 10th Concession. Luther Marsh is also habitat to a large number of regionally significant plants as listed in the Significant Plant List for Wellington County by Dougan and Associates (2009). Future inventory work will undoubtedly reveal new species as the more remote and generally inaccessible areas are more thoroughly inventoried. Special emphasis should be given to graminoids that are likely under-represented in the current floral checklist. Additional work in non-vascular plants should also be considered.

2.3.1i VEGETATION COMMUNITIES

At the core of Luther Marsh Wildlife Management Area is the reservoir/wetland and associated natural and created or enhanced wetlands. All types of wetlands are represented: marshes, swamps, bogs and fen. This complex of wetlands is set in a matrix of upland woodland, mixed conifer plantations, grasslands and agriculture. Vegetation communities are shown in Appendix A, Map 2.5. This very general overview of communities is mapped based on 2006 orthophoto interpretation.

According to Sandilands' 1984 report there are nine major habitat types at Luther Marsh. At the moment this report is the most complete review of vegetation communities for the Management Area. These habitat types are outlined in Table 2.2. Future ELC mapping will help capture these and other communities in more detail than expressed in Appendix A, Map 2.5.

Table 2.2 Major Habitat Types in Luther Marsh (Sandilands, 1984).

Major Habitat Type	Description
Water	<ul style="list-style-type: none"> • This community mostly consists of the two lakes and DU managed wetlands, but there are also many substantially flooded areas that hold water year round. • Excellent for waterfowl staging and brood production.
Marsh	<ul style="list-style-type: none"> • Large emergent stands occur in East Bay, north of the North Bog, and the southern portion of the lake. • Common plants include cattails, bulrushes, willows, red-osier dogwood, reed canary grass, smartweeds, arrowheads, water-plantain, nightshade, horsetails, skullcaps and bugleweeds.
Bog/Fen	<ul style="list-style-type: none"> • The area around Wylde Lake is the largest and most significant bog. There are also boggy areas in the lake, the largest of which is the North Bog, just north of Big Island. In addition, there are a few boggy islands; although they seem to remain stationary, they may actually be floating as they stay at a constant level above the water. • These areas were originally bogs, but since creation of the lake, none are hydrologically isolated, taking on characteristics more typical of fens. • Circumstantial evidence suggests that impoundment may have converted much of the Wylde Lake bog to a fen, but much more research is required. • The majority of bogs in the Management Area are hummocky, covered with sedges, leatherleaf, Labrador tea, pale laurel, bog rosemary, sweet gale, blueberries and wintergreen. • Swamp Birch, Tamarack and willows are becoming more common throughout, but are generally more dense along the edges.
Meadow	<ul style="list-style-type: none"> • Uncultivated open areas having less than 20% shrub or tree cover. • The esker at the internal road supports the driest meadow, having a substrate of sand and gravel. Shrub species are few at this location, with the area dominated by bracken and spreading dogbane, with lesser concentrations of gray goldenrod, pearly everlasting and field pussy-toes. • Prairie Island is still dominated by grasses.
Agriculture	<ul style="list-style-type: none"> • Crops commonly grown are soy beans, corn, wheat, canola, and hay. • Woody vegetation along fencelines usually comprise sugar maple, black cherry, chokecherry, basswood, white ash, apple, mountain ash, and raspberry.
Plantation	<ul style="list-style-type: none"> • The majority of plantations are coniferous, but there are some mixedwood. • The most commonly planted species are pines, spruces, white cedar, tamarack, European larch, Carolina poplar, white ash, and silver maple. • Old plantations are being managed to encourage indigenous deciduous understorey, where appropriate, and new plantings are established with a relatively high diversity and a significant deciduous component.
Shrubland	<ul style="list-style-type: none"> • Most shrub communities occur on damp soils and are typically dominated by willows and dogwoods. • Other shrubs infrequently present include winterberry, holly and meadowsweet.
Lowland Forest (Swamp)	<ul style="list-style-type: none"> • Comprise the majority of the naturally treed areas. • Lowland forests can be further subdivided into deciduous, mixed, and coniferous. • Deciduous forests are dominated by balsam poplar or trembling aspen. • Mixed forests are dominated by poplars and white cedar. • Coniferous forests are primarily white cedar, usually with scattered poplars, balsam fir, and tamarack.
Upland Forest	<ul style="list-style-type: none"> • Younger areas characterized by poplar, sugar maple, and white ash. • Mature areas characterized by sugar maple with white ash, beech, basswood, black cherry, white birch, yellow birch, and some hemlock.

Significant Vegetation Communities

Although the entire Management Area is of significance, there are pockets within the Management Area that deserve special mention including Wylde Lake Bog, Saunder's Fen, Ariss Fen, and the Drain 40 area.

Wylde Lake Bog is in excess of 500 ha and is the largest relatively undisturbed bog in south-central and southwestern Ontario. It supports a variety of regionally significant plants and animal species. In 1956 most of the bog was open with only scattered trees and tall shrubs except for the area around Wylde Lake and isolated sites in the north, east and south of the bog. As a result of succession, areas have become dominated by tamarack, poplars, dwarf and white birch. This may mean that the Wylde lake Bog is not really a bog but moving toward a mixture of bog, fen and swamp communities. The distinction between bog, fen and swamp communities is not always clear.

Saunder's Fen is a 17 ha wetland located along County Road 15 between Monticello and Monck. According to the 1991 Management Plan, fens this size are scarce at this latitude. This fen is important because it exhibits all three stages of a common fen: open areas dominated by sedges, shrub dominated areas, and areas treed with tamarack and white cedar. Specific species include leatherleaf, pitcher plant, Labrador tea, meadowsweet and dwarf birch. It is important to note that this fen has been impacted by municipal drainage and the fen characteristics have changed.

Drain 40 begins south of County Road 15 and flows southeast into the northwest corner of Luther Lake. The riparian corridor of Drain 40 comprises a relatively tolerant meadow marsh community. It is surrounded by relatively less tolerant coniferous and deciduous swamp areas that provide excellent habitat for a variety of mammals, birds, amphibians and reptiles. The mouth of Drain 40 is a shallow water marsh community with emergent and submergent vegetation that provides suitable breeding habitat for a variety of marsh birds, including least bittern, sora, and Virginia rail that have been observed in recent years by GRCA staff.

The Ariss Fen, based on GRCA staff inventories on June 20 and September 2, 2008, is a Fen Birch Shrub Fen Type (FES1-2) community. The community is located along the north side of County Road 15 partially within the former Ariss Tract. The canopy layer of this community is dominated by dwarf birch (*Betula pumila*) and to a lesser extent tamarack (*Larix laricina*), meadowsweet (*Spirea alba*), speckled alder (*Alnus incana*), slender willow (*Salix petiolaris*), and lowland pussy willow (*S. discolor*). The subcanopy and groundcover layers comprise a mix of shrub and herbaceous species, including silky dogwood (*Cornus amomum*), spotted joe-pye-weed (*Eupatorium maculatum*), bonset (*E. perfoliatum*), grass-leaved goldenrod (*Euthamia graminifolia*), purple-stemmed aster (*Aster puniceous*), royal fern (*Osmunda regalis*), northern blue flag (*Iris versicolor*), and purple avens (*Geum rivale*). A species of note is the native buckthorn, Alder-leaved buckthorn (*Rhamnus alnifolia*). Deep (> 120 cm) mesic, organic soils (Om) were encountered throughout this community. Although, the groundwater table was not observed in September, the fen community appeared to be floating.

2.3.2 FAUNA

Mammals

Thirty nine species have been recorded in Luther Marsh (Appendix 2). No provincially significant mammals are known to occur in the Management Area. Provincially significant species are those that are ranked S1, S2, S3, SH or are tracked by the Natural Heritage Information Centre (NHIC). The black bear has occurred sporadically. The hairy-tailed mole, star-nosed mole, little brown bat, snowshoe hare, northern flying squirrel, deer mouse, woodland jumping mouse, black bear and long-tailed weasel are listed in the County of Wellington's 2008 significant mammal list. In addition, the Management Area is known to host significant bats and bat populations.

Amphibians and Reptiles

Ten species of amphibians have been observed in the Management Area (Appendix 2). None of them are currently rare in Ontario, but the mink frog is close to the southern extent of its range, with a well established population (Gore & Storrie Limited, Beak Consultants Limited, 1991). A number of frog species are common with virtually all areas being populated with one or more species. However, it is worth noting that gray tree frog (*Hyla versicolor*) should be present but has not been seen or heard within the Management Area. Salamanders appear to be uncommon, with the only species being the yellow-spotted salamander and the eastern red-backed salamander (Sandilands, 1984). The yellow-spotted salamander, mink frog and American bullfrog are also listed in the County of Wellington's 2008 significant herpetofauna list.

Eleven species of reptiles have been observed in the Management Area (Appendix 2). According to data in Sandiland's 1984 report, four currently provincially significant reptiles have been observed at Luther Marsh: spotted turtle, Blanding's turtle, Butler's gartersnake and northern ribbonsnake. According to the 1991 management plan, the provincially rare Butler's gartersnake may have been the most abundant snake species at Luther Marsh. Sufficient knowledge of this specie's population at Luther Marsh is lacking, and greater research should be considered to better understand this significant population. At this location, Butler's gartersnake would likely be at its most northern population in Ontario and Canada by over 200 km (Gore & Storrie Limited, Beak Consultants Limited, 1991). The 1991 management plan references the spotted turtle as possibly being present, although there were only two isolated reports. However, the Ministry of Natural Resource's Natural Heritage Information Centre (NHIC) has no record of the spotted turtle. Eight species of reptiles found in the Management Area are also listed in the County of Wellington's 2008 significant herpetofauna list.

Fish

Luther Lake accounts for most of the fish habitat, with eighteen fish species recorded across the Management Area (Appendix 2). The fish population in Luther Lake is dominated by minnows and brown bullheads. The only game fish present in Luther Lake is yellow perch. The minnow populations are high and may still supports a commercial bait fishery. Important species are redbelly, finescale and pearl dace, and brassy, bluntnose, and fathead minnow. There are also records of

smallmouth bass (Sandilands, 1984). Black crappie have recently been observed near the Luther Lake dam.

Most of the streams in the Management Area are municipal drains that support minnow species. Most of the streams are slow-flowing, straight, have fine substrates and are shallow, thereby providing only marginal fish habitat. In contrast, Black Creek (at the outlet of Luther Lake) has pools and riffles, a coarse substrate and good flow, and therefore supports a more diverse fish community (Gore & Storrie Limited, Beak Consultants Limited, 1991). Northern pike from the Grand River are found in some of the watercourses in the spring during the spawning and nursery period.

Several aspects of available habitats pose severe limitations to fish. The marsh averages only about 1.0 metres in depth, is choked with vegetation in the summer and has low oxygen levels. This often results in a fish kill starting in June. Winter conditions pose a significant threat to survival rates. Ice depth often exceeds one metre so the water suffers from oxygen depletion, resulting in large annual fish kills. Winter kills of perch and bullheads frequently occur. The drainage systems provide important habitat for spawning cyprinids, which are minnows that stage in the marsh and swamps within the Management Area when water levels are low.

Fish populations are an important food source for staging waterfowl such as loons, grebes, herons, ospreys, gulls, terns, kingfishers and more recently, cormorants and bald eagles.

Birds

Luther Marsh is an extremely important area for breeding and migrating waterfowl, shorebirds and other birds. The creation of the marsh resulted in the colonization of several western migratory species into Ontario and their subsequent spread in the province. As the first large inland impoundment in southern Ontario, the Management Area has played a significant role in the current distribution of waterfowl in the area. The Management Area was also the first confirmed nesting location for two species in the province: cattle egret and canvasback.

In addition to its significance to breeding birds, the Management Area is an important migration stopover for shorebirds. Few shorebirds are seen in spring due to high water levels and the fact that most species fly directly to the breeding areas. In later summer and fall as water levels are lowered in the lake, the exposed shorelines provide ideal habitat for shorebirds. Most concentrations occur along the flooded eighth concession through the North Bog and on the margins of islands.



Figure 2.5 Sandhill Crane

According to the 1967 Luther Marsh Management Plan by the Department of Lands and Forest, 700 nesting pairs of ducks were estimated in 1961.

During the 1981-1985 Breeding Bird Atlas survey, 134 bird species were reported nesting at Luther Marsh, representing 57.5% of all breeding bird species reported in southern Ontario during this period. This elevated the Management Area into the top ten in the province for diversity, out of more than 1,800 10-kilometre squares (Cadman et al., 1987). In addition to those found during the atlas period, there are historical breeding records for cattle egret, broad-winged hawk, whip-poor-will, ruby-crowned kinglet, eastern bluebird, grasshopper sparrow, henslow's sparrow, Western meadowlark, and brewer's blackbird (Sandilands, 1984). Of note, during the survey a loggerhead shrike, which is endangered in Ontario and Canada, nested in the Management Area.

Recently, the second edition of the Breeding Bird Atlas (Cadman et al. 2007) published results that show that the Management Area is still a productive and significant breeding location in southern Ontario. According to the 2001-2005 Atlas, 136 bird species were reportedly breeding at the Management Area, 66 of which were confirmed to be breeding in the atlas square that covers the majority of the Management Area.

The large wetland area has attracted and still occasionally attracts a number of rare wanderers to Ontario such as glossy ibis, snowy egret, and American white pelican. Once a rare sight, sandhill cranes (Figure 2.5) are now annual breeders at Luther Marsh.

The Management Area may also be home to rare marsh birds such as least bittern and king rail. In July 2005, a juvenile least bittern was observed by GRCA staff along Drain 40. A least bittern has also been banded by volunteers prior to 2005. Most recently, in the 2011 breeding season GRCA staff observed a total of eight least bittern in the marsh areas of Luther Lake.

There have been 251 bird species observed in the Management Area (Appendix 2). Approximately, 43 of these species are provincially significant and, of these, many are confirmed breeders.

Section 3: Existing Uses

3.1 INTRODUCTION

Section 3 characterizes the human use of Luther Marsh Wildlife Management Area by individuals, groups, the GRCA and OMNR. The Management Area is valued as a cornerstone of biodiversity for the Grand River watershed and as an important part of the river hydrology control system of the GRCA. The primary activities at Luther Marsh are reservoir management, habitat restoration and management, wildlife management and hunting, outdoor education and nature appreciation.

3.2 PUBLIC USE

Luther Marsh Wildlife Management Area is well known and used by naturalists and hunters. Other uses includes snowshoeing, hiking, cross-country skiing, birding, canoeing, cycling, dog trials and training, picnicking, walking, boating, fishing and baitfish harvesting, trapping and snowmobiling. Snowmobiling is restricted to the interior road system and the Ontario Federation Snowmobile Club (OFSC) trail during the winter. Fishing is permitted in all areas with the exception of the sanctuary. Boating is restricted during the breeding bird season to protect waterfowl and other birds nesting near water. Alcohol is prohibited at all times.

3.2.1 HUNTING

Luther Marsh is the largest “hunnable” area in the Grand River watershed and one of the closest such large areas to the Toronto – Hamilton region. Luther is best-known for waterfowl hunting, and additionally for upland game birds, small game and white-tailed deer. In addition to regular licence requirements, additional permits are required to hunt in the Management Area (Table 3.1). Enforcement during the hunting season is provided by Conservation Officers and LMWMA staff. During the waterfowl season, the Canadian Wildlife Service also provides enforcement staff.

Waterfowl Hunting

Waterfowl hunting has been popular at Luther Marsh since the reservoir was created in 1952. The Management Area has always attracted large numbers of waterfowl during the fall migration, thus providing excellent hunting opportunities. About 300 hunters participate in the opening-day waterfowl hunt, with hundreds more throughout the hunting season. The majority of waterfowl hunters are day use hunters.

Waterfowl hunting season begins in late September with numbers of hunters dwindling rapidly after Thanksgiving. Refer to tables 3.2 and 3.3 (Lamble, 2009) for detailed information on the opening day of the waterfowl harvest. The maximum number of hunters allowed in the Management Area at one time is 450, a number that is normally only reached on opening day. Discussions in 2008 and 2009 have suggested that this number could be reduced to 325 or lower. There is no gun hunting on Tuesdays, Thursdays and Sundays. Near the end of the active season there are frequently fewer than 50 hunters on weekends, while weekday hunters are scarce. In addition, the reservoir traditionally freezes over by mid-November, limiting waterfowl hunting opportunities.

Table 3.1 2009-2010 Hunting Fees

Type	Fee
Day Pass	15.00
Season Hunting Pass	225.00
Season Archery Only Pass	100.00

Table 3.2 Percentage of Waterfowl Harvest on Opening Day by Species

SPECIES	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Mallard	39.4	28.4	64.4	41.9	60.3	43.4	53.0	53.2	61.8	52.5
Blue-winged Teal	4.0	20.0	8.7	13.8	7.8	10.4	7.5	9.34	7.5	5.2
Green-winged Teal	4.0	17.9	6.7	22.6	13.3	10.9	8.6	6.53	7.1	9.1
Wood Duck	7.2	17.9	4.2	7.8	3.0	5.4	9.4	14.5	7.3	12.5
Wigeon	6.0	4.7	4.0	5.0	3.6	10.6	7.0	2.82	4.2	12.5
Gadwall	1.2	1.1	0.16	0.6	0.6	2.2	1.6	0.53	1.3	1.4
Canada Goose	11.6	3.2	8.1	5.2	6.5	7.4	6.2	3.35	5.0	2.7
Others	26.6	6.8	3.8	3.2	4.9	9.7	6.8	8.5	5.8	4.1
Total	100	100	100	100	100	100	100	100	100	100

Table 3.3 12 Year Total Bird Harvest, Total Hunter, and Average Take per Hunter Comparison on Opening Day

YEAR	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AVERAGE PER HUNTER	1.91	1.74	1.78	0.79	1.26	1.8	1.9	1.8	1.68	1.40	1.97	1.66	1.56
TOTAL BIRDS	522	527	728	251	378	596	703	526	539	385	567	522	518
TOTAL HUNTERS	274	295	410	344	280	319	369	285	321	275	288	310	332

Wild Turkey

Following the OMNR's successful wild turkey reintroduction across southern Ontario and at Luther Marsh in January 2000, wild turkey is once again common on the landscape. However, there is no wild turkey hunting at the Luther Marsh Wildlife Management Area, although the remainder of Wildlife Management Unit (WMU) 80 outside Luther Marsh does have both spring and fall turkey seasons. A spring season for wild turkey was not opened at Luther Marsh in order to protect breeding activity of wild turkey.

Upland Game Birds and Pheasant Release Program

The Ruffed Grouse, a relatively common resident in the Management Area, is the primary upland game species harvested during the hunting season. Other birds harvested incidentally during the migratory bird season include American woodcock and common snipe.

For several years ring-necked pheasant have been released at Luther Marsh to provide hunting opportunities. The Grand River Conservation Authority decided in 2009 to discontinue the Pheasant Release Program, as the Management Area has ample opportunity for upland game bird hunting, without releasing birds expressly for that purpose.

Small Game Mammals

The three primary small game mammals that are hunted are: eastern cottontail, snowshoe hare and European hare. The snowshoe hare is abundant in plantations and lowland forests providing excellent hunting opportunities, particularly for hunters with dogs. The European hare is relatively common in the open agricultural areas of the Management Area.

White-tailed Deer

Deer hunting at Luther Marsh has been popular for decades and deer populations are strong. Both bow and gun hunting occur.

3.2.2 DOG TRIALS

A number of dog trial groups hold trials at the Management Area, primarily in autumn, just before hunting season. This has been a traditional, but recently growing use in the Management Area, with trials being held since before the 1970s. Dog trials are an exercise where hunters train their dogs with decoys to quickly retrieve birds. This may not include pointing dogs. In recent years, dog trial groups have used fields adjacent to the Monticello Project site for trials.

3.2.3 CAMPING

Overnight camping is allowed only on the night before the opening day of waterfowl hunting season. In the past there has been limited Scout group camping by special permission.

3.2.4 NATURE VIEWING

The property offers opportunities for nature viewing and appreciation due to the diversity of habitats and numerous interesting and rare species. For viewers on foot, the entire internal road system is available, with sanctuaries being the only “no access” areas. Other than the internal road, no formal trails are maintained. Nature viewing can also be done from municipal roadways in some areas adjacent to the Management Area.

There are two observation towers in the Management Area. One, near the parking lot at the dam, provides a view of the lake and Windmill Island. The second tower is at the main boat launch on the east side of the Management Area. A two-storey metal tower offers a view of the lake, Prairie Island,

Windmill Island and Big Island. This is the largest open portion of the marsh, so the view from the tower is excellent.

Canoeing is commonly used to view some of the lake's natural areas, although it is seasonally limited. Non-motorized water craft, canoes, kayaks and rowboats are permitted from July 31 to September 1st, with completion of an access permit, which can be obtained at the main entrance gate house.

3.2.5 RESEARCH

Luther Marsh has been host to a number of research projects undertaken by university students and professors, but recently little organized research has been conducted. Outside of GRCA programs, bird banding is the only consistent form of research at the Management Area. The banding of waterfowl at Luther by David Lamble contributes to the Ontario Cooperative Banding Project, which is coordinated by the OMNR Wildlife Research Section. The Luther Marsh station is a bait-trapping operation that is one of 16 duck banding stations in 13 OMNR District/Areas. This project is accomplished through a partnership among members of the Atlantic Flyway Council, Mississippi Flyway Council, Canadian Wildlife Service (CWS) and the Ontario Ministry of Natural Resources (OMNR).

The capture and banding of birds helps to answer several questions: How are new species utilizing areas that are being rehabilitated? How does the species makeup of the bird populations at Luther change as Luther changes? Certain species are declining (redheads and ringneck ducks) while others are increasing (double-crested cormorant, pied-billed grebe and great egret). This is also true with some of the land birds: some sparrow species, such as chipping and clay-coloured, are increasing, while other land birds, such as ovenbird and warbling vireo, are declining. The banding provides some base line data for other researchers. The recovery of banded birds provides valuable information on migration patterns and wintering habitats.

Bird banding is also an educational tool used by the Community Environmental Leadership Program (CELP) program operated by the Mount Forest High School. This is a program for Grade 11 and 12 students to have a hands-on experience with the environment. Banding is a part of that experience.

3.2.6 CELP

The Upper Grand District School Board built a nature centre in 2006 on GRCA land on the west side of the Management Area, north of Concession Road 6 – 7 and west of the causeway at Bootlegger Bay. This was a construction project of a student class, and was designed and built to accommodate the Community Environmental Leadership Program (CELP).

3.2.7 BAITFISH HAVESTING

A commercial baitfish harvester is licensed by the OMNR to capture baitfish in the marsh and streams within the Luther Marsh Wildlife Management Area. Bluntnose minnows, fathead minnows, finescale dace, northern redbelly dace, golden shiners and pearl dace are the principal baitfish harvested in the Management Area.

3.2.8 TRAPPING

Two trappers are licensed by the OMNR to trap furbearing animals, principally muskrat, beaver and mink, within the Luther Marsh Wildlife Management Area. Trapping is undertaken by the trappers for income, but also allows for the control of “nuisance” animals.

3.3 GRCA AND OMNR USE

3.3.1 WATER MANAGEMENT

Water management is the primary objective of the reservoir. Luther Marsh exists in its current form today because of the reservoir, which was created in 1952 to provide low flow augmentation in periods of low flow in the upper Grand River. The outlet structure has been operating for this purpose since 1953 and a history of sustaining flow in the upper Grand River has been established. Low-flow augmentation provided by the reservoir downstream of the outlet has attenuated Grand Valley sewage treatment effluent and contributed to Belwood Lake reservoir storage for augmentation farther downstream. Augmenting flow released from the reservoir during the summer months is essential to maintaining a healthy river downstream. Augmenting flow from Luther Marsh also contributes to power production at the Shand Dam. On occasion, Luther Lake outflow constitutes 100% of the flow in the Upper Grand River, from the confluence with Black Creek to Shand Dam. Additionally, the reservoir is used as a minor flood control mechanism.

3.3.2 WILDLIFE MANAGEMENT AND BIODIVERSITY

While the transition of wildlife management continues at the Management Area, sustaining biodiversity is an increasingly important objective for the GRCA. Luther Marsh is one of the most biodiverse areas within the Grand River watershed. The diversity of species, communities and ecosystems, as well as the biophysical functions and evolutionary processes that influence the character of Luther Marsh, is outstanding. Therefore, efforts undertaken by the GRCA and its partners to protect, restore and enhance natural areas across the Management Area will benefit wildlife populations on a local scale as well as the biological diversity on a watershed scale. GRCA staff continue to monitor these areas in order to assess the effect of specific conservation measures such as the installation of artificial bird boxes and nesting platforms and the efficacy of large scale habitat restoration through prescribed burns and tree planting.

3.3.3 REVENUE

The GRCA generates revenue from user fees, activities and programs such as hunting, agricultural tenants, facilities rentals, and special events.

Table 3.4 2009 Revenue from Hunting and Access Passes

Type	Passes	Revenue
Seasonal Hunting Passes	26	\$5,850.00
Seasonal Archery Only Passes	39	\$3,900.00
Daily Hunt Pass (Self Registration)	1751	\$26,265.00
Total Hunt	1816	\$36,015.00
Day Use Pass (adult)	916	\$3,893.00
Day Use Pass (child)	48	\$120.00
Car Seasonal Pass	2	\$190.00
Walk in Pass	2	\$90.00
Total Access	968	\$4,293.00
Revenue		\$40,308.00

Table 3.5 2009 Revenue from Agricultural Lease and Structures

Item	Revenue
MNR Staff House	\$0
Residence	\$17,491.20
CELP	\$2,400.00
Agriculture Tenants (355 ha)	\$39,191.76

3.3.4 NATURE CENTRE

Between 2002 and 2007 the GRCA operated an outdoor education program at the Luther Marsh Centre. The clients were Upper Grand District School Board students from inside and outside the Grand River watershed. Students from Grades 1, 3, 7, and high school attended from January to May (Figure 3.1). Grade 7 students attended the program in January and February followed by Grade 3 students in March and April, and Grades 1 and high school students in February.

The future of the educational program within the Management Area will be determined by funding availability and, more broadly, by the business plan for the GRCA Nature Centre Program.

Nature Centre Attendance

- 2002/2003 504 Grade 7 students
- 2003/2004 654 Grade 7 students
- 2004/2005 1,250 Grades 3 and 7 students
- 2005/2006 1,345 Grades 3 and 7 students
- 2006/2007 1,656 Grades 1, 3, and 7 students.



Figure 3.1 Students attending the Luther Marsh Nature Centre

3.3.5 YOUTH OUTDOOR OPPORTUNITY DAY

Organized by the Guelph District Ministry of Natural Resources and their Stewardship Councils, a team of dedicated volunteers, and countless partners, Youth Outdoor Opportunity Day attracts over 250 youth annually. It is a day designed for families interested in becoming involved in outdoor activities and their environment.

The day was started in 2001 by several conservation groups and agencies. The popularity of this event is increasing yearly. Youth are reconnected to the great outdoors and are given opportunities to participate in bird banding, wood carving, target shooting and fly-fishing along with many other outdoor-related activities. The objective is to connect youth with nature and teach them how to enjoy the outdoors, thereby fostering a new generation that cares about the environment and its conservation.

Volunteers spend time with the youth teaching them how to enjoy outdoor pursuits safely. All equipment for the events is provided so that those who may not own a fishing rod or a bow can still learn the skills.

Not only are youth given hands-on opportunities to participate in outdoor sports and activities, they are also introduced to the importance of nature and wildlife and are encouraged to enjoy and respect the beauty of our natural resources.

3.3.6 LUTHER MARSH CENTRE

The Luther Marsh Centre is used by OMNR, GRCA, and the Canadian Wildlife Service for training programs, and has been rented to various groups for activities, such as dog trials (Figure 3.2). The facilities are owned by OMNR.



Figure 3.2 Luther Marsh Centre

Section 4: Challenges, Opportunities and Stakeholder Input

4.1 INTRODUCTION

Understanding the issues and stakeholder opinions facilitates adaptive management to adjust to new circumstances. Section 4 reviews a number of key challenges and opportunities brought forward during the input process for the plan up-date.

A draft version of this plan was presented at two public open houses on April 17, 2007 at the Grand Valley Community Centre. Representatives from municipalities, local residents, GRCA, OMNR, Ducks Unlimited, North American Versatile Hunting Dog Association (NAVHDA) and the Upper Grand Longbeards provided valuable input on a number of items. A variety of items were discussed at the sessions. Some of the topics included: agricultural land management and habitat conversion; heron platforms in new locations; wind turbines and their potential impact on migratory bird routes; trail use; outdoor education; development near the marsh and, hunting.

4.2 CHALLENGES AND OPPORTUNITIES

4.2.1 AGRICULTURAL LAND MANAGEMENT

The 1991 Management Plan presented 11 questions related to the management of agricultural land in the Management Area. The following questions listed in the 1991 Management Plan are still relevant in this plan:

1. Should land owned by OMNR and GRCA that is currently used for agriculture continue in this land use or be converted to managed wildlife habitat?
2. Should land that is not owned by OMNR or GRCA but which is within the Management Area (boundary) be acquired and should this land be maintained in agriculture?
3. Should conservation tillage practices be adopted on GRCA/OMNR agricultural land and encouraged on private land within the Management Area?
4. Should the demonstration of conservation farming practices be aggressively pursued on GRCA/OMNR lands?
5. Should private land owners be encouraged to adopt conservation land management practices?
6. What are the financial implications of various polices including land acquisition, conservation demonstration programs, land use changes, drainage systems, pesticide use practices and lure crop provision?

This management plan answers these questions, some of which are elaborated elsewhere, but to summarize:

1. Much land owned by both GRCA and OMNR has been converted from agriculture to habitat in the past 15 years. This trend will be greatly accelerated during the term of this plan. The vision is to restore almost all of the farmland within the Management Area to natural habitats: wetlands, forests or grasslands. (Please refer to recommendations section.)
2. Land that would support the Management Area but is not owned by OMNR or GRCA should be acquired, however the default assumption is that such land should be restored to natural habitat unless there is a compelling reason to maintain it as agriculture.
3. Not only is conservation tillage a condition of the leases, but wildlife-friendly practices have also been more strongly woven into the agricultural leases e.g. delayed cutting in hayfields to benefit nesting grassland species.
4. GRCA partnered with the Ontario Soil and Crop Improvement Association (OSCIA) (2005 – 2007) to explore best practices for wildlife on fields adjacent to the Monticello project. All farm fields at Luther Marsh should be models of farming practices friendly to soil, water and wildlife. If not, they would be incompatible landuses within a provincially significant Wildlife Management Area.
5. Private landowners throughout the watershed are encouraged to follow conservation farming practices.
6. It is anticipated that revenues from leasing agricultural lands will gradually decline to virtually nil, as habitat restoration diminishes the “leasable” acreage over time.

Efforts were made in 2006-2007 to fully reconcile leased acreages versus the actual acreages being farmed, and to ensure higher compliance levels with respect to current lease conditions. Subsequently, lease conditions may be modified or increased to further strengthen the contribution of agricultural lands to biodiversity and game objectives. Better lease mapping, coupled with on-the-ground markers, are anticipated to improve protection of ecological buffers and restoration areas adjacent to leased lands. These areas are typically at risk from farm equipment in their early years of development.

4.2.2 HUNTING

Input received during the update for this plan included concerns about hunting, mainly waterfowl hunting. The concerns were raised by neighbours, staff and users, including hunters. Some hunters have been disappointed with the quality of the hunt at Luther Marsh, with the most common complaint being the ethics and/or proximity of nearby hunters. Most who are familiar with the history of hunting at Luther Marsh would concede that the hunt is vastly improved compared to the early days. The GRCA undertakes an annual review of the hunting season to contemplate any additional changes that could be made to further improve safety or quality of hunt, or to further reduce user conflicts. In the spirit of continuous improvement, modifications are implemented after each annual review as relevant and feasible.

Non-hunters, and occasionally even hunters, sometimes perceive their safety to be compromised during hunting season. There have also been reports of gun shots in either sanctuaries or safety

zones. Hunting or shooting is forbidden in these areas for the protection of wildlife and people. The boundaries of sanctuaries and safety zones are reviewed annually and adjusted as necessary to ensure optimal protection from these designations.

Some stakeholders challenged the appropriateness of allowing hunting in such a significant natural area. Attendees at the public sessions generally felt that hunting at Luther Marsh should continue and that current management practices should be maintained and improved as opportunities arise. Managers should periodically review the existing hunting practices to improve the quality of the hunt and improve safety. This is a practice that has been done annually since the 1991 Management Plan. For example, the current hunter distribution system seems to work well and it is understood that the system disperses hunters in order to provide a better hunting experience. However, some were concerned that hunters often do not abide by the distribution system and hunt too close to others, thereby impairing the experience.

Some participants challenged the appropriateness of allowing hunting at all at Luther Marsh. Hunting-related concerns expressed by some adjacent residential and farm land owners included noise, trespassing and vandalism.

4.2.3 CORMORANT POPULATION INCREASE

Double-crested cormorants are indigenous fish-eating waterfowl. They are protected under the Migratory Birds Convention Act and therefore cannot be hunted. Their populations and ranges have grown rapidly in recent decades and they are beginning to expand into inland lakes from the Great Lakes.

In 2004 there were four breeding pairs at Luther Marsh. In 2005 there were 25 breeding pairs and in 2006 there were 52 breeding pairs (Figure 4.1). Population data collected by the Canadian Wildlife Service throughout the Great Lakes basin confirms that cormorant numbers have increased significantly within the region and also suggests that a dramatic increase in the cormorant population at Luther Marsh is a possibility (Weseloh et al. 1995).

Double-crested cormorants are nesting in the heronry on Luther Lake, possibly disrupting this significant nesting site. Participants at the public sessions agreed it would be a good idea to establish a number of new heron nesting platforms in shallow water throughout the Management Area. Cormorants seem to prefer nesting locations with ready access to deep water.

Cormorants will occupy natural or artificial nesting sites that traditionally have been used by great blue herons. The Luther Marsh heronry is considered very significant but may already be in decline as a result of nesting site limitations. It appears that cormorants and herons are able to co-exist at Luther Marsh. In an effort to provide alternative nesting sites for the herons, a couple of dozen nesting platforms were installed at Monticello and Rut 'n' Strut wetlands. As of the 2009 nesting season, there has been no recorded heron nesting on these platforms, but some successful osprey nests. In 2009 herons colonized a new nesting site in a mature hardwood forest on the western shore

of Luther Lake, near the traditional heronry site. The cormorant populations will continue to be monitored by GRCA staff and any related impacts will be documented and addressed as needed.



Figure 4.1 Cormorants nesting in the heronry. (06/09/2006).

4.2.4 EAST LUTHER GRAND VALLEY LANDFILL

At the southern end of the Management Area at the north end of the 21st Sideroad, is the former Township of East Luther Grand Valley landfill site. This is on GRCA land immediately east of, and adjacent to, Wylde Lake Bog. The township operated a landfill on property leased from GRCA for over 40 years. The 1991 Management Plan questioned the compatibility of this landfill adjacent to a provincially significant wetland

In early 2006 the landfill was closed. The township has met its decommissioning requirements under the Ministry of Environment's Certificate of Approval and must continue post-closure monitoring.

4.2.5 PROPOSED WILSON QUARRY

A 1991 application under the Aggregate Resources Act to develop and operate a below-water bedrock quarry at Lot 10, Concession 10, West Luther, was referred to the Ontario Municipal Board in 2007-2008. The proposed quarry is located in the southeast corner of the intersection at Monck, just west of the Management Area's northwest "shoulder". As extraction is proposed below the groundwater table, it is essential to ensure that proposed quarry operations does not harm nearby provincially significant wetlands, some of which are within the Luther Marsh Wildlife Management Area.

4.2.6 EQUESTRIAN USE

Several equestrian centres and horse boarding facilities operate near the Management Area creating some demand for horse-riding access to the Management Area. Equestrian access proposals are evaluated relative to potential ecological impact, potential for user conflict, and operational feasibility. Discussions are on-going, with no designated equestrian access to the Management Area, as of (October 2010).

4.2.7 REGIONAL PRESSURES

Population Growth

Some local rural land owners expressed concern about increased rural residential development in general, and estate development in particular, and the potential impact on the Management Area and its significant features. The recent establishment of the Greenbelt around the Greater Toronto Area (GTA) and the associated growth plan has made some people beyond the greenbelt wary or resentful of development pressure "leapfrogging" into the area around the Management Area. Such areas may include Grand Valley, Orangeville, Shelburne and Arthur.

"The population of both Dufferin and Wellington Counties is increasing and is undergoing a shift from a rural to an urban environment", says the 1978 Luther Marsh Master Plan showing that population increase is not a new issue. Rapidly growing communities near Luther Marsh include Grand Valley, Waldemar, Orangeville, Arthur, Dundalk, Shelburne and Mount Forest. Growth projections over the next ten years for these areas show significant increases (Table 4.1). For example, the Orangeville Official Plan designates sufficient land for residential development at sufficient densities to allow for a population of 32,000 providing that sewage treatment capacity is increased and additional sources of water supply are established. Under current conditions and assumptions, Orangeville's "build out" population of 32,000 would be reached in 2012. The 2007 population of Orangeville was 27,110, and between 1996 and 2007, the town grew by 21%.

Table 4.1 Growth Projections for Settlements Near Luther Marsh

Location	2006 Population	Future Population
Arthur	2,327	2,700 (2017)
Mount Forest	4,490	5,510 (2017)
Dundalk	2,000	2,818 (2025)
Orangeville	26,925	32,000 (2012)
Shelburne	5,149	6,811 (2024)

Population growth in Dufferin and Wellington counties over the next ten years will potentially impact management strategies at the Management Area. Already, Luther Marsh attracts visitors from Toronto and beyond. With population increasing in nearby settlements, public use will certainly increase. Therefore, this management plan anticipates the need to accommodate potential future visitation without impairing natural heritage values. In addition, water demands, in the form of discharge from the reservoir, may also grow in importance.

Wind Farms

The area between Luther Marsh and Shelburne has sprouted wind turbines in the past half decade (Figure 4.2). As mentioned earlier, Luther Marsh is on the Dundalk Plateau, the highest elevation in southern Ontario. As a result the area can often have high winds, thus attracting investment from generating companies. The locations of existing and proposed wind farms are outlined in Appendix A, Map 4.1. Currently, the majority of applications are within Melancthon and Amaranth townships.

Wind power generation is an emerging practice used to generate clean renewable energy. Not all potential or cumulative impacts are fully understood. Some concerns raised at the public input session for the plan included possible disruptions to migrating birds or bats, and possible impacts to the hydrologic regime of wetlands related to their operation or the installation of supporting infrastructure. Proponents are expected to monitor the impact of wind turbines on migratory birds and bats.



Figure 4.2 Wind Farm along County Rd 17, Melancthon (Yerex, 2006)

A group of three people who attended one of the meetings expressed concern about the potential for wind farms affecting migratory bird routes. In response, GRCA and OMNR staff explained that all applications for wind farms are reviewed for environmental impact. When reviewing an application, potential impacts on migratory bird routes as well as any other potential impacts on all wildlife and their habitat are considered. In addition, if a wind farm was proposed adjacent to the Management Area, the GRCA and/or the OMNR would be able to review the application not only as a regulatory agency but also as an adjacent land owner. Long-term monitoring of migration habits near wind turbines is on-going by the Canadian Wildlife Service and Natural Resource Solutions Inc.

4.2.8 TRAILS

About four attendees felt that trail use opportunities should be increased and maintained. Some trails have become overgrown because of reduced maintenance. These are not “official” trails and are not promoted for use. GRCA staff explained that the internal road essentially acts as the Management Area’s trail system. Users may walk and bike the internal road but must remain outside of all sanctuary areas, and are encouraged to stay out of all sensitive areas. During the hunting season the internal road may be used by vehicles so people walking or biking on the internal road must be aware of this.

As of 2008, walking trails were in the process of being developed around the southern half of the Monticello Project.

4.2.9 OUTDOOR EDUCATION

The desire to have outdoor education and interpretive programs at Luther led to a GRCA nature centre program starting in 2002. It was suspended in 2008 mainly as a result of budget considerations. At the time of the public sessions the program was active, and the following related issues were raised: compatibility relative to hunting, impact of related traffic into sensitive areas and spatial limitations related to safety zones/sanctuaries.

Section 5: Management Practices

5.1 INTRODUCTION

This section sets out the proposed management practices for the Management Area for 2010-2019. Luther Marsh management focuses on reservoir management, biodiversity protection and habitat restoration, and provision of recreation opportunities. These and other practices are discussed in section 5.2.

As both the GRCA and the OMNR own portions of the Luther Marsh Wildlife Management Area, the two agencies jointly guide the management via the Luther Marsh Steering Committee. This arrangement has worked well, and it is assumed here that this arrangement will continue for the period of this plan. The GRCA is responsible for the day-to-day management of the Management Area including dam operations, administration, maintenance, monitoring, most capital developments, security/access and other aspects of land, habitat and hydrologic management. The OMNR is responsible for instituting and changing fish and wildlife regulations, and enforcement of fish and wildlife regulations.

5.2 ADMINISTRATION AND INFRASTRUCTURE

5.2.1 LUTHER MARSH STEERING COMMITTEE

The Luther Marsh Steering Committee guides the management of the Luther Marsh Wildlife Management Area. The committee meets twice a year, or on an as-needed basis, and is made up of GRCA and OMNR representatives only. Guests may be invited to meetings to present or add information on a specific discussion. Any significant proposed deviations from this plan and the management of Luther Marsh should be vetted by the Luther Marsh Steering Committee.

5.2.2 STAFFING AND ROLES

The Luther Marsh Wildlife Management Area is staffed by one GRCA Superintendent and one GRCA Maintenance Assistant. Assistance is provided routinely by staff from GRCA head office or other GRCA Conservation Areas, especially in the areas of restoration, monitoring and infrastructure installation or maintenance. GRCA provides maintenance and most capital developments, control of hunters and other users, and biological and water expertise and restoration funding and implementation.

The OMNR assigns Conservation Officer patrols to the Management Area as needed, e.g. the opening day waterfowl controlled hunt. The OMNR provides relevant game and fish regulation enforcement, quotas for trapping and bait fishing and expertise on wildlife management.

Additional technical support is provided by OMNR and GRCA staff and others, such as Ducks Unlimited Canada or Canadian Wildlife Service (CWS), for large, non-routine projects that intermittently arise.

5.2.3 SUPPORT FACILITIES

The GRCA has a workshop/administrative building, gate house and a pole barn near the dam. Adjacent to the workshop is a rental residence that was formerly the Superintendent's Residence. Other structures owned by GRCA include a viewing tower south of the dam, a boathouse west of the dam, a drive shed on the west side, just north of the 6th Concession adjacent to the newly-constructed CELP structure, and a rental residence north of the drive shed (former Biewald Property).

The Luther Marsh Centre (owned by OMNR) is approximately 1.6 km south of the dam, on the east side just north of Mallard Pond (Appendix A, Map 1.2). It provides sleeping and meeting facilities. The house is used by agency enforcement staff during the hunting season. Otherwise, it is used for training workshops for various groups and was, in the past, rented out to dog trial groups, researchers or others. The GRCA nature centre program formerly used the workshop and nearby lands. These buildings now require significant upgrades prior to further public use (October, 2009).

GRCA provides a small outboard motor watercraft to staff for transportation on the marsh.

5.2.4 ROADS AND ACCESS

In 1990 the west side (Bootlegger Road) and south end entrances were closed, with all access to the marsh being at the main entrance at the dam. All visitors must enter and register at the main gatehouse near the dam. The gatehouse is not been staffed and visitors have used the honour system to register and pay the access fee. A property map and visitor guide are posted at the gatehouse for visitors to familiarize themselves with the Management Area. Interior roads and parking areas are seasonally open to motor vehicles. All other motor vehicle uses are prohibited, except authorized snowmobiles on GRCA-approved trails. The interior road generally requires grading prior to the hunting season each year.

There are four boat launch locations: one on the east side at the lower viewing tower; one on the north shore approximately one kilometer west of the dam; one west of the heronry; and, one at the west side causeway. Only non-motorized watercraft (canoes, kayaks, and rowboats, etc.) are permitted on the lake from July 31 to September 1st with the completion of an access permit and paid entrance fee. After September 1st until freeze-up, boats with motors up to 25 hp are added to the allowable watercraft and the access permit requirement is removed. The lake is shallow with many stumps, so boaters are advised to exercise caution. Water craft are not permitted in the sanctuaries.

5.2.5 USER FEES

Each year the GRCA reviews user fees for activities at its Conservation Areas. The GRCA compares user fee information from other conservation authorities, Ontario Parks and private operators to be sure fees are in line with other organizations that provide similar facilities and services in the market area. Table 5.1 outlines user fees required at Luther Marsh for 2009-2010.

Table 5.1 Management Area User Fees for 2009-2010

Type		Fee
Admission	Over 14 years of age	\$4.20
	Child (ages 6-14)	\$2.50
	5 Years of age & under	Free
Seasonal Walk in Pass	Over 14 years of age	\$45.00
	Child (ages 6-14)	\$35.00
Vehicle Season's Pass	1 st Vehicle	\$95.00
	2 nd Vehicle	\$65.00
Hunting Fees	Day Pass	\$15.00
	Season Hunting Pass	\$225.00
	Season Archery Only Pass	\$100.00

5.3 WATER MANAGEMENT

The guiding principle for water management is to hold and release water to moderate flows and enhance water quality downstream, while maintaining habitat within the reservoir. A balance must be achieved between local and downstream communities and neither should suffer to the benefit of the other. Likewise, no single species or group of species should be considered preeminent such that others might be endangered to the benefit of that group. Striking an appropriate balance is the goal.

According to the 1991 Management Plan, the following goals are used to guide water management at Luther Marsh:

1. Protect marsh water quality by the prevention of input of materials that would cause toxicity to waterfowl and other water-based wildlife.
2. Ensure stable water levels during nesting periods.
3. Enhance shoreline vegetation regrowth through water level fluctuation.
4. Provide augmenting flow to the Upper and Middle Grand River to protect fishery habitat and dilute pollutant loads during summer low-flow periods.

These guidelines are carried over to the present plan, but it must be highlighted that the low-flow augmentation role is the overriding one. Water is released from the reservoir over 45 to 60 days from late June to early September. Augmenting flow released from Luther Lake during the summer months is essential to maintaining a healthy river downstream. Summer flows must be maintained in order to dilute effluent from the Grand Valley sewage treatment plant.

Since 1967 the fluctuation has been between 481 and 480 metres above sea level. Maximum water depth at the dam is 5.2 metres. Water level fluctuations in the reservoir must be controlled to minimize flooding of wildlife habitat, specifically waterfowl and muskrat nests at critical periods of the year, while also providing occasional periods of shoreline drying in order to stimulate shoreline vegetation growth. Additionally, shoreline emergent vegetation provides a food source and habitat for shorebirds. To protect muskrat lodges, water level drawdown in September should be limited. Drawdown prior to June 1 should also be limited since extreme drawdown would leave some bird nests (such as sandhill crane) exposed and could encourage the spread of invasive exotics.

5.4 WILDLIFE MANAGEMENT

Due to the assortment of wildlife present at Luther Marsh, there are a variety of related practices and activities. Historically and recently, most wildlife management practices and activities have focused on bird species, such as waterfowl species, wild turkey and pheasants. There is little to no wildlife management practices focusing on mammal species. Beaver dam management would be the only management practice involving mammal species. There is no active management program within the Management Area for deer or any other mammal species.

5.4.1 WATERFOWL MANAGEMENT

According to the 1991 Management Plan, the primary goals of waterfowl management at Luther Marsh are:

1. to improve management, nesting habitat and production. Although the majority of waterfowl harvested in the autumn are northern migrants, increased waterfowl production is consistent with the goals of the North American Waterfowl Management Plan;
2. to maintain or improve the diversity of nesting waterfowl species;
3. to maintain the significance of the marsh as a waterfowl staging area, particularly in autumn;
4. to provide high quality waterfowl viewing, research, and hunting opportunities; and,
5. to minimize crop depredation on local private lands.

Sanctuaries

Management for some species is via sanctuaries established for their protection. The public is excluded entirely from these areas, unlike a Restricted Area, where the public may enter by approved reservation. Originally, shortly after the marsh was created, a 325 ha Crown Game Preserve was established. Later, about 1971, the Crown Game Preserve was replaced by the current sanctuaries. The extent and location of the sanctuaries are reviewed on an as-needed basis, but annually at a

minimum. Refer to Map 5.1 in Appendix A for exact locations of the sanctuaries within the Management Area.

Habitat Restoration and Nesting Structures

Luther Marsh has long been the focus of habitat enhancement work to benefit wildlife, especially waterfowl. The growing importance of habitat restoration and creation puts even greater emphasis on this direction within the plan period, especially to create large blocks of grassland, wetland, or forests habitat that will benefit waterfowl and other wildlife (Appendix 1, Map 6.1).

Wetland restoration and grassland establishment at the Management Area will create the greatest benefit to waterfowl. Wetland restoration at the Management Area continues with long-time partner, Ducks Unlimited Canada and, previously the now-defunct Wetland Habitat Fund. Opportunities for wetland creation and enhancement are screened by GRCA and OMNR staff, considered, and, as applicable, implemented. In the past decade, the Monticello Project, Townline Wetland and Rut 'n' Strut areas have been created. Satellite wetlands and impoundments increase nesting potential, staging areas and hunting opportunities. A variety of non-game wildlife also benefit from these areas. Maintenance of these areas will need to be on-going, especially for invasive exotic species such as purple loosestrife and common reed. Grassland establishment is discussed further in Section 5.4.6, because grassland establishment benefits wildlife in addition to waterfowl.

Nesting platforms intended for herons have been erected at the edge of shallow satellite wetlands to reduce potential nesting site competition with cormorants. As of the fall of 2009, some nesting platforms have been successfully used by osprey. In addition, no cormorants established nests.

Trumpeter Swan Restoration Program

The trumpeter swan restoration program was started in 1982 with the goal of establishing a self-sustaining population. This goal would require a wild stock of 500 trumpeter swans and at least 100 breeding pairs. One aspect of the program is to have breeding pairs of swans produce young for subsequent release into the wild. The Luther Marsh Wildlife Management Area has been one of many sites across southern Ontario where a captive breeding pair has been cared for, in this case by GRCA staff. In 2004 the first objective of having over 500 wild trumpeter swans in southern Ontario was reached and by 2009 the status of self-sustaining population was reached.

5.4.2 BIRD BANDING AND NESTING BOXES

Bird banding has been an important research and monitoring tool used for decades at the Management Area. For most of the previous plan period, banding has been done by David Lamble, an extremely dedicated, volunteer, master bird-bander. Numerous types of birds, including shorebirds, waterfowl and grassland birds, are banded each year. It is intended to continue with the volunteer bird banding.

Bird nesting boxes have been installed and monitored, including banding, throughout the Management Area by GRCA, DU, David Lamble (Figure 5.1) and others.

Nesting structures for purple martins have also been installed and maintained, and wood duck boxes and small bird boxes continue to be installed, monitored, and maintained.



Figure 5.1 David Lamble banding an osprey (07/05/2006)

5.4.3 BEAVER DAM MANAGEMENT

Beaver dams are removed where necessary to protect infrastructure or provide outlet for adjacent private land drainage. Otherwise, the habitat changes provided by beavers are welcomed, because flooding on the land provides temporary waterfowl habitat, groundwater recharge and stimulates wetland vegetation.

5.4.4 WATERFOWL HUNT

In the early years at the Management Area, neither the number of hunters nor their distribution was controlled. It was estimated that as many as 2,000 hunters were within the Management Area on some opening days. This resulted in a poor quality hunt and raised safety issues. There were also problems with parking along township roads and trespassing on private property. Numerous infractions of game laws occurred and enforcement was difficult due to the multitude of access points. As many as 25 conservation officers were present on some opening days. Then, in 1971, controlled hunting was introduced. The number of hunters allowed into the Management Area at any given time was limited to 800.

Since 1971, improvements have been made. The number of access points has been reduced as has the allowable numbers of hunters (currently 450 and 250 on opening day), as well as the hunter distribution system. Hunter distribution is an on-going process and is continually improving. The reduced number of access points allows better hunter control and requires less management personnel. The hunter distribution system can be seen in Appendix A, Map 5.1. As part of the system, hunters must park at designated parking spots, as signed by white markers. Also, all hunters must enter and register at the front gate so staff know how many people are hunting. Hunters have to also leave through the front gate. On opening day hunter's birds are counted for records.

There was once a 325 ha Crown Game Preserve, which evolved to become the current system of sanctuaries and restricted areas. The sanctuaries and restricted areas differ from the Crown Game Preserves in that all human access is now prohibited, not just hunting. Human access is permitted in safety zones, but there is no hunting within the zone. The sanctuaries afford refuge during the hunting season and encourage waterfowl to stay longer in the autumn. Other significant features, such as the great blue heron rookery, osprey nests and a great egret roosting area, are protected from disturbances.

During the hunting season, other than internal roads and parking, no facilities such as boats and huts are offered to hunters. Hunters are allowed to bring their own huts, boats, or blinds they require for their safe and productive hunting experience.

There is no discharge of firearms from March 1 to the opening day of Canada goose season anywhere on the property. Firearms must be unloaded on all roadways.

5.4.5 DOG TRAINING AND TRIALS

Dog training and trials will be available in the proposed area outlined on Figure 5.2 for the short term. Activities will be monitored to inform decisions on the location and timing of activity in order to minimize wildlife disturbance.

5.4.6 GRASSLAND ESTABLISHMENT

Grassland habitat and related nesting opportunities have been noted as inadequate in previous management plans. Natural succession or tree planting has rendered many meadows less suitable for waterfowl nesting and grassland habitat more generally. Windmill and Prairie islands are predominantly grassland habitat succeeding to shrub or pioneer forest communities. The islands were initially ideal nesting habitat and had high densities of breeding waterfowl, including rare or unusual species, but nesting productivity has declined with succession. The first prescribed burns at Luther Marsh were conducted in spring of 2007 and 2008 to discourage the succession to shrubs and forest. This effort has moved into a monitoring and assessment phase to see if further prescribed burning is warranted. Opportunities for establishing and or maintaining grassland habitats will be

pursued as feasible throughout the Management Area, especially where large blocks of meadow and grassland are possible. A suite of grassland species is expected to benefit, including nesting waterfowl and upland species such as bobolink, eastern meadowlark, savannah sparrow, vesper sparrow, grasshopper sparrow, Lincoln sparrow and short-eared owl. A total of 204 hectares of grassland is targeted in the restoration plan, most of which is currently rented farmland.



Figure 5.2 Dog Training and Trials Location

Agricultural Demonstration Site

Fifty-seven hectares of farmland on the west side of the Monticello project are to be maintained as a demonstration and trial area to test and demonstrate innovative, wildlife-friendly farming practices, such as one-cut hay crop mixture, subject to review. This is the area where the Ontario Soil and Crop Association studied crop yield and depredation relative to wetland proximity, and where a special seed mix for delayed hay is being tested on an ongoing basis. This use will continue, with varying innovations tested or demonstrated, for as long as it is deemed to be a useful and appropriate complement to the overall habitat strategy for Luther Marsh. Results from this project will help guide future grassland habitat establishment activities.

During the implementation of this plan, all other agricultural land is intended to be restored to natural habitat.

5.5 AGRICULTURAL LAND MANAGEMENT

Farm tenant leases are provided on an annual basis to local farmers. It is standard practice to offer leases to tenants who farmed the field(s) described in lease from the previous year. However, when a property comes out of lease, or the tenant chooses not to farm the field(s), the GRCA will use the opportunity to review options for the affected land, so as not to transfer the land immediately to another tenant farmer, without first considering restoration options or lease conditions. A vision for restoring much of the agricultural land to natural habitat is found in Appendix A, Map 6.1.

According to the farm leases for Luther Marsh, the following best management practices are required of the farmland tenants.

- No hay cutting prior to July 15 to protect nesting and young-of-the-year birds.
- A flushing bar will be used during any cutting to protect wildlife.
- Mechanical bangers, scarecrows or other scaring devices to prevent waterfowl from feeding are prohibited.
- Application of biosolids is not permitted.
- The keeping of livestock on the subject lands is not permitted.
- Any natural area will not be altered, damaged or disfigured.
- No automobiles, trucks, tractors or other equipment will be stored on the subject lands.

A complete list of the tenant covenants is included in each lease. In addition to the covenants of the lease, tenant farmers are encouraged to practice conservation tillage, which is the practice or system of practices that leaves plant residue on the soil surface for erosion control, reduction of soil compactions, moisture conservation, and reduced chemical runoff.

5.6 FOREST MANAGEMENT

Primary goals of forest management at Luther Marsh are forest health, wildlife habitat and conversion of most coniferous plantations to more naturalistic mixed forests. Plantation thinning is prescribed on a site-by-site basis, to convert some stands to mixed woods, and to promote health and growth. Forest products that may result from such thinnings generate revenues that are invested back to the forest.

Shortly after land acquisition at the Management Area began, reforestation also began. Between 1952 and 1967 in excess of 2.1 million trees were planted in 117 plantations at Luther Marsh, covering approximately 560 ha. The surviving trees were mostly coniferous, although significant efforts were made to establish diverse plantings with a moderately high deciduous component. Following the acquisition of the land for the Damascus Reservoir in the late 1970s, about 53 ha of land was planted

to conifers. In addition to these areas, some of the lands in the Management Area were once Agreement Forests, some of which were also planted with conifers. Additional reforestation occurred in the 1980s, so that there were approximately 680 ha of plantation by the 1990s. Dominant species within the plantations are pines, spruces, white cedar, European Larch, white ash and silver maple. Most plantations are 40 years old or more and are, therefore, into their third or fourth thinning cycle, which opens the canopy to allow for regeneration of a naturalistic understory.

Thinning was also practiced in natural forests at Luther, before and after acquisition, and probably all natural forests were grazed before acquisition, except perhaps those in which livestock could not wander without sinking into wet muck. No natural forests have been thinned since 1985, and they are now due or overdue for thinning from a timber management perspective. However, as part of the largest natural area in the watershed, and with some of the greatest potential for interior forest habitat, these forests offer great biodiversity enrichment if they are allowed to evolve further toward old growth conditions. Many species thrive only in relatively secluded forests with old, large trees a habitat that is exceedingly rare in southwestern Ontario. The opportunity exists at Luther to provide a wide variety of forest habitats including deciduous, mixed and coniferous stands in both upland and wetland situations. There also exists the opportunity to have all age classes represented, from pioneer forests to old growth.

Selection thinning, patch cutting, interplanting, and other forest management practices for plantations within the Management Area have been scheduled in the GRCA's 2008-2027 Forest Management Plan.

In addition, to the above forest management practices, forest plantings continue at the Management Area, with 96 hectares in the past seven years, and approximately 140 hectares slated for the plan period. Forest plantings are on a spectrum ranging from low-cost conifer plantations to moderately intensive restoration plantings, depending upon the site and funding circumstances. The general trend is toward the restoration end of the spectrum, moving as quickly as feasible to diverse native forest communities.

5.7 LAND ACQUISITION

As population growth and agricultural intensification continues at a rapid pace in the Grand River watershed, the urgency to set aside some of the most significant lands for conservation and protection has increased. At the same time, the cost of acquiring these lands has escalated.

In the 1991 Management Plan, a land acquisition map (found on page 142) outlined a number of areas to consider for acquisition over the duration of the plan. This map has been updated and is found in Appendix A (Map 5.2). Since 1991, the following has been accomplished:

- Parcel #1 – no action yet taken;
- Parcel #2 – active file;
- Parcel #3 – portions of this area have been acquired (21 ha);

- Parcel #4 – no action yet taken;
- Parcel #5 – no action yet taken;
- Parcel #6 – currently not active, acquisition was pursued but no agreement was reached.

These parcels and other adjacent lands are still priority areas for acquisition and will be pursued when opportunities become available. The most recent acquisition is not shown on the 1991 map. It is a part of the potential link between the north end of the Luther Marsh Wildlife Management Area and the Keldon Source Area, north of Highway 89.

Land acquisition near and adjacent to Luther Marsh conforms to the GRCA Land Acquisition Policy.

Section 6: Recommendations

6.1 INTRODUCTION

In the 1991 Management Plan, a comprehensive set of actions was recommended to guide the management of Luther Marsh over the next ten years. Many of these were one-time actions implemented during the plan period and are, therefore, not carried forward as recommendations in the plan renewal. Other recommendations were deemed inappropriate or too low a priority at this time and do not appear as recommendations here. Others are ongoing and, as such, have been listed again even though they were implemented in the last plan.

Some of the recommended strategies carried forward have been modified to be consistent with current practice.

New recommendations have been made as deemed appropriate by the Luther Marsh Steering Committee.

Decisions on these recommendations, whether new, modified, carried forward or set aside, were informed by stakeholder input and the input of staff and volunteers.

As with all plans, implementation will depend on budgets and staff resources.

A continued effort will be made by GRCA, OMNR and stakeholders to seek funding to support the implementation of this plan.

6.2 1991 MANAGEMENT STRATEGIES REVIEW AND NEW 2010 RECOMMENDATIONS

Table 6.1 1991 Management Strategies Review and New 2010 Recommendations

#	1991 Management Strategies	Completed	Dis-continue	Continue	#	2010 Recommendations
High Priority						
1	Regular meetings of the Luther Marsh Technical Working Committee should be re-instated.	✓		✓	1	Meetings of the Luther Marsh Steering Committee should occur twice a year, one in the spring and one in the fall, or on an as-needed basis.
2	A source of external funding through partnerships with other resource agencies and interest groups and/or a charitable foundation must be obtained.	✓		✓	2	Continue to secure relevant funding streams in support of the implementation of this plan.
3	Any land recommended for purchase as shown in Figure 15 that becomes available on the open market should be purchased.	✓		✓	3	Acquire as much of the designated acquisition area as possible.
4	A study to ascertain the minimum flow requirements in the Upper Grand River and the effects on Belwood reservoir during summer months should be completed.	✓	✓			Done
5	The total water equivalents available for spring runoff to Luther Lake should be estimated.	✓		✓	4	Estimate the total water equivalents available for spring runoff to Luther Lake.
6	A water management operating plan should be prepared.		✓			The original recommendation for a standalone plan was not completed. Instead the recommendation was covered off within the GRCA's "Reservoir Operating Policy".
7	Island habitat should be reverted to early successional stages as soon as possible. Woody growth around some ponds and impoundments should be removed (Figure 10), and dense monotypic stands of reed canary grass should be converted to a more suitable grass cover.			✓	5	Maintain or revert habitat on Prairie and Windmill islands as grassland through prescribed burns and other techniques, as needed and feasible, to provide important grassland habitat near water. Establish and maintain new grassland habitats throughout the area, especially adjacent to water or wetlands.
8	Additional satellite ponds and impoundments should be created (Figure 10).	✓		✓	6	Implement additional wetland restoration projects.
9	Experiments to control purple loosestrife should be undertaken in test plots.	✓		✓	7	Continue practice of monitoring loosestrife and moving beetles as needed to affect control.
10	A proper waterfowl nesting survey must be designed and implemented. Management has insisted that waterfowl nesting has declined, but has been unable to document it with the type of studies that have been conducted.			✓	8	Design and implement an expanded wildlife monitoring program. (see also #15)
11	An ANSI inventory should be undertaken as soon as possible. The botanical resources of the Management Area are poorly understood and the complete distribution of many significant species is unknown. Undoubtedly, the study will reveal rare species that are currently not known to be present.			✓	9	All lands that constitute the Luther Marsh Wildlife Management Area continue to be inventoried using the Ecological Land Classification System for Southern Ontario and the Ontario Wetland Evaluation System for Southern Ontario. Compile 2008/2009 fieldwork.
12	Changes in waterfowl hunter management and distribution are essential. These include hunting on alternate days, a parking lot and numbered stake distribution system, a	✓		✓	10	Continue implementing improvements to hunting, including distribution, maximum allowable, and dog use zones.

#	1991 Management Strategies	Completed	Dis-continue	Continue	#	2010 Recommendations
	review of the maximum allowable number of hunters, and implementation of dog-use zones.					
13	A Luther Marsh Hunting Association should be investigated.	✓	✓			Not pursued
14	A work program for plantation thinning should be prepared and implemented.	✓		✓	11	Refer to the GRCA's 2008-2027 Forest Management Plan for all forest management practices such as plantation selection thinning and patch cutting.
15	Remedial work required in old-field zones on Figure 12 should be undertaken.			✓	12	Develop a grassland restoration and maintenance plan.
16	An adequate number of nesting structures should be provided for Great Blue Herons and Ospreys.	✓		✓	13	Monitor great blue heron nesting and great egret roosting activity, including use of all nesting structures to determine whether or not, and how, to take supportive action.
17	The access system should be upgraded and completed including making the Bootlegger Road the primary access point, upgrading the western road between the Bootlegger Road and the eighth concession, and constructing a road to provide access to Mallard Pond.		✓			Not practical.
18	Information kiosks should be provided at key areas on the Management Area, and at Damascus Conservation Area.	✓	✓			An information kiosk exists at the main gate of the Management Area.
19	An inventory of plants, wildlife and benthic invertebrates should be undertaken in Bootlegger Bay as baseline data prior to making water management decisions.	✓		✓		See 9 above
20	East Luther Township should be encouraged to find another landfill site. Appropriate actions should be taken to ensure that leachate is contained.			✓	14	Request results of East Luther – Grand Valley's long-term, post-decommissioning monitoring program related to their former landfill on GRCA adjacent Wylde Lake Bog.
					15	Design and implement a monitoring program for birds, herpetofauna, and species at risk using standardized protocols.
					16	Based on Appendix A, Map 6.1, restore approximately 271 hectares of rented agricultural and fallow lands to natural habitat including hardwood forest, conifer lowland forest, grassland/meadow and wetlands. Utilize succession and natural regeneration, as feasible.
					17	Monitor water quality at Luther Lake.
Medium Priority						
1	After ten years, another management plan should be prepared. It should be relatively brief, summarizing activities that occurred since 1991 and recommending new management strategies.	✓		✓	1	After ten years, another management plan should be prepared. It should be relatively brief, summarizing activities that occurred since 2010 and including new recommendations.
2	If the baseline studies are favourable, active water management programs should be undertaken in Bootlegger Bay. The effects of the management on vegetation, wildlife and benthos should be monitored. If results are positive, thought should be given to implementing the techniques in other		✓			Not favourable

#	1991 Management Strategies	Completed	Dis-continue	Continue	#	2010 Recommendations
	areas.					
3	Certain shoreline area (Figure 10) should be cleared of woody growth. Shallow U-shaped ditches and small off-shore islands could be created in these areas.	✓	✓			Done
4	If a suitable technique for controlling purple loosestrife is found, it should be applied on a wide-scale basis.	✓	✓			Done
5	Waterfowl food plants such as wild rice and barnyard grass should be introduced in selected areas around the marsh and all satellite ponds.	✓	✓			Done
6	If at all possible, the extent of shoreline emergent vegetation should be increased.			✓	2	Increase, as feasible, the extent of shoreline vegetation.
7	The locations of baiting stations should be investigated and changed if warranted.	✓		✓	3	Continue annual review of the baiting station program; modify, if warranted.
8	The feasibility of supplying floating blinds or fixed off-shore blinds for hunting should be investigated.	✓	✓			Deemed infeasible
9	If necessary, the sanctuary boundaries should be altered.	✓		✓	4	Continue annual review of the sanctuary and restricted areas boundaries; modify, if warranted.
10	A study on the incidence of lead-shot poisoning should be undertaken.		✓			Lead-shot is now banned, so this study is not necessary.
11	Ruffed Grouse management should continue and the program could possibly be expanded into the Forest Succession Zone (Figure 12).			✓	5	Evaluate outcome of the Ruffed Grouse habitat management program (1980's), relative to future habitat management.
12	Programs could be instituted to promote growth of hardwood stands and conversion of softwood stands to mixedwood communities.	✓		✓		See high priority recommendation #10.
13	Studies should be undertaken at Damascus Reservoir to see if conditions can be improved for largemouth bass or other fish species.		✓			Not part of Management Area.
					6	Explore the feasibility of controlled access with a swing arm and box at the current gate house.
					7	Explore and implement where appropriate the use of agricultural drain projects for improving wetland habitat.
Low Priority						
1	An agricultural study could be undertaken to identify potential problem areas from a pollutant transport perspective. Remedial actions plans should be completed if problem areas are identified.			✓	1	Any agricultural lands that contain potential problem areas from a pollutant transport perspective are scheduled for restoration within the plan period.
2	Routine water quality samples could be collected at the outlet and at key locations within the reservoir.			✓		See high priority recommendation #16.
3	Tiny islands and/or floating platforms could be provided to increase nesting habitat for waterfowl and other water birds.			✓	2	Provide floating platforms to increase nesting opportunities for relevant species. (successful already for loons)
4	The possibility of having an external person or agency supplying Ring-necked Pheasants for put-and-take hunting could be investigated.	✓	✓			Pheasant hunt discontinued 2009

#	1991 Management Strategies	Completed	Dis-continue	Continue	#	2010 Recommendations
5	The feasibility of introducing Gray Partridge and Sharp-tailed Grouse could be examined.	✓	✓			Not appropriate
6	Riparian habitat could be introduced or improved along drains to improve conditions for fish and wildlife.	✓		✓	3	Improve riparian buffers along drains. (largely redundant, as almost all agricultural land to be restored within plan period)
7	If a demand for camping arises, thought could be given to providing facilities, preferably at Damascus Conservation Area.		✓			Not part of Management Area.
8	Research by external agencies and individuals should be encouraged provided that it is compatible with the area and provides additional insight to the Management Area.	✓		✓	4	Continue to support compatible research activities.
					5	Implement a fall Wild Turkey hunt.

6.3 2010 RECOMMENDATIONS BACKGROUND

Section 6.3 provides rationale for a number of new recommendations in this plan. Other recommendations that continue from 1991, but have been revised, are also explained.

6.3.1 AGRICULTURAL LAND CONVERSION (HABITAT RESTORATION)

Recommendation: *Based on Appendix A, Map 6.1, restore approximately 271 hectares of rented agricultural and fallow lands to natural habitat including hardwood forest, conifer lowland forest, grassland/meadow and wetlands. Utilize succession and natural regeneration, as feasible.*

Given that the Management Area supports the largest natural area in the Grand River watershed and is the most significant wetland complex, the best use of the agricultural lands within the Management Area is to support biodiversity enrichment through restoration.

6.3.2 CORMORANTS AND HERONS

Recommendation: *Design and implement an expanded wildlife monitoring program.*

Monitoring efforts are currently minimal, although a very good snapshot exists of the heronry between 2006 and 2009. A regular monitoring program is needed, with resources dedicated annually for consistent data. Increased monitoring is needed, not just for the heronry, but for all habitats and various specific species that may be at risk, require intervention or may be impacted by current or proposed activities. One approach would be to annually hire two students for the spring and summer. Detailed monitoring protocols would be established by the GRCA Ecologist in consultation with OMNR staff.

6.3.3 INVENTORIES & MONITORING

Recommendation: *That a monitoring program be implemented for birds, herptofaunal and species at risk using standardized protocols.*

As the watershed's most significant natural area in public ownership, it is essential that Luther Marsh's ecosystem be better understood. Monitoring will provide the feedback mechanism to facilitate adaptive management.

In addition, banding efforts should be increased.

Recommendation: *Monitor water quality at Luther Lake.*

The rationale is the same as above.

Recommendation: *That all lands that constitute the Luther Marsh Wildlife Management Area continue to be inventoried using the Ecological Land Classification System for Southern Ontario.*

Prior to the 2010 Management Plan, inventory at Luther Marsh generally consisted of traditional forest inventory methods, on forest management compartments alone. Inventory practices did not include any herbaceous plants and few wetland communities. In 2006 GRCA staff started conducting an ecological land classification (ELC) of Luther Marsh. This work is based on the ELC for Southern Ontario (First Approximation) (Lee et al. 1998). When complete, an ELC at Luther Marsh will provide a detailed and standardized inventory of all vegetation community types, such as upland forest, wetland, meadow and thicket.

6.3.4 CONTROLLED ACCESS

Recommendation: *Explore the feasibility of controlled access with a swing arm and box at the current gate house.*

With having only two staff at the Management Area there are few opportunities for staff to control and monitor access to the property. Currently, visitors are required to self-register at the main gate house. As there is usually no staff at the gate house, it is a voluntary act to self register and pay the access fee. The installation of a swing arm and box at the gate house would help properly manage the access of visitors to the Management Area through the main entrance. The result will be an increase in revenue.

6.3.5 ISLAND RESTORATION THROUGH PRESCRIBED BURNING

Recommendation: *Maintain or revert habitat on Prairie and Windmill islands as grassland through prescribed burns and other techniques, as needed and feasible, to provide important grassland habitat near water. Establish and maintain new grassland habitats throughout the area, especially adjacent to water or wetlands.*

Post-burn monitoring of the site will be essential to determine the effectiveness of the prescribed burn technique in this circumstance.

Section 7: Plan Implementation

7.1 INTRODUCTION

This section presents the principal priorities and phasing of the Management Plan.

7.2 IMPLEMENTATION PRIORITIES

Each successive plan builds on the lessons learned during the implementation of the previous plan, and is informed by evolving science, the changing landscape context, changes in species populations and changes in priorities. This plan shows a shift from the previous plan by putting greater emphasis in the following areas:

- ecosystem monitoring;
- conversion of agricultural lands to natural habitats;
- enhancement of existing habitat; and
- species at risk.

There are, of course, many recommendations unrelated to these areas of emphasis. This list shows not only the evolution of the management of Luther Marsh, but also some of the top priorities in its implementation.

7.3 PHASING

This phasing plan (Table 7.1) organizes the future management and project implementation for Luther Marsh over the ten year plan period. Individual time frames are either long (7-10 years), medium (4-6 years) or short (1-3 years) term. These potential time frame periods will be flexible. If an item is a long term item (7-10 years), it does not mean that it will begin in seven years, but it may take seven to ten years to implement. Again, all recommendations are dependent upon budget and funding requirements.

Table 7.1 Phasing Plan

CATEGORY	TASK	ITEM COSTS	PLAN IMPLEMENTATION TOTAL COSTS*	TIME FRAME
a) Habitat Restoration				
	a) Agricultural and fallow land to natural habitat (starting 2011)	Grassland = \$133,100 (\$1,100/ha X ~121 ha) Forest = \$675,000 (\$4,500/ha X ~150 ha)	\$808,100	Long
	b) Island restoration	~ \$5000 per burn	\$10,000	Short
b) Inventories and Monitoring				
	a) Luther Marsh ELC	Budgeted Staff/Student Time		Short
	b) Monitoring program implementation	\$15,000 / year	\$150,000	On Going
	c) Surface water quality monitoring	Budgeted Staff/Student Time		On Going
	d) Wildlife monitoring	Budgeted Staff/Student Time		On Going
c) Habitat Enhancement				
	a) Heron/Osprey platforms	\$350/platform X 50	\$17,500	Short-Medium
	b) Additional satellite ponds	\$5,000 X 5	\$25,000	Long
	c) Routine forest management	Cost Recovery		Long
	d) Riparian vegetation of drains flowing into Management Area	\$30,000 X 5	\$150,000	Long
	e) Floating platforms	\$1,200/platform X 10	\$12,000	Long
d) Controlled Access				
	a) Swing Arm and Access Fee Box	\$15,000	\$15,000	Long
	a) Land Acquisition	534 ha X market value	\$2,670,000	Long
PLAN IMPLEMENTATION TOTAL COST			\$3,857,600	

* These costs are above and beyond the routine operating costs.

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Appendix 1: Maps



Luther Marsh Wildlife Management Area 2010 Management Plan

Map 1.1 Regional Location of Luther Marsh Wildlife Management Area



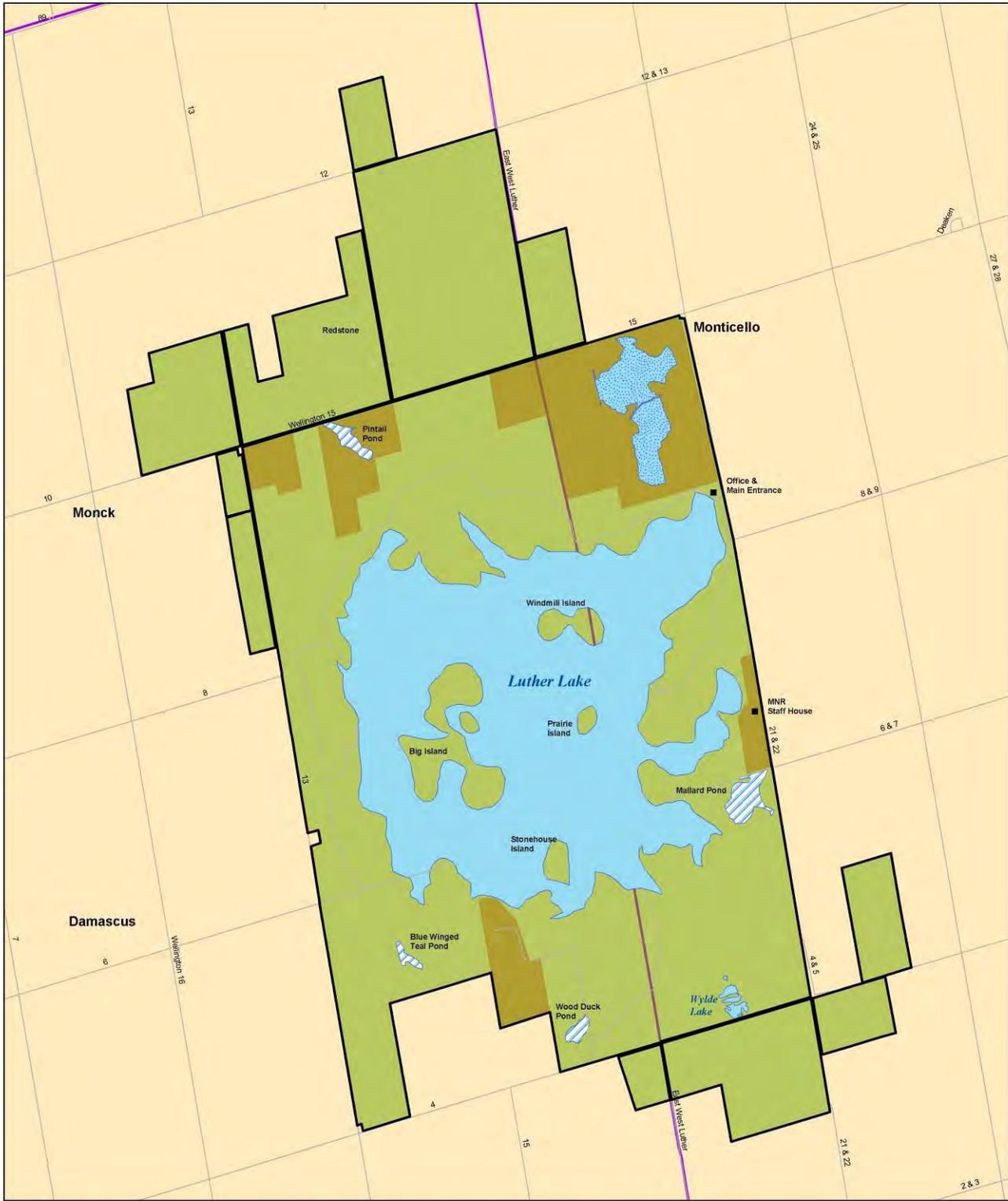
Legend

- ROADS
- LUTHER MARSH WILDLIFE MANAGEMENT AREA
- LUTHER LAKE and DAMASCUS RESERVOIR
- MUNICIPAL BOUNDARY
- GRAND RIVER WATERSHED
- OTHER RESERVOIRS



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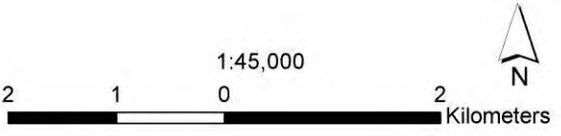


Luther Marsh Wildlife Management Area 2010 Management Plan

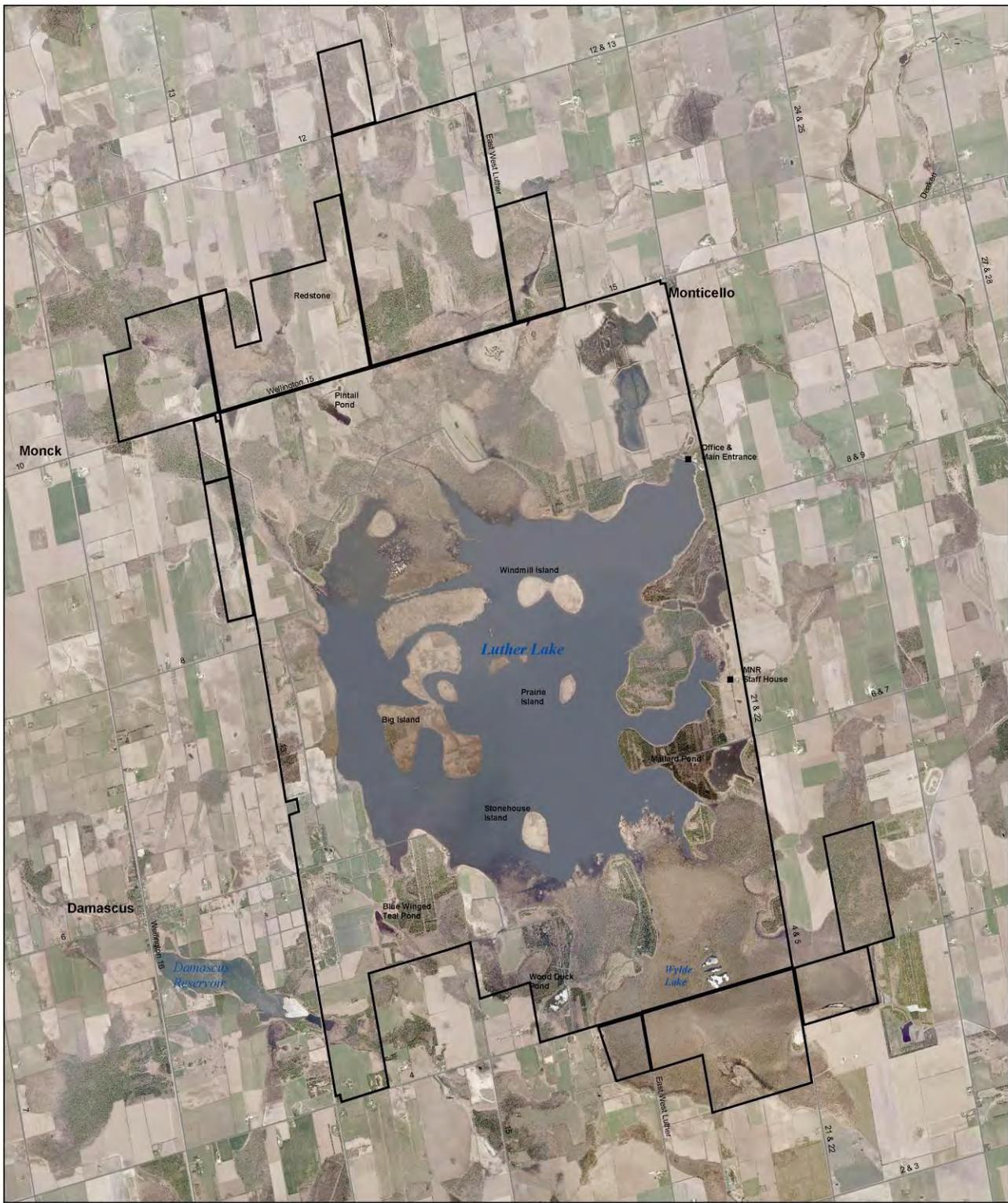
Map 1.2 Luther Marsh Wildlife Management Area



- Legend**
- ROADS
 - LAKES
 - MONTICELLO PROJECT
 - DU MANAGED WETLANDS
 - MNR PROPERTY
 - GRCA PROPERTY
 - MUNICIPAL BOUNDARY



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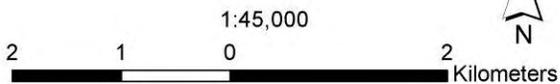
Luther Marsh Wildlife Management Area 2010 Management Plan

Map 1.3 2006 Orthophoto of Luther Marsh Wildlife Management Area



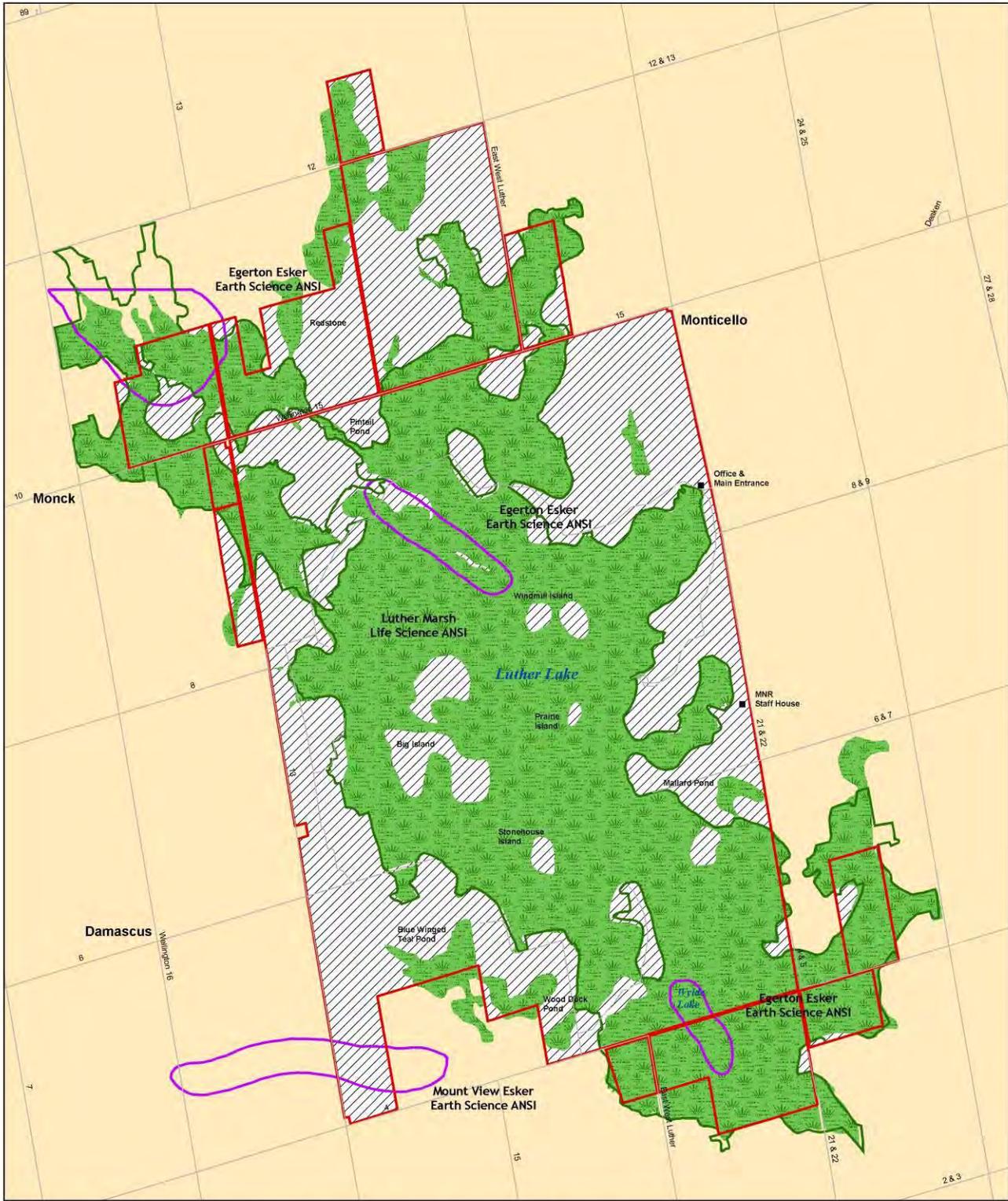
Legend

- ROADS
- LUTHER MARSH WILDLIFE MANAGEMENT AREA



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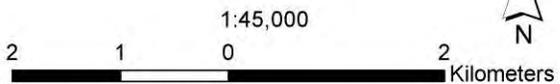
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Map 1.4 Designations



Legend

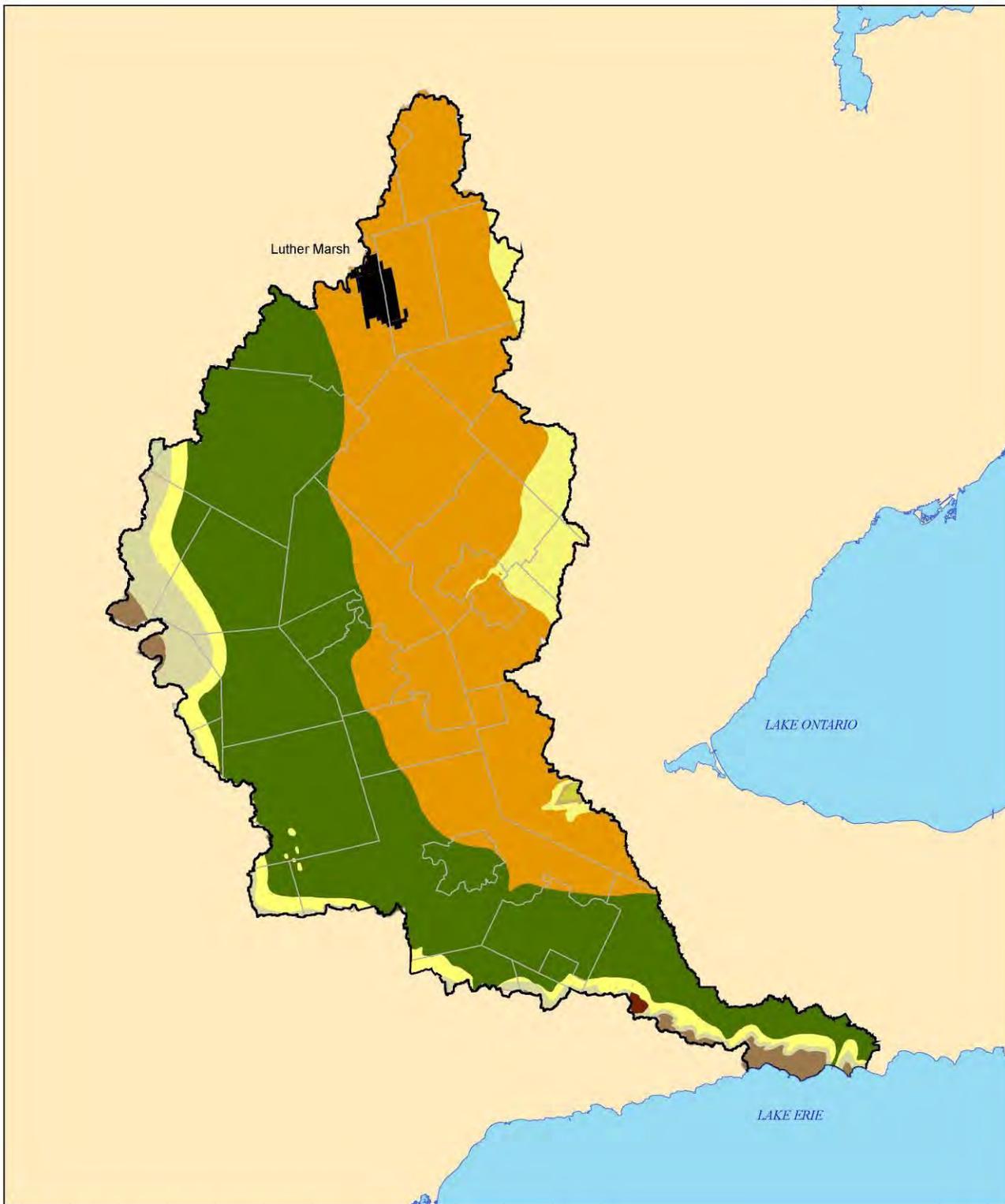
- ROADS
- IMPORTANT BIRD AREA
- ANSI, Life Science
- ANSI, Earth Science
- PSW
- LUTHER MARSH WILDLIFE MANAGEMENT AREA



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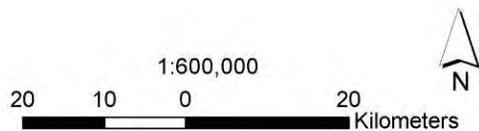
Map 2.1 Grand River Bedrock Geology

Legend

-  LUTHER MARSH
-  MUNICIPAL BOUNDARY
-  WATERSHED BOUNDARY
-  GREAT LAKES

BEDROCK GEOLOGY

-  BASS ISLANDS - BERTIE
-  BOIS BLANC
-  CLINTON - CATARACT GROUP
-  GUELPH
-  LOCKPORT - AMABEL
-  ONONDAGA - AMHERSTBURG
-  ORISKANY
-  QUEENSTON
-  SALINA



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Map 2.2 Surficial Geology

Legend

- ROADS
- LUTHER MARSH WILDLIFE MANAGEMENT AREA

SURFICIAL GEOLOGY

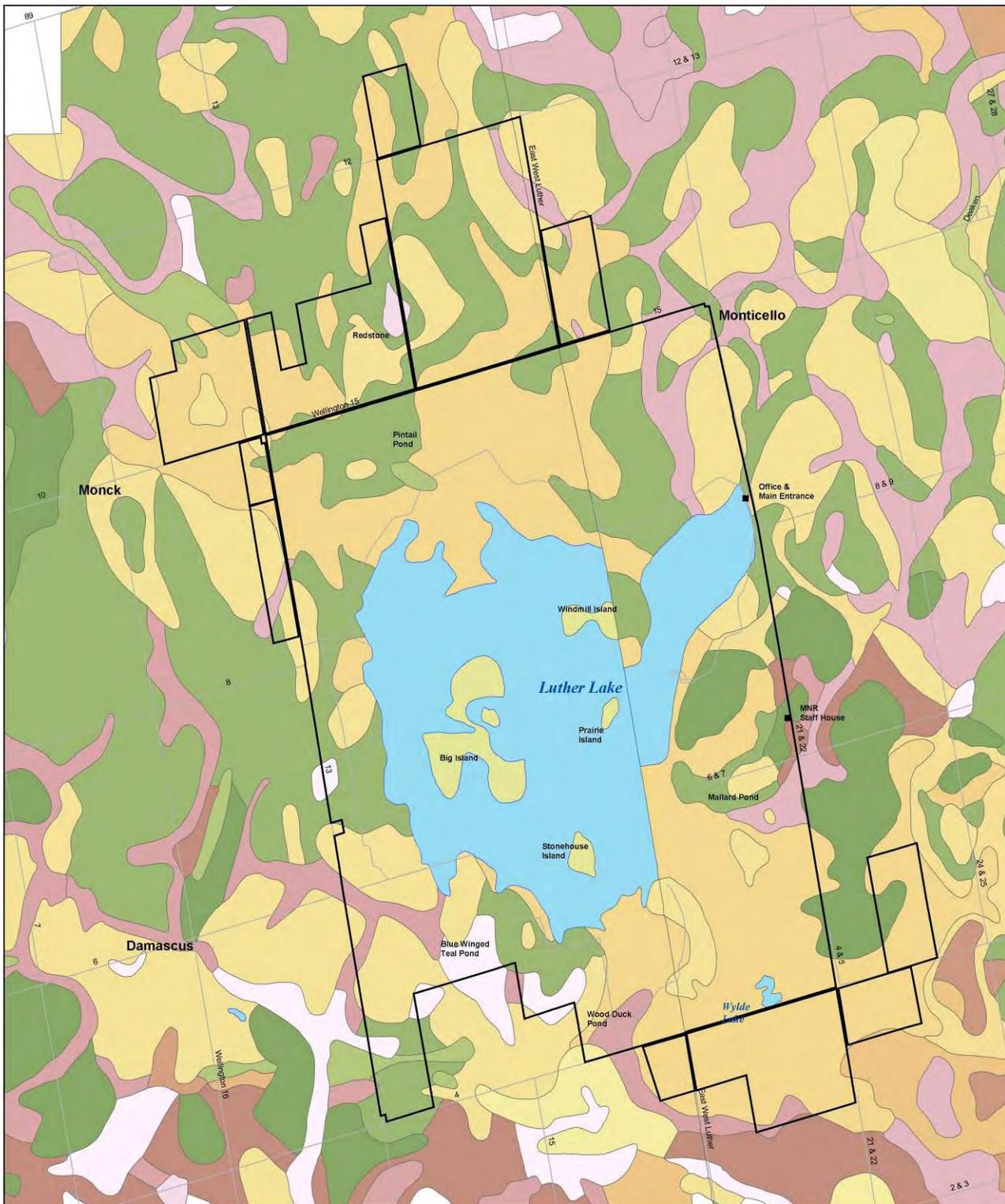
- | | |
|---|--|
| CATFISH CREEK TILL | GUELPH FORMATION |
| ELMA TILL (HURON-GEORGIAN BAY LOBE) | MODERN FLUVIAL DEPOSITS |
| GLACIOFLUVIAL ICE-CONTACT DEPOSITS | ORGANIC DEPOSITS |
| GLACIOFLUVIAL OUTWASH DEPOSITS | TAVISTOCK TILL (HURON-GEORGIAN BAY LOBE) |
| GLACIOLACUSTRINE DEPOSITS DEEP WATER | WATER |
| GLACIOLACUSTRINE DEPOSITS SHALLOW WATER | |

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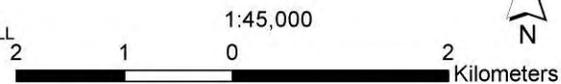
Map 2.3 Soils

Legend

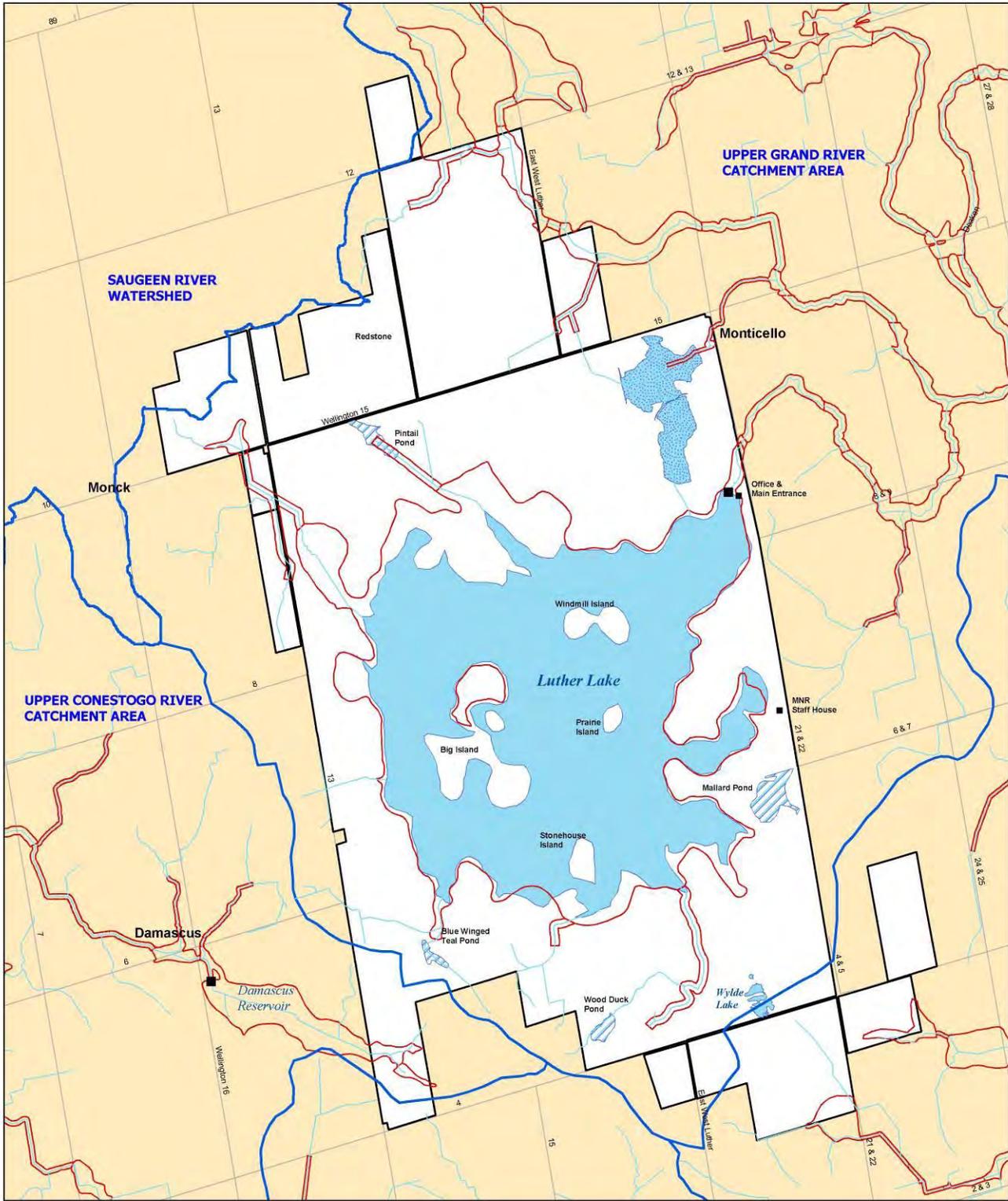
- ROADS
- LUTHER MARSH WILDLIFE MANAGEMENT AREA

SOILS

BENNINGTON	FOX	HILLSBURGH	PARKHILL
BRISBANE	GILFORD	HURON	PEAT
BROOKSTON	GRANBY	LISTOWEL	PERTH
BURFORD	GUELPH	LONDON	TAVISTOCK
COLWOOD	HARKAWAY	MUCK	TOLEDO
DONNYBROOK	HARRISTON	NOT MAPPED	WATER



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Map 2.4 Hydrology

Legend

- DAMS
- ROADS
- DRAINAGE
- ▭ CATCHMENT AREAS
- ▭ FLOODPLAIN
- ▭ LAKES
- ▨ DU MANAGED WETLANDS
- ▨ MONTICELLO PROJECT
- ▭ LUTHER MARSH WILDLIFE MANAGEMENT AREA

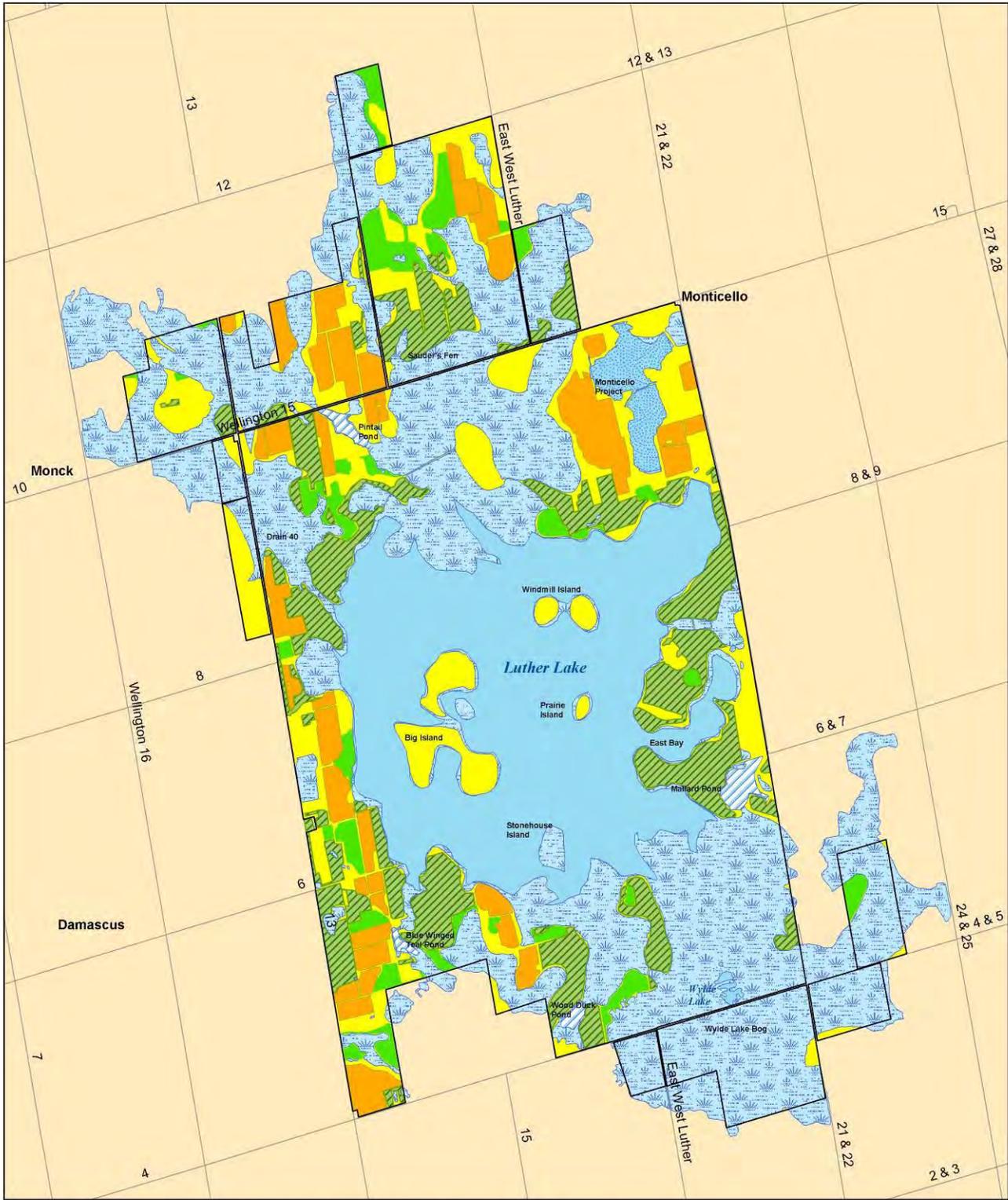


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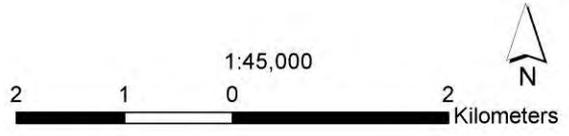


Luther Marsh Wildlife Management Area 2010 Management Plan

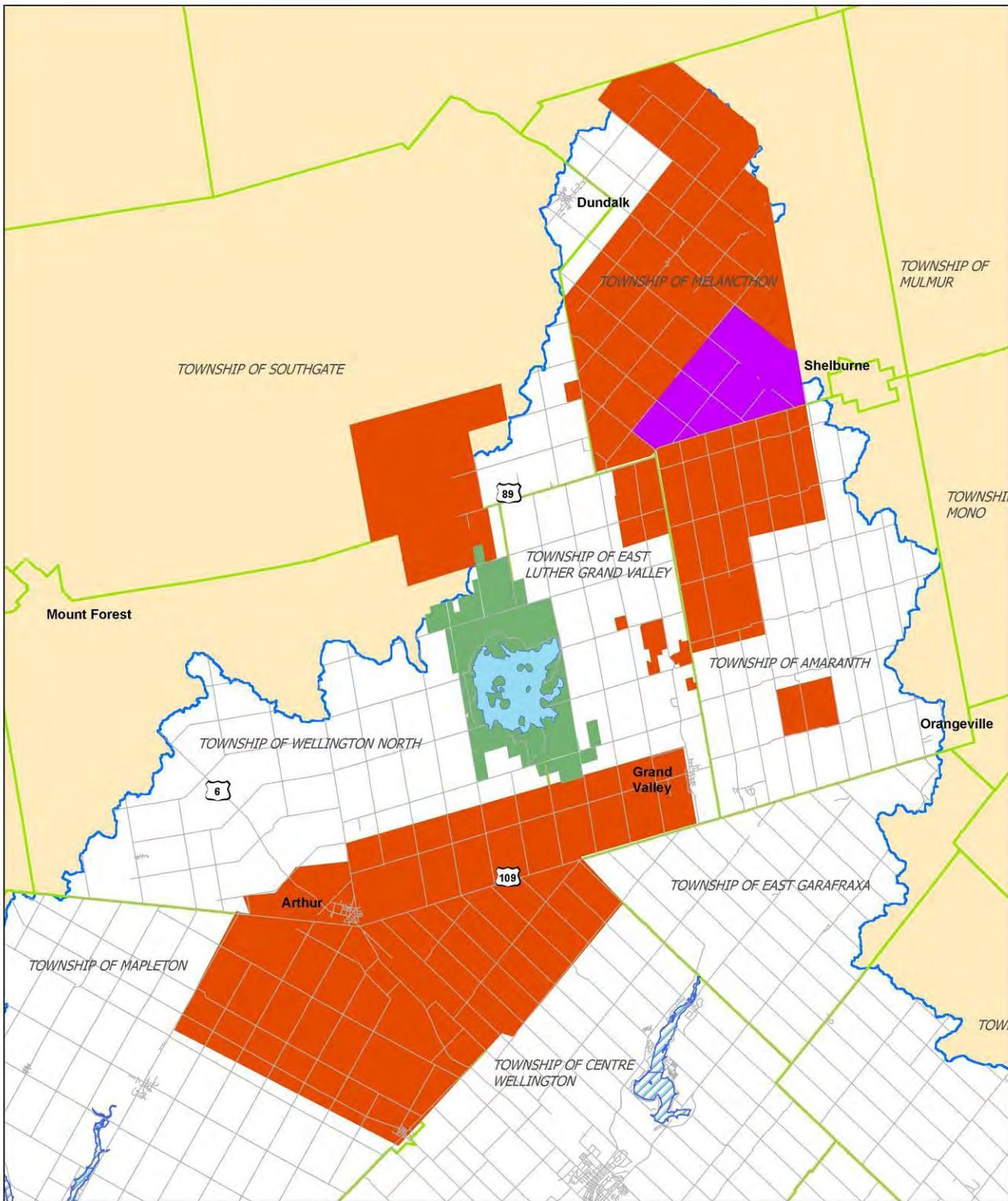
Map 2.5 Vegetation Communities

Legend

- ROADS
- LAKES
- MONTICELLO PROJECT
- DU MANAGED WETLANDS
- WETLAND
- PLANTATION
- AGRICULTURE
- UPLAND FOREST
- NATURAL AREA (MEADOW/GRASSLAND/THICKET)
- LUTHER MARSH WILDLIFE MANAGEMENT AREA



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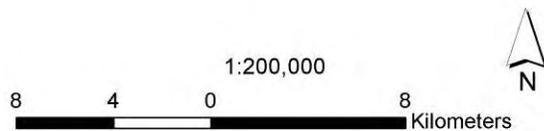


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Map 4.1 Regional Pressures

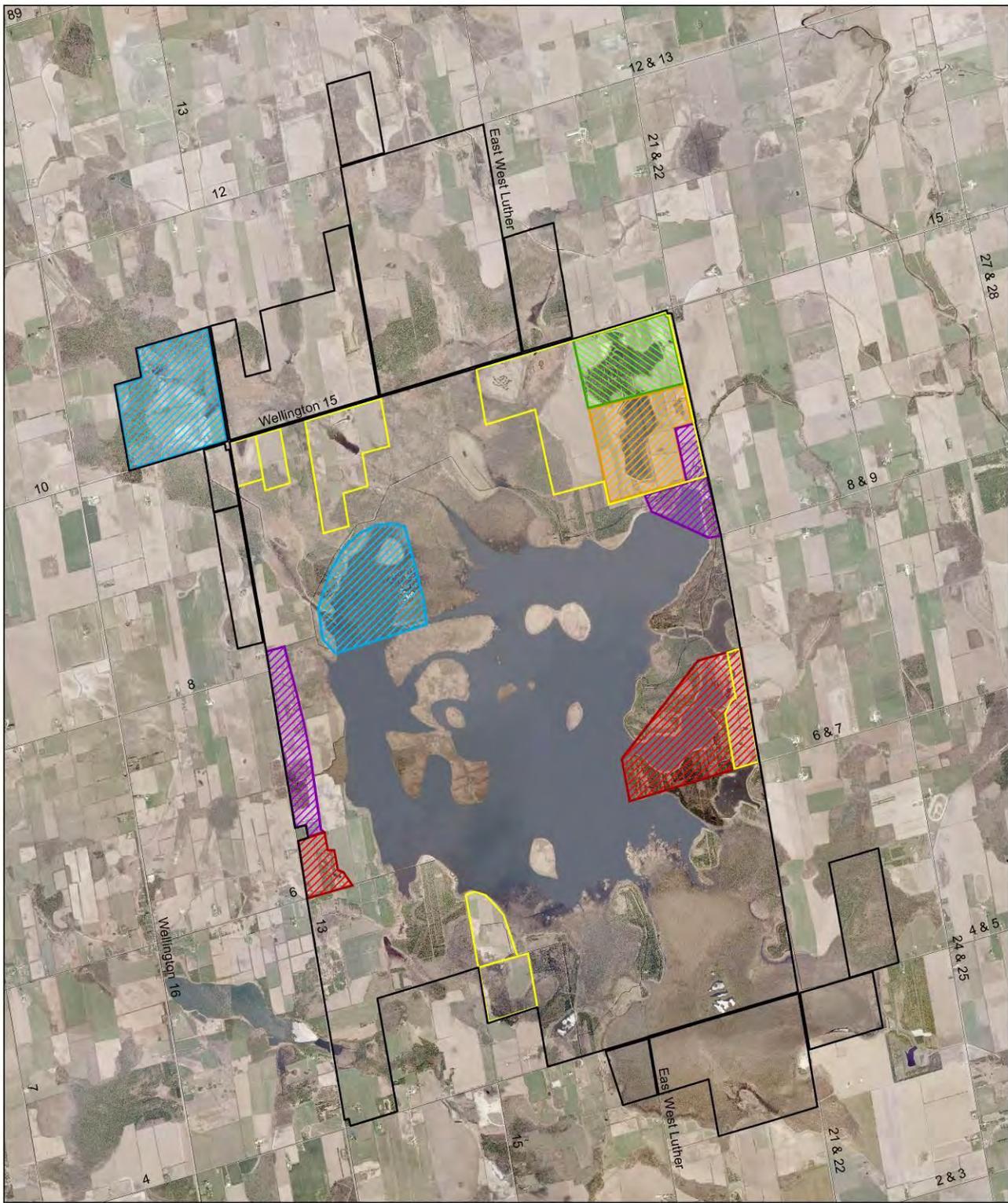
Legend

- ROADS
- LUTHER LAKE
- LUTHER MARSH WILDLIFE MANAGEMENT AREA
- EXISTING WIND FARM
- POTENTIAL WIND FARM
- OTHER RESERVOIRS
- MUNICIPAL BOUNDARY
- GRAND RIVER WATERSHED



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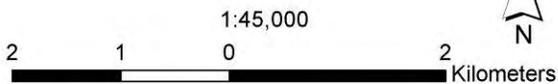


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Map 5.1 Hunter Distribution

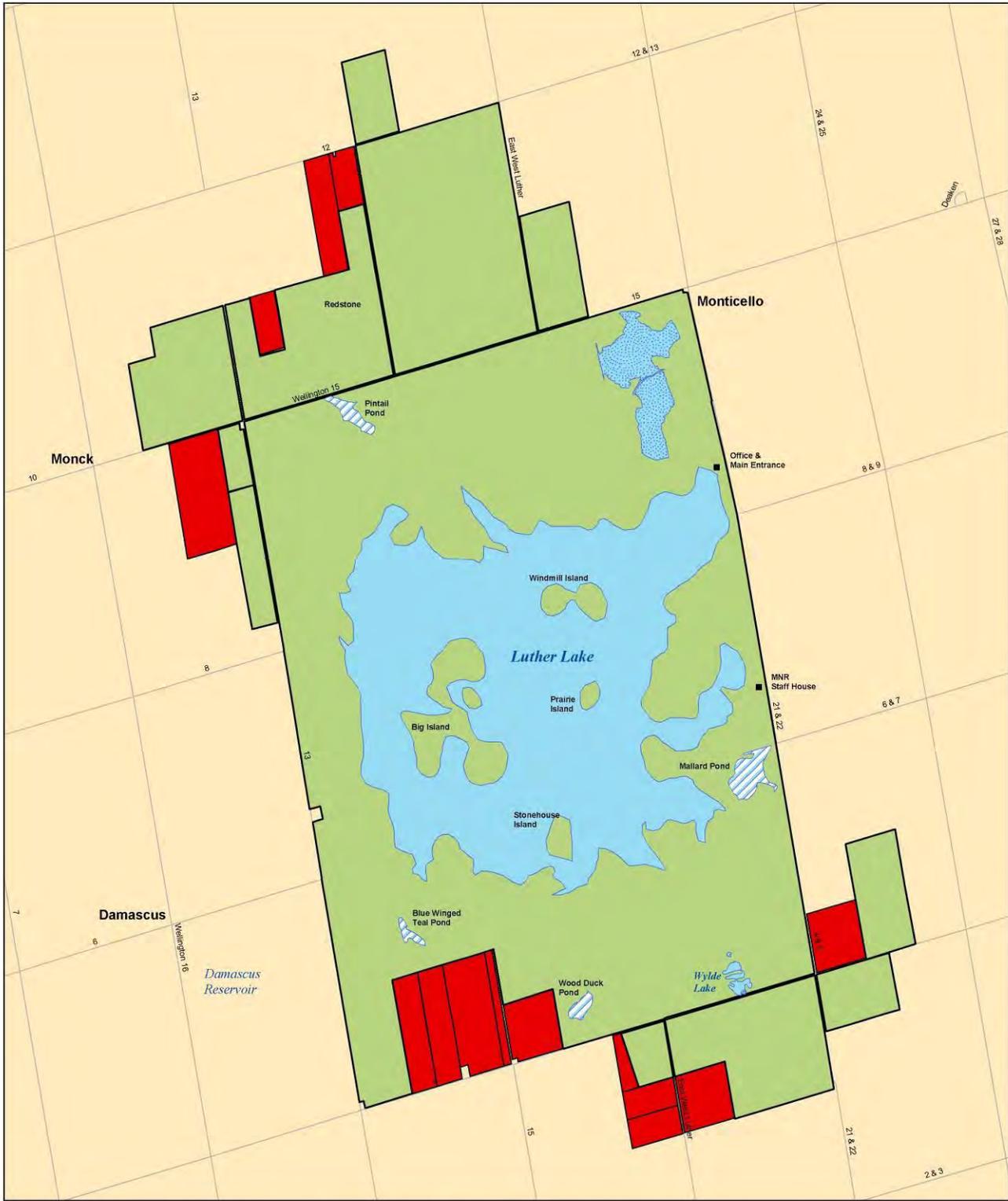
Legend

- ROADS
- LUTHER MARSH WILDLIFE MANAGEMENT AREA
- MNR PROPERTY
- ▨ RESTRICTED AREA
- ▨ SAFETY ZONES
- ▨ BAITING AREAS
- ▨ MONTICELLO PROJECT HUNTING AREA - Mandatory Parking Stakes
- Mandatory Dog Use When Hunting Migratory Birds
- ▨ SANCTUARY



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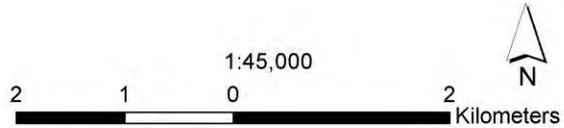


Luther Marsh Wildlife Management Area 2010 Management Plan

Map 5.2 Land Acquisition

Legend

-  ROADS
-  MONTICELLO PROJECT
-  DU MANAGED WETLANDS
-  LAKES
-  LUTHER MARSH WILDLIFE MANAGEMENT AREA
-  TARGET ACQUISITION AREAS



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Appendix 2:
Species Lists

HERPTOFAUNAL SPECIES LIST								
ORDER	FAMILY	COMMON NAME	SCIENTIFIC NAME	COSEWIC	MNR	SRANK	GRANK	HABITAT
ANURA	BUFONIDAE	American Toad *	Bufo americanus			S5	G5	Wetland/Forest
CAUDATA	AMBYSTOMATIDAE	Spotted Salamander *	Ambystoma maculatum			S4	G5	Forest
	PLETHODONTIDAE	Eastern Red-backed Salamander *	Plethodon cinereus			S5	G5	Forest
	HYLIDAE	Western Chorus Frog *	Pseudacris triseriata	NAR	NAR	S4	G5	Wetland/Forest/Grassland
		Spring Peeper *	Pseudacris crucifer			S5	G5	Wetland/Forest
	RANIDAE	American Bullfrog *	Rana catesbeiana			S4	G5	Wetlands
		Green Frog *	Rana clamitans			S5	G5	Wetlands
		Northern Leopard Frog *	Rana pipiens	NAR	NAR	S5	G5	Wetland
		Mink Frog *	Rana septentrionalis			S5	G5	Wetland
		Wood Frog *	Rana sylvatica			S5	G5	Wetland/Forest
CRYPTODEIRA	CHELYDRIDAE	Snapping Turtle *	Chelydra serpentina			S5	G5	Wetland
	EMYDIDAE	Midland Painted Turtle *	Chrysemys picta marginata			S5	G5T5	Wetland
		Spotted Turtle *	Clemmys guttata	END	SC	S3	G5	Wetland
		Blanding's Turtle *	Emydoidea blandingii		THR	S3	G4	Wetland
SQUAMATA	COLUBRIDAE	Northern Watersnake *	Nerodia sipedon sipedon	NAR	NAR	S5	G5T5	Wetland
		Northern Brownsnake *	Storeria dekayi dekayi			SU	G5T?	Wetland/Forest/Grassland
		Northern Red-bellied Snake *	Storeria occipitomaculata occipitomaculata			S5	G5T5	Forest/Grassland
		Butler's Gartersnake *	Thamnophis butleri	THR	THR	S2	G4	Wetland/Grassland
		Northern Ribbonsnake *	Thamnophis sauritus septentrionalis			S3	G5T?	Wetland
		Eastern Gartersnake *	Thamnophis sirtalis sirtalis			S5	G5T?	Wetland/Forest/Grassland
		Smooth Greensnake *	Opheodrys vernalis			S4	G5	Wetland/Grassland

* Sandilands, 1984

FISH SPECIES LIST

Common Name	Scientific Name	Location
Banded Killifish***	<i>Fundulus diaphanous</i>	Luther Lake
Blacknose dace* * * * *	<i>Rhinichthys atratus</i>	Streams, Black Creek
Blacknose shiner*	<i>Notropis heterolepis</i>	Streams
Bluntnose minnow* * *	<i>Pimephales notatus</i>	Luther Lake, Streams, Black Creek
Brassy minnow* * *	<i>Hybognathus hankinsoni</i>	Luther Lake, Streams
Brook Stickleback** * * * * *	<i>Culaea inconstans</i>	Luther Lake, Streams, Black Creek
Brown Bullhead* * * * *	<i>Ictalurus nebulosus</i>	Luther Lake, Black Creek, Streams,
Central Mudminnow*** * * * * * * * *	<i>Umbra limi</i>	Luther Lake, Streams, Black Creek
Central stoneroller** * *	<i>Campostoma anomalum</i>	Streams, Black Creek
Common shiner* * * * * * * *	<i>Notropis cornuta</i>	Streams, Black Creek
Creek Chub*** * * * * * *	<i>Semotilus atromaculatus</i>	Streams
Fantail darter*	<i>Etheostoma flabellare</i>	Streams
Fathead minnow* * * * * * * * *	<i>Pimephales promelas</i>	Luther Lake, Streams
Finescale dace* * *	<i>Chrosomus negogaeus</i>	Luther Lake, Streams
Golden shiner	<i>Notemigonus crysoleucas</i>	Luther Lake
Hornyhead chub* * * * *	<i>Nocomis biguttatus</i>	Streams, Black Creek
Iowa Darter*** * * * *	<i>Etheostoma exile</i>	Luther Lake, Streams, Black Creek
Johnny darter* *	<i>Etheostoma nigrum</i>	Black Creek, Streams
Least darter* *	<i>Etheostoma microperca</i>	Streams, Black Creek
Mottled Sculpin**	<i>Cottus bairdii</i>	Streams
Northern Pike* **	<i>Esox lucius</i>	Streams
Northern Redbelly Dave*** * * * * * * * *	<i>Chrosomus eos</i>	Luther Lake, Streams, Black Creek
Pearl dace* * * * *	<i>Semotilus margarita</i>	Luther Lake, Streams
Pumpkinseed** * * *	<i>Lepomis gibbosus</i>	Streams
Rainbow darter*** *	<i>Etheostoma caeruleum</i>	Black Creek, Streams
River chub*	<i>Nocomis micropogon</i>	Streams
Rock Bass* * * * *	<i>Ambloplites rupestris</i>	Black Creek, Stream
Rosyface shiner*	<i>Notropis rubellus</i>	Black Creek
Smallmouth Bass*** * * * *	<i>Micropterus dolomieu</i>	Luther Lake, Black Creek, Streams
Striped shiner	<i>Luxilus chrysocephalus</i>	Streams
White Sucker*** * * * * *	<i>Catostomus commersoni</i>	Streams
Yellow Perch* * * * * * *	<i>Perca flavescens</i>	Luther Lake, Black Creek, Streams

Fish Species Record Sources

*GRCA 1983. Fisheries Inventory on the Upper Grand River Watershed 1983. Cynthia Mitton, GRCA.

**GRCA 1996. 1996 Fish Collections. L. Richardson et. al. GRCA

***GRCA 1999. 1999 Fish Collections. O'Farell and Schmidt, GRCA

*GRCA 2001. 2001 Fish Collections. Ethier et. al. GRCA

**LaFrance B. 1987. letter regarding trapnetting in Damascus Reservoir

***Mackie T. 1997. Fish Communities in Plunge Pools. Wilfrid Laurier University

*Messier. R. 2003. fish species found in Black Creek immediately downstream of Luther Marsh dam.

**SAAR 1996. SAAR Environmental Limited Environmental Consultants.

***Timmerman A.J. and D. P. Coulson. 1997. Note on observations at drain in Luther Marsh WMA

*Timmerman A. 1999. Note to File: Black Creek Tributaries - Fisheries Inventory

**University of Guelph. 1981. Fish Collections - 1981. From Dr. David Noakes.

***Sandilands 1984. Annotated Checklist of the Vascular Plants and Vertebrates of Luther Marsh, Ontario.

MAMMAL SPECIES LIST

ORDER	FAMILY	COMMON NAME	SCIENTIFIC NAME	COSEWIC	MNR	SRANK	GRANK	HABITAT
MARSUPIALIA	DIDELPHIDAE	Virginia Opossum**	Didelphis virginiana			S4	G5	Forest
INSECTIVORA	SORICIDAE	Masked Shrew*	Sorex cinereus			S5	G5	Wetland/Forest
		Northern Short-tailed Shrew*	Blarina brevicauda			S5	G5	Wetland/Forest
	TALPIDAE	Hairy-tailed Mole*	Parascalops breweri			S4	G5	Forest/Grassland
		Star-nosed Mole*	Condylura cristata			S5	G5	Wetland
CHIROPTERA	VESPERTILIONIDAE	Little Brown Bat*	Myotis lucifugus			S5	G5	Wetland/Forest
		Silver-haired Bat*	Lasionycteris noctivagans			S4	G5	Forest
		Big Brown Bat*	Eptesicus fuscus			S5	G5	Forest
LAGOMORPHA	LEPORIDAE	Eastern Cottontail*	Sylvilagus floridanus			S5	G5	Forest/Grassland
		Snowshoe Hare*	Lepus americanus			S5	G5	Forest
		Cape Or European Hare*	Lepus europaeus			SE	G5	Grassland
RODENTIA	SCIURIDAE	Eastern Chipmunk*	Tamias striatus			S5	G5	Forest
		Woodchuck*	Marmota monax			S5	G5	Forest/Grassland
		Grey Squirrel*	Sciurus carolinensis			S5	G5	Forest
		Red Squirrel**	Tamiasciurus hudsonicus			S5	G5	Forest
		Northern Flying Squirrel*	Glaucomys sabrinus			S5	G5	Forest
	CASTORIDAE	Beaver*	Castor canadensis			S5	G5	Wetland
	CRICETIDAE - Subfamily Neotominae	Deer Mouse*	Peromyscus maniculatus			S5	G5	Forest
	Subfamily Neotominae	White-footed Mouse*	Peromyscus leucopus			S5	G5	Forest
		Meadow Vole*	Microtus pennsylvanicus			S5	G5	Wetland/Grassland
Superfamily Muroidea	Subfamily Arvicolinae	Muskrat*	Ondatra zibethicus			S5	G5	Wetland
	MURISEA - Subfamily Murinea	Norway Rat*	Rattus norvegicus			SE	G5	Wetland/Forest/Grassland/Human structures
	Subfamily Murinea	House Mouse*	Mus musculus			SE	G5	Grassland/Human structures
	ZAPODIDAE	Meadow Jumping Mouse*	Zapus hudsonius			S5	G5	Wetland/Grassland
	DIPODIDAE	Woodland Jumping Mouse*	Napaeozapus insignis			S5	G5	Wetland/Forest
	ERETHIZONTIDAE	Porcupine*	Erethizon dorsatum			S5	G5	Forest
CARNIVORA	CANIDAE	Coyote*	Canis latrans			S5	G5	Forest/Grassland
		Red Fox*	Vulpes vulpes			S5	G5	Forest/Grassland
	URSIDAE	Black Bear*	Ursus americanus	NAR	NAR	S5	G5	Wetland/Forest/Grassland
	PROCYONIDAE	Raccoon*	Procyon lotor			S5	G5	Forest
		Marten****	Martes americana			S5	G5	Forest
		Fisher***	Martes pennanti			S5	G5	Forest
	MUSTELIDAE	Ermine*	Mustela erminea			S5	G5	Forest/Grassland
		Long-tailed Weasel*	Mustela frenata			S4	G5	Forest/Grassland
		Mink*	Mustela vison			S5	G5	Wetland/Forest

	MEPHITIDAE	Striped Skunk*	Mephitis mephitis			S5	G5	Forest/Grassland
	FELIDAE	Bobcat*	Lynx rufus			S4	G5	Wetland/Forest/Grassland
ARTIODACTYLA	CERVIDAE - Subfamily Capreolinae	White-tailed Deer*	Odocoileus virginianus			S5	G5	Wetland/Forest/Grassland

*Sandilands, 1984

**Bell

***Timmerman

****Broccolo, 06/2005

BIRD SPECIES LIST

ORDER		COMMON NAME	SCIENTIFIC NAME	BREEDING EVIDENCE	COSEWIC	MNR	SRANK	GRANK	HABITAT
ANSERIFORMES	ANATIDAE								
	Subfamily Anserinae	Snow Goose #	<i>Chen caerulescens</i>				S4B,SZN	G5	Wetland
	Subfamily Anserinae	Brant *	<i>Branta bernicla</i>				SZN,SRB	G5	Wetland
	Subfamily Anserinae	Canada Goose ***	<i>Branta canadensis</i>	Co			S5B,SZN	G5	Wetland
	Subfamily Anserinae	Mute Swan ***	<i>Cygnus olor</i>				SE	G5	Wetland
		Trumpeter Swan ***	<i>Cygnus buccinator</i>	Co	NAR	NAR	S2S3	G4	Wetland
		Tundra Swan *	<i>Cygnus columbianus</i>				S3B,SZN	G5	Wetland
	Subfamily Anatinae	Wood Duck ***	<i>Aix sponsa</i>	Co			S5B,SZN	G5	Wetland
	Subfamily Anatinae	Green-winged Teal ~	<i>Anas crecca</i>	Po			S4B,SZN	G5	Wetland
	Subfamily Anatinae	American Black Duck °	<i>Anas rubripes</i>	Co			S5B,SZN	G5	Wetland
	Subfamily Anatinae	Mallard ***	<i>Anas platyrhynchos</i>	Co			S5B,SZN	G5	Wetland
	Subfamily Anatinae	Northern Pintail *	<i>Anas acuta</i>				S5B,SZN	G5	Wetland
	Subfamily Anatinae	Blue-winged Teal °	<i>Anas discors</i>	Co			S5B,SZN	G5	Wetland
	Subfamily Anatinae	Northern Shoveler °	<i>Anas clypeata</i>	Po			S4B,SZN	G5	Wetland
	Subfamily Anatinae	Gadwall °	<i>Anas strepera</i>	Co			S4B,SZN	G5	Wetland
	Subfamily Anatinae	Eurasian Wigeon *	<i>Anas penelope</i>				SZN	G5	Wetland
	Subfamily Anatinae	American Wigeon °	<i>Anas americana</i>	Co			S4B,SZN	G5	Wetland
	Subfamily Anatinae	Canvasback *	<i>Aythya valisineria</i>				S1B,S2N	G5	Wetland
	Subfamily Anatinae	Redhead °	<i>Aythya americana</i>	Co			S2B,SZN	G5	Wetland
	Subfamily Anatinae	Ring-necked Duck °	<i>Aythya collaris</i>	Co			S5B,SZN	G5	Wetland
	Subfamily Anatinae	Greater Scaup *	<i>Aythya marila</i>				S2B,SZN	G5	Wetland
	Subfamily Anatinae	Lesser Scaup *	<i>Aythya affinis</i>				S4B,SZN	G5	Wetland
	Subfamily Anatinae	Long-tailed Duck *	<i>Clangula hyemalis</i>				S2S3B,SZN	G5	Wetland
	Subfamily Anatinae	Black Scoter *	<i>Melanitta nigra</i>				SZN,SUB	G5	Wetland
	Subfamily Anatinae	Surf Scoter *	<i>Melanitta perspicillata</i>				S1B,SZN	G5	Wetland
	Subfamily Anatinae	White-winged Scoter *	<i>Melanitta fusca</i>				S1S2B,SZN	G5	Wetland
	Subfamily Anatinae	Common Goldeneye *	<i>Bucephala clangula</i>				S5B,SZN	G5	Wetland
	Subfamily Anatinae	Bufflehead *	<i>Bucephala albeola</i>				S3B,SZN	G5	Wetland
	Subfamily Anatinae	Hooded Merganser °	<i>Lophodytes cucullatus</i>	Pr			S5B,SZN	G5	Wetland
	Subfamily Anatinae	Common Merganser *	<i>Mergus merganser</i>				S5B,SZN	G5	Wetland
	Subfamily Anatinae	Red-breasted Merganser *	<i>Mergus serrator</i>				S4B,SZN	G5	Wetland
	Subfamily Anatinae	Ruddy Duck °	<i>Oxyura jamaicensis</i>	Pr			S2B,SZN	G5	Wetland
GALLIFORMES	PHASIANIDAE								
	Subfamily Phasianinae	Ring-necked Pheasant °	<i>Phasianus colchicus</i>	Co			SE	G5	Grassland
	Subfamily Tetraoninae	Ruffed Grouse °	<i>Bonasa umbellus</i>	Co			S5	G5	Forest
	Subfamily Meleagridinae	Wild Turkey °	<i>Meleagris gallopavo</i>	Co			S4	G5	Forest
GAVIIFORMES	GAVIIDAE	Common Loon ***	<i>Gavia immer</i>	Co	NAR	NAR	S4B,SZN	G5	Wetland
PODICIPEDIFORMES	PODICIPEDIDAE	Pied-billed Grebe ***	<i>Podilymbus podiceps</i>	Co			S4B,SZN	G5	Wetland
		Horned Grebe *	<i>Podiceps auritus</i>			DD	S1B,SZN	G5	Wetland

		Red-necked Grebe *	Podiceps grisegena		NAR	NAR	S3B,SZN	G5	Wetland
PELECANIFORMES	PELECANIDAE	American White Pelican **	Pelecanus erythrorhynchos		NAR	END-R	S2B,SZN	G3	Wetland
	PHALACROCORACIDAE	Double-crested Cormorant ***	Phalacrocorax auritus	Co	NAR	NAR	S4B,SZN	G5	Wetland
CICONIIFORMES	ARDEIDAE	American Bittern **	Botaurus lentiginosus	Co			S4B,SZN	G4	Wetland
		Least Bittern ***	Ixobrychus exilis	Pr	THR	THR	S3B,SZN	G5	Wetland
		Great Blue Heron ***	Ardea herodias	Co			S5B,SZN	G5	Wetland
		Great Egret ##	Casmerodius albus	Pr			S2B,SZN	G5	Wetland
		Snowy Egret *	Egretta thula				SZB,SZN	G5	Wetland
		Cattle Egret *	Bubulcus ibis				SZB,SZN	G5	Wetland
		Green Heron °	Butorides virescens	Co			S4B,SZN	G5	Wetland
		Black-crowned Night-heron ##	Nycticorax nycticorax	Co			S3B,SZN	G5	Wetland
	THRESKIORNITHIDAE - Subfamily Threskiornithinae	Glossy Ibis *	Plegadis falcinellus				SZN	G5	Wetland
	CATHARTIDAE	Turkey Vulture **	Cathartes aura	Pr			S4B,SZN	G5	Forest
	ODONTOPHORIDAE	Northern Bobwhite °	Colinus virginianus	Co	END	END	S1S2	G5	Grassland
FALCONIFORMES	ACCIPITRIDAE- Subfamily Pandioninae	Osprey ***	Pandion haliaetus	Co			S4B,SZN	G5	Wetland
	Subfamily Accipitrinae	Golden Eagle *	Aquila chrysaetos		NAR	END-R	S1B,SZN	G5	Forest/Grassland
	Subfamily Accipitrinae	Bald Eagle ***	Haliaeetus leucocephalus	Co	NAR	END-R	S4B,SZN	G4	Forest
	Subfamily Accipitrinae	Northern Harrier ##	Circus cyaneus	Co	NAR	NAR	S4B,SZN	G5	Grassland
	Subfamily Accipitrinae	Sharp-shinned Hawk ~	Accipiter striatus	Pr	NAR	NAR	S5B,SZN	G5	Forest
	Subfamily Accipitrinae	Cooper's Hawk ~	Accipiter cooperii	Pr	NAR	NAR	S4B,SZN	G5	Forest
	Subfamily Accipitrinae	Northern Goshawk °	Accipiter gentilis	Co	NAR	NIAC	S4	G5	Forest
	Subfamily Accipitrinae	Red-shouldered Hawk °	Buteo lineatus	Po	SC	SC	S4B,SZN	G5	Forest
	Subfamily Accipitrinae	Broad-winged Hawk *	Buteo platypterus				S5B,SZN	G5	Forest
	Subfamily Accipitrinae	Red-tailed Hawk ~	Buteo jamaicensis	Pr	NAR	NAR	S5B,SZN	G5	Forest/Grassland
	Subfamily Accipitrinae	Rough-legged Hawk *	Buteo lagopus		NAR	NAR	S1B,SZN	G5	Forest/Grassland
	FALCONIDAE	American Kestrel *	Falco sparverius	Co			S5B,SZN	G5	Forest/Grassland
	Subfamily Falconinae	Merlin *	Falco columbarius	Pr	NAR	NAR	S4B,SZN	G5	Forest/Grassland
		Peregrine Falcon *	Falco peregrinus			END	S2S3B,ZN	G4	Forest/Grassland
GRUIFORMES	RALLIDAE	King Rail *	Rallus elegans		END	END-R	S2B,SZN	G4G5	Wetland
		Virginia Rail ~	Rallus limicola	Co			S4B,SZN	G5	Wetland
		Sora ***	Porzana carolina	Pr			S4B,SZN	G5	Wetland
		Common Moorhen ***	Gallinula chloropus	Co			S4B,SZN	G5	Wetland
		American Coot **	Fulica americana	Co	NAR	NAR	S4B,SZN	G5	Wetland
	GRUIDAE - Subfamily Gruinae	Sandhill Crane ##	Grus canadensis	Co			S4B,SZN	G5	Wetland
CHARADRIIFORMES	CHARADRIIDAE - Subfamily Charadriinae	Black-bellied Plover *	Pluvialis squatarola				SZN	G5	Grassland

	Subfamily Charadriinae	American Golden-plover *	Pluvialis dominica				S1B,SZN	G5	Grassland
	Subfamily Charadriinae	Semipalmated Plover *	Charadrius semipalmatus				S4B,SZN	G5	Grassland
	Subfamily Charadriinae	Killdeer **	Charadrius vociferus	Co			S5B,SZN	G5	Grassland
	SCOLOPACIDAE - Subfamily Scolopacinae	Spotted Sandpiper °	Actitis macularius	Co			S5B,SZN	G5	Wetland/Forest/Grassland
		Solitary Sandpiper *	Tringa solitaria				S4B,SZN	G5	Forest
	Subfamily Scolopacinae	Lesser Yellowlegs >	Tringa flavipes				S4B	G5	Wetland
	Subfamily Scolopacinae	Greater Yellowlegs *	Tringa melanoleuca				S4B,SZN	G5	Wetland
	Subfamily Scolopacinae	Willet *	Catoptrophorus semipalmatus				SZN	G5	Wetland
	Subfamily Scolopacinae	Upland Sandpiper °	Bartramia longicauda	Pr			S4B,SZN	G5	Grassland
	Subfamily Scolopacinae	Whimbrel *	Numenius phaeopus				S2B,SZN	G5	Grassland
	Subfamily Scolopacinae	Hudsonian Godwit *	Limosa haemastica				S2S3B,SZN	G4	Wetland
	Subfamily Scolopacinae	Ruddy Turnstone *	Arenaria interpres				SZN	G5	Grassland
		Sanderling *	Calidris alba				SZN	G5	Grassland
	Subfamily Scolopacinae	Semipalmated Sandpiper *	Calidris pusilla				S3S4B,SZN	G5	Wetland
	Subfamily Scolopacinae	Western Sandpiper *	Calidris mauri				SZN	G5	Wetland
	Subfamily Scolopacinae	Least Sandpiper *	Calidris minutilla				S4B,SZN	G5	Wetland
	Subfamily Scolopacinae	White-rumped Sandpiper *	Calidris fuscicollis				SZN	G5	Wetland
	Subfamily Scolopacinae	Baird's Sandpiper *	Calidris bairdii				SZN	G5	Wetland
	Subfamily Scolopacinae	Pectoral Sandpiper *	Calidris melanotos				SHB,SZN	G5	Wetland
	Subfamily Scolopacinae	Dunlin *	Calidris alpina				S3B,SZN	G5	Wetland
	Subfamily Scolopacinae	Stilt Sandpiper *	Calidris himantopus				S2S3B,SZN	G5	Wetland
	Subfamily Scolopacinae	Short-billed Dowitcher *	Limnodromus griseus				S2S3B,SZN	G5	Wetland
	Subfamily Scolopacinae	Wilson's Snipe **	Gallinago delicata	Pr			S5B,SZN	G5	Wetland
	Subfamily Scolopacinae	American Woodcock °	Scolopax minor	Co			S5B,SZN	G5	Forest
	Subfamily Phalaropodinae	Wilson's Phalarope *	Phalaropus tricolor	Pr			S3B,SZN	G5	Wetland
	Subfamily Phalaropodinae	Red-necked Phalarope *	Phalaropus lobatus				S3B,SZN	G4G5	Wetland
	LARIDAE								
	Subfamily Larinae	Bonaparte's Gull *	Larus philadelphia				S4B,SZN	G5	Wetland
	Subfamily Larinae	Ring-billed Gull **	Larus delawarensis				S5B,SZN	G5	Wetland
	Subfamily Larinae	Herring Gull ^	Larus argentatus				S5B,SZN	G5	Wetland
	Subfamily Sterninae	Caspian Tern ***	Sterna caspia		NAR	NAR	S3B,SZN	G5	Wetland
	Subfamily Sterninae	Common Tern *	Sterna hirundo		NAR	NAR	S4B,SZN	G5	Wetland
	Subfamily Sterninae	Black Tern ***	Chlidonias niger	Co	NAR	SC	S3B,SZN	G4	Wetland
COLUMBIFORMES	COLUMBIDAE	Rock Dove °	Columba livia	Co			SE	G5	Forest/Grassland
		Mourning Dove °	Zenaid macroura	Co			S5B,SZN	G5	Forest/Grassland
CUCULIFORMES	CUCULIDAE - Subfamily Coccozinae	Black-billed Cuckoo ~	Coccyzus erythrophthalmus	Co			S4B,SZN	G5	Forest
	Subfamily Coccozinae	Yellow-billed Cuckoo *	Coccyzus americanus				S4B,SZN	G5	Forest
STRINGIFORMES	STRINGIDAE	Eastern Screech-owl ~	Otus asio	Po	NAR	NAR	S5	G5	Forest
		Great Horned Owl °	Bubo virginianus	Pr			S5	G5	Forest
		Snowy Owl *	Nyctea scandiaca		NAR	NAR	SZB?,SZN	G5	Grassland

		Long-eared Owl *	Asio otus				S4	G5	Forest/Grassland
		Northern Saw-whet Owl ~	Aegolius acadicus				S4B,SZN	G5	Forest
CAPRIMULGIFORMES	CAPRIMULGIDAE - Subfamily Chordeilinae	Common Nighthawk ##	Chordeiles minor	Pr			S4B,SZN	G5	Grassland
	Subfamily Caprimulginae	Whip-poor-will *	Caprimulgus vociferus				S4B,SZN	G5	Forest
APODFORMES	APODIDAE	Chimney Swift °	Chaetura pelagica	Pr			S5B,SZN	G5	Grassland
	TROCHILIDAE - Subfamily Trochilinae	Ruby-throated Hummingbird °	Archilochus colubris	Pr			S5B,SZN	G5	Forest
CORACIFORMES	ALCEDINIDAE	Belted Kingfisher ##	Ceryle alcyon	Pr			S5B,SZN	G5	Wetland
PICIFORMES	PICIDAE	Red-headed Woodpecker *	Melanerpes erythrocephalus		SC	SC	S3B,SZN	G5	Wetland/Forest
		Red-bellied Woodpecker ~	Melanerpes carolinus				S4	G5	
		Yellow-bellied Sapsucker ~	Sphyrapicus varius				S5B,SZN	G5	Forest
		Downy Woodpecker ~	Picoides pubescens	Co			S5	G5	Forest
		Hairy Woodpecker ~	Picoides villosus	Pr			S5	G5	Forest
		Northern Flicker ~	Colaptes auratus	Pr			S5B,SZN	G5	Forest
		Pileated Woodpecker °	Dryocopus pileatus	Pr			S4S5	G5	Forest
PASSERIFORMES	TYRRANIDAE - Subfamily Fluvicolinae	Olive-sided Flycatcher *	Contopus cooperi				S5B,SZN	G4	Forest
	Subfamily Fluvicolinae	Eastern Wood-pewee °	Contopus virens	Pr			S5B,SZN	G5	Forest
	Subfamily Fluvicolinae	Yellow-bellied Flycatcher ~	Empidonax flaviventris				S5B,SZN	G5	Wetland/Forest
	Subfamily Fluvicolinae	Alder Flycatcher °	Empidonax alnorum	Po			S5B,SZN	G5	Wetlands
	Subfamily Fluvicolinae	Acadian Flycatcher ~	Empidonax virens		END	END	S2B	G5	Forest
	Subfamily Fluvicolinae	Willow Flycatcher ~	Empidonax traillii	Po			S5B,SZN	G5	Wetlands
	Subfamily Fluvicolinae	Least Flycatcher ~	Empidonax minimus	Co			S5B,SZN	G5	Forest
	Subfamily Tyranninae	Eastern Phoebe °	Sayornis phoebe	Co			S5B,SZN	G5	Forest
	Subfamily Tyranninae	Great Crested Flycatcher ~	Myiarchus crinitus	Co			S5B,SZN	G5	Forest
	Subfamily Tyranninae	Scissor-tailed Flycatcher ****	Tyrannus forficatus				S4	G5	Forest
	Subfamily Tyranninae	Western Kingbird *	Tyrannus verticalis				S1B,SZN	G5	Grassland
	Subfamily Tyranninae	Eastern Kingbird ***	Tyrannus tyrannus	Co			S5B,SZN	G5	Grassland
	LANIIDAE	Northern Shrike ~	Lanius excubitor				S2S3B,SZN	G5	Wetland/Forest
		Loggerhead Shrike *	Lanius ludovicianus		END	END-R	S2B,SZN	G4	Grassland
	VIREONIDAE	Blue-headed Vireo ~	Vireo solitarius	Po			S5B,SZN	G5	Forest
		Yellow-throated Vireo *	Vireo flavifrons				S4B,SZN	G5	Forest
		Warbling Vireo °	Vireo gilvus	Pr			S5B,SZN	G5	Forest
		Philadelphia Vireo ~	Vireo philadelphicus				S5B,SZN	G5	Forest
		Red-eyed Vireo ~	Vireo olivaceus	Co			S5B,SZN	G5	Forest
	CORVIDAE	Blue Jay ~	Cyanocitta cristata	Co			S5	G5	Forest
		Black-billed Magpie *	Pica pica				S3?	G5	Grassland
		American Crow **	Corvus brachyrhynchos	Co			S5B,SZN	G5	Forest

		Common Raven ~	Corvus corax	Pr			S5	G5	Forest
	ALAUDIDAE	Horned Lark ~	Eremophila alpestris	Pr			S5B,SZN	G5	Grassland
	HIRUNDINIDAE	Purple Martin ~	Progne subis				S4B,SZN	G5	Wetland/Forest/Grassland
		Tree Swallow ~	Tachycineta bicolor	Co			S5B,SZN	G5	Wetland
	Subfamily Hirundininae	Northern Rough-winged Swallow °	Stelgidopteryx serripennis	Po			S5B,SZN	G5	Wetland/Grassland
	Subfamily Hirundininae	Bank Swallow °	Riparia riparia	Co			S5B,SZN	G5	Wetland/Forest/Grassland
		Cliff Swallow °	Petrochelidon pyrrhonota	Co			S5B,SZN	G5	Wetland/Grassland
	Subfamily Hirundininae	Barn Swallow ~	Hirundo rustica	Co			S5B,SZN	G5	Grassland
	PARIDAE	Black-capped Chickadee °	Poecile atricapillus	Co			S5	G5	Forest
		Boreal Chickadee *	Poecile hudsonicus				S5	G5	Forest
	SITTIDAE - Subfamily Sittinae	Red-breasted Nuthatch ~	Sitta canadensis	Po			S5B,SZN	G5	Forest
		White-breasted Nuthatch ~	Sitta carolinensis	Pr			S5	G5	Forest
	CERTHIIDAE - Subfamily Certhiinae	Brown Creeper ~	Certhia americana	Po			S5B,SZN	G5	Forest
	TROGLODYTIDAE	House Wren ~	Troglodytes aedon	Co			S5B,SZN	G5	Forest
		Winter Wren ~	Troglodytes troglodytes	Po			S5B,SZN	G5	Forest
		Sedge Wren *	Cistothorus platensis		NAR	NAR	S4B,SZN	G5	Wetland/Grassland
		Marsh Wren ***	Cistothorus palustris	Pr			S5B,SZN	G5	Wetland
	REGULIDAE	Golden-crowned Kinglet ~	Regulus satrapa	Po			S5B,SZN	G5	Forest
		Ruby-crowned Kinglet ~	Regulus calendula				S5B,SZN	G5	Forest
	SYLVIDAE - Subfamily Polioptilinae	Blue-gray Gnatcatcher *	Polioptila caerulea				S4B,SZN	G5	Forest
	TURDIDAE	Eastern Bluebird ~	Sialia sialis	Co	NAR	NAR	S4S5B,SZN	G5	Forest/Grassland
		Veery °	Catharus fuscescens	Pr			S4B,SZN	G5	Forest
		Gray-cheeked Thrush ~	Catharus minimus				S3S4B,SZN	G5	Forest
		Swainson's Thrush ~	Catharus ustulatus				S5B,SZN	G5	Forest
		Hermit Thrush ~	Catharus guttatus				S5B,SZN	G5	Forest
		Wood Thrush °	Hylocichla mustelina	Po			S5B,SZN	G5	Forest
		American Robin ~	Turdus migratorius	Co			S5B,SZN	G5	Forest
	MIMIDAE	Gray Catbird ~	Dumetella carolinensis	Pr			S5B,SZN	G5	Wetland/Forest/Grassland
		Northern Mockingbird *	Mimus polyglottos				S4B,SZN	G5	Forest/Grassland
		Brown Thrasher °	Toxostoma rufum	Pr			S5B,SZN	G5	Forest/Grassland
	MOTACILLIDAE	American Pipit >	Anthus rubescens				S4B,SZN	G5	Grassland
	BOMBYCILLIDAE	Cedar Waxwing ~	Bombycilla cedrorum	Pr			S5B,SZN	G5	Forest/Grassland
		European Starling ~	Sturnus vulgaris	Co			SE	G5	Forest/Grassland

	PARULIDAE	Blue-winged Warbler *	Vermivora pinus				S4B,SZN	G5	Forest/Grassland
		Golden-winged Warbler *	Vermivora chrysoptera				S4B,SZN	G4	Wetland/Grassland
		Tennessee Warbler *	Vermivora peregrina				S5B,SZN	G5	Forest/Grassland
		Orange-crowned Warbler >	Vermivora celata				S4B?,SZN	G5	Forest
		Nashville Warbler ~	Vermivora ruficapilla	Po			S5B,SZN	G5	Forest
		Yellow Warbler ~	Dendroica petechia	Pr			S5B,SZN	G5	Wetland
		Chestnut-sided Warbler °	Dendroica pensylvanica	Po			S5B,SZN	G5	Forest
		Magnolia Warbler ~	Dendroica magnolia	Pr			S5B,SZN	G5	Forest
		Cape May Warbler ~	Dendroica tigrina				S5B,SZN	G5	Forest
		Black-throated Blue Warbler ~	Dendroica caerulescens				S5B,SZN	G5	Forest
		Yellow-rumped Warbler ~	Dendroica coronata	Co			S5B,SZN	G5	Forest
		Black-throated Green Warbler ~	Dendroica virens	Pr			S5B,SZN	G5	Forest
		Blackburnian Warbler **	Dendroica fusca				S5B,SZN	G5	Forest
		Pine Warbler ~	Dendroica pinus	Po			S5B,SZN	G5	Forest
		Palm Warbler ~	Dendroica palmarum				S?	G5	Wetland/Forest
		Bay-breasted Warbler *	Dendroica castanea				S5B,SZN	G5	Forest
		Blackpoll Warbler *	Dendroica striata				S4B,SZN	G5	Forest
		Black-and-white Warbler °	Mniotilta varia	Pr			S5B,SZN	G5	Forest
		American Redstart ~	Setophaga ruticilla	Pr			S5B,SZN	G5	Forest
		Ovenbird ~	Seiurus aurocapillus	Po			S5B,SZN	G5	Forest
		Northern Waterthrush °	Seiurus noveboracensis	Po			S5B,SZN	G5	Wetland
		Connecticut Warbler *	Oporornis agilis				S4B,SZN	G4	Wetland
		Mourning Warbler °	Oporornis philadelphia	Po			S5B,SZN	G5	Forest
		Common Yellowthroat ~	Geothlypis trichas	Pr			S5B,SZN	G5	Wetland/Forest/Grassland
		Wilson's Warbler >	Wilsonia pusilla				S5B,SZN	G5	Wetland
		Canada Warbler ~	Wilsonia canadensis				S5B,SZN	G5	Forest
	THRAUPIDAE	Scarlet Tanager °	Piranga olivacea	Pr			S5B,SZN	G5	Forest
	EMBERIZIDAE	Eastern Towhee °	Pipilo erythrophthalmus	Po			S4B,SZN	G5	Forest/Grassland
		American Tree Sparrow ~	Spizella arborea				S5B,SZN	G5	Forest/Grassland
		Chipping Sparrow ~	Spizella passerina	Co			S5B,SZN	G5	Forest/Grassland
		Clay-colored Sparrow ~	Spizella pallida	Co			S4B,SZN	G5	Forest/Grassland
		Field Sparrow ~	Spizella pusilla	Pr			S5B,SZN	G5	Forest/Grassland
		Vesper Sparrow ~	Poocetes gramineus	Po			S4B,SZN	G5	Grassland
		Savannah Sparrow ~	Passerculus sandwichensis	Co			S5B,SZN	G5	Wetland/Grassland
		Grasshopper Sparrow ~	Ammodramus savannarum				S4B,SZN	G5	Grassland
		Henslow's Sparrow *	Ammodramus henslowii		END	END-R	S1B,SZN	G4	Grassland
		Le Conte's Sparrow >	Ammodramus leconteii				S4B,SZN	G4	Wetland/Grassland
		Nelson's Sharp-tailed Sparrow >	Ammodramus nelsoni		NAR	NAR	S3S4B	G5	Wetland/Grassland
		Fox Sparrow ~	Passerella iliaca				S4B,SZN	G5	Forest
		Song Sparrow ~	Melospiza melodia	Co			S5B,SZN	G5	Grassland
		Lincoln's Sparrow ~	Melospiza lincolni	Po			S5B,SZN	G5	Wetland
		Swamp Sparrow °	Melospiza georgiana	Co			S5B,SZN	G5	Wetland
		White-throated Sparrow ~	Zonotrichia albicollis	Pr			S5B,SZN	G5	Forest

		White-crowned Sparrow ~	Zonotrichia leucophrys			S4B,SZN	G5	Forest/Grassland
		Dark-eyed Junco ~	Junco hyemalis			S5B,SZN	G5	Forest
		Lapland Longspur ~	Calcarius lapponicus			S4B,SZN	G5	Wetland/Grassland
		Snow Bunting ~	Plectrophenax nivalis			SZB?,SZN	G5	Grassland
	CARDINALIDAE	Northern Cardinal ~	Cardinalis cardinalis	Pr		S5	G5	Forest/Grassland
		Rose-breasted Grosbeak ~	Pheucticus ludovicianus	Pr		S5B,SZN	G5	Forest
		Indigo Bunting ~	Passerina cyanea	Co		S5B,SZN	G5	Forest/Grassland
	ICTERIDAE	Bobolink ##	Dolichonyx oryzivorus	Co		S4B,SZN	G5	Grassland
		Red-winged Blackbird ***	Agelaius phoeniceus	Co		S5B,SZN	G5	Wetland
		Eastern Meadowlark °	Sturnella magna	Co		S5B,SZN	G5	Grassland
		Western Meadowlark *	Sturnella neglecta			S4B,SZN	G5	Grassland
		Yellow-headed Blackbird °	Xanthocephalus xanthocephalus	X		S2S3B,SZN	G5	Wetland
		Rusty Blackbird *	Euphagus carolinus			S5B,SZN	G5	Wetland
		Brewer's Blackbird *	Euphagus cyanocephalus			S4B,SZN	G5	Grassland
		Common Grackle ~	Quiscalus quiscula	Co		S5B,SZN	G5	Wetland/Forest/Grassland
		Brown-headed Cowbird ~	Molothrus ater	Co		S5B,SZN	G5	Grassland
		Orchard Oriole *	Icterus spurius			SZB,SZN	G5	Forest/Grassland
		Baltimore Oriole ~	Icterus galbula	Pr		S5B,SZN	G5	Forest/Grassland
	FRINGILLIDAE - Subfamily Carduelinae	Pine Grosbeak ~	Pinicola enucleator			S3S4B,SZN	G5	Forest
		Purple Finch ~	Carpodacus purpureus	Po		S5B,SZN	G5	Forest
	Subfamily Carduelinae	House Finch ~	Carpodacus mexicanus	Pr		SE	G5	Grassland
	Subfamily Carduelinae	Red Crossbill *	Loxia curvirostra			S5B,SZN	G5	Forest
	Subfamily Carduelinae	Common Redpoll ~	Carduelis flammea			S4B,SZN	G5	Forest
		White-winged Crossbill ~	Loxia leucoptera			S5B	G5	Forest
	Subfamily Carduelinae	Pine Siskin ~	Carduelis pinus			S5B,SZN	G5	Forest
	Subfamily Carduelinae	American Goldfinch ~	Carduelis tristis	Co		S5B,SZN	G5	Grassland
	Subfamily Carduelinae	Evening Grosbeak *	Coccothraustes vespertinus			S5B,SZN	G5	Forest
	PASSERIDAE	House Sparrow ~	Passer domesticus	Co		SE	G5	Grassland

* Sandilands, 1984

^ Breeding Bird Atlas 1981-1985

° Breeding Bird Atlas 2001 – 2005, where X = observed, Po = possible, Pr = probable and Co - confirmed

> Lamble, 2007

Zammit, Tupman, 2007

~ Lamble, 2008

** Zammit, Bell, Tupman, 2009

*** Tupman, Bell, Cowan, 2010

**** Tupman, Bell, 2010

Zammit, Tupman, 2010

Appendix 3:
Conservation Area User Fees

Grand River Conservation Authority
CONSERVATION AREAS FEES – 2009
 (Applicable to Luther Marsh Wildlife Management Area)

DAILY ADMISSION

Adult (over 14 years of age)	4.75
Child (ages 6 to 14)	2.50
5 years and under	FREE
Buses - 20 or more - discount each \$0.25	

MISCELLANEOUS ITEMS

Boat Launch Ramps - per day	8.00
Boat Launch - season's pass	60.00

PERSONAL BUTTON PASS

Adult (over 14 years of age)	45.00
Child (ages 6 to 14)	35.00

VEHICLE SEASON'S PASS

First Vehicle	95.00
Second Vehicle	65.00