Essex Forests and Wetlands Conservation Action Plan
Executive Summary

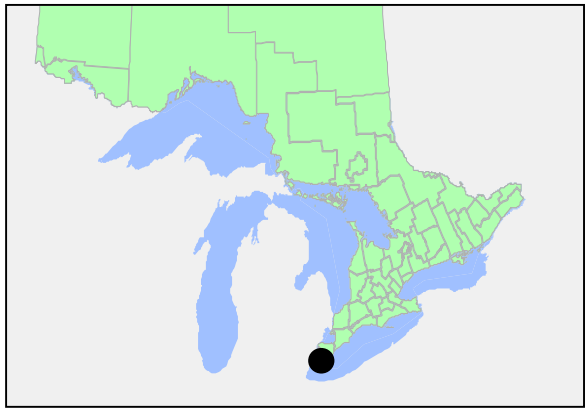
Vision Statement

The Essex Forests and Wetlands support a variety of terrestrial and aquatic habitats, including characteristic Carolinian forest and rich wetland areas. Species at Risk thrive in a variety secure habitats, which contribute to the overall connected matrix of natural cover. Natural cover is restored to at least 12%, and management focuses on further conserving and enhancing the biodiversity value of the area. The local community takes pride in the area and members from all sectors and heritage participate in stewardship and conservation. Relationships between conservation partners are strong and reciprocal, allowing for maximum success in conservation efforts across the interconnected, functional landscape.

Goals

1. To maintain existing and establish new functional ecological linkages between core conservation areas.
2. To complete securement of core conservation areas.
3. To maintain and recover viable populations of Species at Risk, including reducing anthropogenic mortality of all reptile species.
4. To manage invasive species populations so no net increase in population density occurs.
5. To increase natural cover through restoration to a total of 12% of the landscape.
6. To enhance community support and understanding of Essex Forests and Wetlands and to promote community participation in its conservation, including enforcement of policies and regulations.
7. To enhance information and monitoring of biodiversity values, natural processes and threats.
8. To support and enhance conservation partnerships across the Natural Area.

Conservation Context and Rationale



The Essex Forests and Wetlands Natural Area covers 109,958.6 ha (271,597.7 ac; 1099.6 km^2) of forests, wetlands, prairies and beaches in the most south-westerly portion of Ontario along the Lake Erie shore. The area supports plants and animals characteristic of the Carolinian Life Zone, many of which are provincially, nationally and globally rare, including over 50 Species at Risk. This valuable piece of Carolinian Canada has seen great reductions in natural cover to date, but within the natural portions which remain are the greatest number of rare species in Ontario. Within the Natural Area (NA) are a number of Provincially Significant Wetlands and Areas of Natural and Scientific Interest, as well as a National Park, a Provincial Park and a Ramsar Site. If this plan is implemented successfully, a minimum of 500 ha (1235 ac) of Priority 1 and 2 lands will be secured. Priority restoration objectives will include prescribed burns, invasive species removal and reforestation.

A partnership between the Nature Conservancy of Canada, Essex Region Conservation Authority, Essex County Stewardship Network, Parks Canada and other groups will aim to achieve community outreach, landowner contacts, field research, and conservation and restoration successes over the long term.

Biodiversity Targets

1. Upland Deciduous Forests
2. Prairies and Savannahs
3. Inland Wetlands and Swamps
4. Coastal Marshes
5. Beaches and Shorelines
6. Riparian, River and Creek Systems
7. Ecological Services on Farms
8. Reptiles and Amphibians

Point Pelee Forests and Beaches
Photo by: Parks Canada

Threats – includes all very high, high and medium ranked threats

Threat	Magnitude
7.2.1 Municipal and agricultural drains	Very High
1.1.1 Residential and cottage development	High
8.1.1 Common Reed	High
8.2.1 Mesopredators such as raccoons, skunk and opossums	High
6.1.1 Terrestrial recreational activities such as ATVs.	High
4.1.1 Existing roads, new roads, redeveloped roads, and maintenance of these roads	High
8.1.2 Terrestrial invasive species such as Garlic Mustard	High
8.1.3 Aquatic invasive species such as Purple Loosestrife	High
4.3.1 Shipping lanes through the Detroit River and related effects of dredging and channel widening	High
4.2.1 Roadkills of sensitive species	High
2.1.1 Fragmentation of natural habitat from agricultural lands and the expansion of existing lands into natural areas	High
9.3.1 Effluents from agriculture practices affecting aquatic habitats, plants and wildlife	High
7.3.1 Shoreline hardening modifying sediment transport and natural habitats	High
9.1.1 Urban pollutants such as salt, drain effluent and household contaminants such as bacteria	Medium
5.3.1 Unsustainable forest management practices	Medium
7.2.2 Drain management	Medium
8.1.4 Impact of feral cats on sensitive wildlife	Medium
5.1.1 Persecution of snakes; collection of turtles and snakes for pet trade	Medium

Conservation Actions – includes all urgent and necessary actions

1. Securement - Land/ Water Protection
1.1 Site/Area Protection
1.1.1 Secure a minimum of 500 hectares (1235 acres) of Priority 1 and 2 lands by 2014.

2. Stewardship – Land/Water Management
2.1 Site/Area Management
2.1.1 Prepare Interim Stewardship Statements within one year and prepare Property Management Plans (PMPs) following NCC's approved Stewardship Performance Standards for secured properties within two years of securement. Implement key PMP-directed stewardship actions on acquired properties by 2014.
2.1.2 Work with Tallgrass Ontario and other partners to identify and map species richness and condition of all prairie/savannah remnants throughout the NA by 2011.
2.1.3 Complete Baseline Documentation Reports at the time of registration for properties secured under conservation easement following NCC's approved Stewardship Performance Standards. Monitor all easement properties annually starting in 2009.
2.1.4 Restore fire regime to Ojibway Prairie sites via prescribed burns at regular intervals by 2012.

2.2 Invasive/Problematic Species Control
2.2.1 Keep informed on current research to control Common Reed in key prairie, beach and wetland sites beginning in 2009, annually. Establish a pilot control site and prepare a regional-scale control program if/when proven viable.
2.2.3 Research raccoon abundance and compare with other sites to determine acceptable levels and support management mechanisms as deemed necessary to protect biodiversity targets from further predation and damage by 2014.

2.3 Habitat & Natural Process Restoration
2.3.1 Restore 120 ha (300 acres) of native habitat on secured lands using tested and successful techniques such as pit and mound, vernal pool restoration and mixed prairie and tree seeding by 2014. Total restoration in the NA likely to be much higher (400 ha) due to existing restoration efforts by ERCA and Essex County Stewardship Network (MNR).

3. Stewardship – Species Management
3.1 Species Management
3.1.1 Work with herptile recovery group to identify location of core reptile habitat; mapping will be used to determine where to buffer, link and protect reptile habitat and quantify total amount by 2011.
3.1.2 Work with partners in the hunting community to facilitate hunting as appropriate on ERCA and NCC lands beginning in 2009.
3.1.3 Enhance populations of Round-leaved Greenbrier by collecting and propagating local seeds to restore mixed-gender dynamic to existing populations; assess all existing sites and implement restoration within two key sites by 2012.
3.1.4 Enhance populations of Kentucky Coffee-tree by including this species in restoration plantings where appropriate. Collect and propagate local seeds to restore mixed-gender dynamic to existing populations; assess all existing sites and implement restoration strategy at four key sites by 2013.

4. Communications, Education and Awareness
4.3 Awareness & Communications
4.3.1 Facilitate a coordinated multi-partner landowner contact program which targets and educates landowners on the Endangered Species Act by 2011.
4.3.3 Meet with local ATV groups by 2010 to increase awareness about potential impact of activity, and work with groups to come up with a strategy that directs use away from sensitive natural areas.

5. Government Relations, Law and Policy
5.2 Policies & Regulation
5.2.1 Provide input into Essex County Official Plan when applicable throughout 2009-2014 and ensure that appropriate natural heritage policies exist for natural habitat over 2 ha (5 ac) in size by 2011.

5.4 Compliance & Enforcement
5.4.1 Increase surveillance, monitoring and enforcement of violations regarding policies related to recreation and animal and plant gathering in the NA. Suggest to Ontario Finance Minister that fines from violations be directed into natural area restoration by 2012.

6. Stewardship – Livelihood, Economic and Other Incentives
6.3 Market Forces
6.3.1 Research and promote positive incentive approaches for farmers to conserve biodiversity on their land such as Alternative Land Use Services-type initiatives, Ecosystem Goods and Services cost-benefit analyses and Environmental Farm Plan cost-sharing by 2012.

7. Philanthropy, Marketing and Capacity Building
7.2 Alliance & Partnership Development
7.2.2 Support and complement ongoing efforts to address the ecological integrity of Point Pelee National Park and Hillman Marsh and the associated public process currently underway starting in 2009.
7.3 Conservation Finance
7.3.1 Raise required funds to implement all actions within the CAP by 2014.

Essex Forests and Wetlands Conservation Action Plan (CAP)

PROJECT TEAM AND KEY PARTNERS

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Development of this Conservation Action Plan (CAP) was facilitated by two planning workshops, held from October 1-3, 2008 in Port Stanley, and from December 1-2, 2008 at Chippewas of the Thames First Nation, and subsequent review and comments by the participants. The following people participated in one or both of the workshops and provided their expertise to the development of the plan:

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Essex Forests and Wetlands Conservation Action Plan
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1. CONSERVATION CONTEXT AND RATIONALE

A. CONTEXT

i. GEOGRAPHIC CONTEXT

The Essex Forests and Wetlands (EFW) Natural Area (NA) covers 109,958.6 ha (271,597.7 ac; 1099.6 km^2) of land along the eastern bank of the Detroit River (including the southwestern tip of the City of Windsor) and the most southwesterly border of Ontario along the Lake Erie shore, including Point Pelee (see Figure 1). The boundary was interpolated from Carolinian Canada's hotspot analysis, and combines two Carolinian Canada priority areas (Detroit River and Point Pelee) as well as several significant natural features which help link these hotspots. The boundaries were modified based on expert opinion to include as many significant features and species as possible while keeping the Natural Area to a manageable size. The Natural Area is part of Ontario's Ecodistrict 7E-1.

ii. ECOLOGICAL CONTEXT

Carolinian Canada

The EFW NA is located in Ecoregion 7E, colloquially known as the Carolinian life zone of Canada, which falls south of a line running between Grand Bend and Toronto. This life zone encompasses the northernmost edge of the deciduous forest region of eastern North America and, though smaller than other Canadian vegetation zones (<0.25% of Canadian land area), it has greater numbers of species of flora and fauna than any other ecosystem in Canada (Norfolk Environmental Advisory Committee 2006). This zone is characterized by mainly deciduous-dominated forests including some conifer species [e.g. Eastern Red-cedar (*Juniperus virginiana*), White Pine (*Pinus strobus*)] as well as many southern trees at their northern range limits such as Tuliptree (*Liriodendron tulipifera*), along with shrubs and herbaceous species not found in other parts of Canada (Lindsay 1984). Carolinian Canada supports, over 70 native tree species, 2,200 plant species and more than half of all Canadian bird species (Solymár et al. 2008).

Ecoregion 7E-1

At the southwest end of Ecoregion 7E is Ecodistrict 7E-1 (Chatham), which is the southernmost ecodistrict in Ontario. It is largely composed of the Lake St. Clair clay plains with minor till moraines. The northern boundary borders the Bothwell sand plains and bevelled till plains. Lake Erie sandspits occur at Point Pelee and Rondeau. Ecodistrict 7E-1 is one of the most threatened ecodistricts in Ontario, with < 7% natural cover remaining, nearly half of which is marsh (mainly at Point Pelee and in the St. Clair Delta). The majority of the remaining natural cover is a mixture of forested ecological systems comprised predominantly of small remnant patches of sand plain deciduous forest complexes (4,071 ha/10,059 ac), till plain deciduous forest complexes (3,714 ha/9,177 ac) and clay plain deciduous forest complexes (2,140 ha/5,287 ac). {Henson and Brodribb 2005}

Despite the widespread conversion of natural cover to urban and agricultural land, 7E-1 remains biologically diverse. Within the remaining portions of natural cover, the NA still supports among the highest concentrations of globally rare species and communities in Ontario, and over 50 species listed as nationally rare by COSEWIC (Committee on the Status of Endangered Wildlife in Canada). In a recent assessment of global biodiversity values (rare species and communities, endemic and disjunct species), 7E-1 was found to rank fourth in Ontario, behind Manitoulin Island (6E-17) and the Northern and Southern Bruce Peninsula (6E-14 and 6E-4). Despite its high conservation value, Ecodistrict 7E-1 has very few protected areas. Only about 1% of the region is protected in regulated parks, with an additional 2% in conservation lands [e.g. Conservation Authority lands, Areas of Natural and Scientific Interest (ANSI)]. This is the lowest proportion of protected areas and conservation lands of any region in Ontario. {Henson and Brodribb 2005}

Essex County

Essex County, occupying the southwestern end of Ecodistrict 7E-1, is unique because it contains not only the rare and significant plants found throughout the Carolinian life zone, but also some plants which are exclusive to this extreme southwestern corner of Ontario (ERCA 2002). Essex County supports a higher diversity of plant and animal species than any other regional division in Canada and contains one third of Canada's rare plants and animals (ERCA 2002).

However, in contrast to this striking diversity of plant species, the Essex region actually supports one of the lowest percentages of natural cover in all of Ontario, with only small isolated pockets of natural cover remaining. Over 90% of the landscape in Essex County is covered in agricultural land and urban areas, leaving just over 7.5% as natural cover (Child, pers. comm.). The natural systems which do remain in Essex County are generally too small to sustain viable ecological processes and functions. They are highly fragmented and degraded, and require extensive restoration. Throughout history, points in time existed when several of the townships in Essex County retained only 1% of their original natural cover, the rest lost to urban development, agriculture and other anthropogenic land uses. {ERCA 2002} The rapid disappearance of natural lands in Essex County has long been recognized, including a period of time in the mid-1900s when scrubland was being lost from the system at a rate of 2.7% per year, and forests at 1% per year (Oldham 1983).

Physiography and Glacial History

The EFW NA is primarily located within the St. Clair Clay Plains physiographic region (Chapman and Putnam 1984). These extensive clay plains cover 363,200 ha (897,104 ac) in total, at an altitude of approximately 200 m above sea level with very little relief. There is a deep overburden covering the limestone and dolostone bedrock throughout the majority of the region. The region was once extensively covered by the glacial Lakes Whittlesey and Warren, which did not stratify the sediment and left the majority of the land covered in unconsolidated clay till, smoothed by shallow deposits of lacustrine clay. The Essex Clay Plain, a portion of the larger physiographic region, covers the entirety of the Natural Area and is essentially a till plain covering the Cincinnati Arch, which is a low swell in the bedrock. The prevailing soil type in this area is Brookston clay loam which developed under moist swamp forests. Other widespread soils in the NA are Berrien sand, Colwood fine sandy loam, Granby sand, Toledo silt loam and Toledo clay, a few areas with excessively drained soils such as Burford gravelly loam and Plainfield sand (Bakowsky 1993), Caistor clay (Lebedyk 1994), Jeddo clay (ERCA 1994) and several others which contribute significantly to variations across the landscape in drainage, vegetation and landform. Overall, the area is characterized by poorly drained soils, and in some undrained areas, peat and muck has accumulated. Throughout the NA extremely flat topography is broken only in small sections by low gravel ridges and old beach deposits. {Chapman and Putnam 1984; Canadian Heritage Rivers System 1998}

The NA also encompasses a portion of the Erie Spits physiographic region at Point Pelee. This physiographic region tells a history of erosion and deposition in Lake Erie. The Erie Spits are constantly changing shape and size, and are tending to gradually shift outwards into the lake using sand made available by erosion of the Lake Erie shoreline. The Point Pelee peninsula was formed as a result of sediment transport by water after the retreat of the last glacier. Over the past 3,500 years the peninsula has been moving west, eroding about 1 m/yr on the east side and accreting about 1 m/yr on the west side (Coakley et al. 1998). This is a natural, geomorphological process.

The Erie Spits have the most temperate climate in Ontario aside from Pelee Island. Trees rarely found inland, such as Common Hackberry (*Celtis occidentalis*) and Common Hoptree (*Ptelea trifoliata*), are plentiful on Point Pelee. Within the physiographic region, Point Pelee is famous as a globally significant stopover site for a great diversity of migratory birds. {Chapman and Putnam 1984}

The Detroit River was very strongly modified during the Wisconsin glacial period. Since the glaciers retreated 10,000 years ago, the Detroit River has played an important role in shaping the Great Lakes ecosystem. As waters of post-glacial Lake Erie receded, the present Detroit River channel began to be carved out of the flat, exposed lake bottom. As the land continued to rebound after the removal of the weight of the glacial ice, a new drainage system developed that served as an outflow for the waters of the Great Lakes into the French and Mattawa Rivers. This left the Detroit River basin dry. Then, three to four thousand years ago, isostatic rebound was sufficient to divert the waters from the French/Mattawa system back to the Detroit River. At this point, the Detroit River regained its water flow and became the major channel connecting the upper and lower Great Lakes. In some areas of the Detroit River watershed, the underlying bedrock is composed of either Paleozoic soft Dundee limestone or relatively harder Detroit River dolomite. The Detroit River dolomite was more resistant to glacial erosion during the last glaciation, and thus islands which can be seen in the Detroit River today are mostly associated with outcrops of the harder dolomite. {Canadian Heritage Rivers System, 1998}

Some areas demonstrate different patterns of glacial history, including the Ojibway Prairie Provincial Nature Reserve which lies on a flat sandy plain approximately 8 m above the Detroit River. The medium grained sand was deposited during a short-lived postglacial lake, representing a quiet water environment. About 1 m below the surface sands is a thick layer of clay till and a thin layer of sandy till. The nature reserve is underlain by mid-Devonian limestone of the Dundee Formation. {NHIC 2008}

Biodiversity in the EFW NA

As Canada's southernmost locale, the EFW NA supports a mild climate and fertile soils which have resulted in unique communities of plants and animals (Oldham 1983), and one of the greatest varieties of plant and animal species in the country (Canadian Heritage Rivers System 1998). Hundreds of species are nationally, provincially or regionally rare or endangered, and many are found nowhere else in Canada. The prairie, oak savannah and woodland remnants in the Ojibway Prairie area (near Windsor) total 320 ha (790 ac) in area, and together comprise the most extensive and intact remnants in southern Ontario outside of Walpole Island. Floristically, these communities are even richer than those found at Walpole, supporting 110 provincially rare species, compared to 98 known from the latter. There are 115 prairie indicator species known, and 65 of these are provincially rare. This area also supports representative prairie and oak woodland on dry-mesic sites, which is rare on Walpole. {Bakowsky 1993}

The area is also notable for its breeding, nesting and staging bird populations. Every fall and spring, people from around the world visit parts of the NA to take in some of the best birding on the planet. The Holiday Beach/Big Creek IBA (Important Bird Area) has been recognized for its raptor populations since the 1950s, with maximum daily counts including 3,200 Turkey Vulture (*Cathartes aura*) 2,130 Sharp-shinned Hawk (*Accipiter striatus*) 95,499 Broad-winged Hawk (*Buteo platypterus*) and 1,105 American Kestrel (*Falco sparverius*). Each fall, observers tally between 600,000 and 750,000 migrant birds, of which approximately half are Blue Jay (*Cyanocitta cristata*) (peak daily counts for this species exceed 50,000). Other maximum daily counts include 200 Ruby-throated Hummingbird (*Archilochus colubris*), 825 Eastern Bluebird (*Sialia sialis*), and 195 Great Egret *(Ardea alba*). Staging waterfowl can be observed in large numbers in the NA, including an unprecedented concentration of Red-breasted Merganser (*Mergus serrator*), with 195,000 estimated in November 1992. {IBA Canada 2004a} Bird Species at Risk that have been observed in the NA include Acadian Flycatcher, Cerulean Warbler, Prothonotary Warbler, Red-headed Woodpecker and Yellow-breasted Chat, among others (Cadman et al. 2007; NHIC 2008).

In the Lower Detroit River IBA 34,021 nesting pairs of Ring-billed Gull (*Larus delawarensis*) were observed on Fighting Island in 1990, representing as much as 3.9% of the estimated North American breeding population, and as much as 5.6% of the estimated Canadian breeding population (IBA Canada

2004b). In more recent years this species was confirmed breeding at three sites in the NA (Cadman et al. 2007). Small numbers of Common Tern (*Sterna hirundo*) have been noted to nest in this IBA as well (33 nests in 1995; breeding confirmed from 2001-2005) (IBA Canada 2004b; Cadman et al. 2007). This IBA is a significant late fall staging and wintering area, boasting more than 8,000 Canvasback (*Aythya valisineria*) (greater than 1% of the estimated North American population), and 7,000 Common Mergansers (*Mergus merganser*) (greater than 1% of the estimated North American population) during the annual Christmas Bird Count (IBA Canada 2004b).

Protected Areas and Conservation Lands

Though natural cover patches in Essex County are scattered, they contribute collectively to the functioning of larger ecosystems, and provide much-needed aesthetic value to a landscape which is visually and functionally dominated by agriculture and urban development (Oldham 1983). The remaining natural habitat in the EFW NA includes patches of woodlands, bottomlands, undrained swamps, marshes and islands. There are several types of protected areas and land use designations which apply to EFW NA (Appendix B), and these can be found summarized in Table 1.1 and illustrated in Figure 2.1. For an illustration of the Conservation Blueprint distribution across the NA, please see Figure 2.2.

Table 1.1: Natural Heritage Designations – Essex Forests and Wetlands Natural Area

Designation	IUCN Protected Area Management Category[1]	Area in hectares (acres)	Percentage of Natural Area (109,958 ha total)	Reference
Provincial Park (Nature Reserve)	Ia	65.1 (160.8)	0.06%	NHIC 2008
Conservation Authority Area	II	964.7 (2383.7)	0.9%	NHIC 2008
National Park	II	1,565.7 (3,867.3)	1.4%	NHIC 2008
Crown Game Preserve	IV	880.4 (2,174.6)	0.8%	NHIC 2008
Nature Conservancy of Canada Projects[2]	IV	112.2 (277.1)	0.10%	
Ramsar Site	VI	1,564.0 (3,863.1)	1.4%	NHIC 2008
Area of Natural and Scientific Interest (Earth Science)	None	18.4 (44.4)	0.02%	NHIC 2008
Area of Natural and Scientific Interest (Life Science)	None	4,673.2 (11,542.8)	4.2%	NHIC 2008
Carolinian Canada Site	None	2,607.9 (6,441.6)	2.4%	NHIC 2008
Important Bird Areas	None	15,884.3 (40,508.0)	14.4%	IBA Canada 2004a, IBA Canada 2004b
International Biological Program Site	None	583.6 (1,441.5)	0.5%	NHIC 2008
Provincially Significant Wetland	None	2,515.1 (6,212.3)	2.3%	NHIC 2008

[1] IUCN Categories: Ia. Nature Reserve or wilderness area nature reserve*; Ib. Wilderness area*; II. National/provincial park*; III. Natural monument; IV. Habitat/species management areas, V. Protected landscape or seascape, VI. Managed resource protected areas; * Strictly regulated protected areas. Some areas may have more than one IUCN category because of internal zoning.

[2] Heaton Property (39.9 ha) is owned fully by NCC, while Callon Corporation – Cedar Creek (70.1 ha) and Steimer – Ojibway Prairie (2.2 ha) properties have been transferred to a CA and MNR, respectively.

iii. NATURAL COVER / ECOSYSTEM TYPES

The region is noted for its coastal marshes, Carolinian woodlands, tallgrass prairie, and savannah habitats (Canadian Heritage Rivers System 1998). There are also expanses of sand beaches, grasslands and a variety of wetland types including swamp forests and open water systems.

To date, approximately 97% of the original wetlands in Essex County have been lost (ERCA 2002), leaving only 2.5% of the landscape in wetland cover (ERCA 1995). The largest expanses of wetlands can be found along the coast of the Detroit River, at Canard River and on Fighting Island in the Detroit River (ERCA 2002). The Natural Area includes Big Creek Marsh, which is the largest wetland in all of Essex Region covering a total of 1177 ha (2942 ac) (Oldham 1983; Eagles & Beechey 1985), as well as other significant marshes such as Hillman Marsh (362 ha/895 ac), located just north of Point Pelee. As mentioned, there are a variety of wetland types, from the rich marshes of Broadleaf Cattail (*Typha latifolia*), various reed spp. and Jewelweed (*Impatiens capensis*) to the Green Ash – Slippery Elm – Silver Maple (*Fraxinus pennsylvanica – Ulmus rubra – Acer saccharinum)* bottomland swamp forests. The NA's wetlands are primarily marshes and swamps with areas of open water. In the past, only coastal wetlands were officially "Provincially Significant". Several inland wetlands have now also been categorised as provincially significant (Groves, pers. comm.). Inland wetlands contribute to the ecological and hydrological integrity of watersheds by augmenting the base flows of streams; moderating the erosive power of peak flows in streams; stabilizing stream banks and channels; reducing the overland transport of sediments and nutrients to streams; increasing the transit time of water flows within streams; and by absorbing and retaining nutrients, heavy metals and other contaminants (Norfolk County 2007 – odd reference???). Coastal wetlands in the Natural Area are found along the shores of Lake Erie and the Detroit River. They provide nursery and spawning habitat for game and non-game species of fish; staging and feeding areas for resident and migratory birds; and habitat for benthic organisms (Norfolk County 2007). Coastal wetlands also contribute to ecological and hydrological integrity by moderating the erosive power of storms and by absorbing and retaining nutrients, heavy metals and other contaminants (Norfolk County 2007). There are five main coastal marshes in the area, but they are all heavily degraded by the presence of the invasive species Common Reed (*Phragmites australis*) and Purple Loosestrife (*Lythrum salicaria*) (Groves, pers. comm.).

In Essex County 93% of the original forest system has been lost, leaving the landscape in a highly degraded and fragmented state (ERCA 2002). Approximately 5% of the remaining landscape is covered by forest (Groves, pers. comm.; Child and Lebedyk, pers. comm.). Ojibway Black Oak Woods Environmentally Sensitive Area is only place in the Detroit River subwatershed that has 200 m of forest interior habitat. In southeastern Essex Region, Point Pelee has a fair-sized area of 100 and 200 m interior forest habitat. Small patches of 100-200 m forest interior exist in the Canard River subwatershed as well as at two sites in the Turkey Creek subwatershed, and one site in the Sturgeon Creek subwatershed (ERCA 2002). These low levels of forest cover, even in the most heavily forested places, cannot support the full suite of bird species that could potentially utilize the habitat, especially those species requiring forest interior habitat. Throughout the Detroit River subwatershed, most forest patches are smaller than 10 ha (ERCA 2002). The largest forest patches in the Natural Area can be found on Point Pelee (186 ha), in the Cedar Creek area (90 ha), and the Ojibway Prairie complex (62 ha), but even the largest forest is not large enough to support 100% of the bird species which could potentially be found in Essex County (ERCA 2002). Examples of forest types in the Natural Area include Red Maple – Green Ash – White Oak (*Acer rubrum – Fraxinus pennsylvanica – Quercus alba*) wet forest, Shagbark Hickory – Sugar Maple – Oak spp. (*Carya ovata – Acer saccharum – Quercus* spp.) upland forest, Black Oak/Red Oak/White Oak – Red Hickory (*Quercus velutina/Quercus rubra/Quercus alba – Carya ovalis*) upland forest, Sassafras – Red Oak – Red Maple (*Sassafras albidum – Quercus rubra – Acer rubrum*) upland forest and a rare stand of Silver Maple Mixed Hardwood Forest with White Oak, Bur Oak (*Quercus macrocarpa*) and Shagbark Hickory associates (NHIC 2008). However, forest cover is not always preferable, such as when it replaces other important habitat. Due to the suppression of natural fire and large number of breaks in the natural landscape, more forest currently exists in the historical prairies of the Ojibway area than at any time in the past several thousand years (Woodliffe, pers. comm.).

The landscape of Essex County once supported large areas of tallgrass prairie and savannah. It was estimated that when European settlers arrived in the 1700s, there were over 40,000 ha of prairie in the Essex County area (Windsor Parks and Recreation date unknown; Bakowsky 1993). Today only 0.05% of the landscape is tallgrass prairie habitat (Pratt 1994). Native tallgrass prairie, which once dominated a large portion of North America, now only exists as minor remnants in isolated locations such as railway right of ways, roadsides and a few parks (Windsor Parks and Recreation, date unknown). However, the western influence of prairie species in this particular portion of southwest Ontario is unmistakable, and due to the very small number of prairie systems remaining in Ontario and the fact that many systems support species which are not found in drier shortgrass rangelands further west, the significance of these ecological systems is further emphasized (Windsor Parks and Recreation, date unknown). Examples of vegetation systems found within tallgrass prairie and tallgrass savannah areas include Black Oak Savannah with Pennsylvania Sedge (*Carex pennsylvanica*), Woodland Sunflower (*Helianthus divaricatus*), and Canada Bluegrass (*Poa compressa),* and Black Oak – Pin Oak – Swamp White Oak – White Oak (*Quercus velutina – Quercus palustra – Quercus bicolour – Quercus alba*) wet prairie woodland. The Ojibway Prairie is located within the Natural Area and is known as the largest protected tallgrass prairie in Ontario (Windsor Parks and Recreation, date unknown) and contains some of the most representative remaining areas of tallgrass prairie and savannah habitat in all of Southern Ontario (ERCA 2002). In the Ojibway Prairie area alone, 533 species of flowering plants, many of prairie and western affinity, can be found (Windsor Parks and Recreation, date unknown). However, it should also be noted that the quality of this prairie has deteriorated significantly since it was protected in the 1970s, mainly due to the infrequency of prescribed burns to mimic the fires which occurred naturally on this landscape in earlier times (Woodliffe, pers. comm.). In addition, prairie areas are at an even greater risk of being lost from this landscape as they can be degraded much more readily than the heavily treed landscapes of forests (Woodliffe, pers. comm.).

Point Pelee is a unique system within the Essex Forests and Wetlands Natural Area. In a survey conducted in the 1980s, 755 vascular plant species were observed in Point Pelee National Park, which spans only 1600 ha (3952 ac) (Jellicoe 1984). Mixtures of different light, moisture and soil conditions create a variety of habitats, including beach, upland forest, swamp and marsh, in which many plant species are able to thrive (Jellicoe 1984). Point Pelee has a significantly different landscape than the remainder of Essex County with levels of natural cover totalling closer to 100%.

Many river systems can be found running through the NA, with outflows into Lake St. Clair, the Detroit River and Lake Erie. The largest of these include the Canard River, Cedar Creek, Turkey Creek and Big Creek. As with forest systems, the riparian corridors in the Natural Area are degraded due to fragmentation and discontinuity. The forest cover along riparian corridors is significantly lower than the recommended 75% as only 9-10% of the corridors in the NA contain the 30 m buffer that is recommended for health and sustainability into the future. As a result, the area suffers from poor water quality. {ERCA 2002} However, it should be noted that the Canard River contains the longest stretch of continuous woodland in Essex County and is located centrally in the Natural Area (Oldham 1983; ERCA 2002).

The Detroit River runs over 50 km between Lake St. Clair and Lake Erie, and links the upper and lower Great Lakes (EPA 2008). This watershed has been noted as an Area of Concern, and as a result of the misguided uses of the ecosystem, several beneficial uses of the river have been impaired, including fish and wildlife consumption, drinking water consumption, beach usage and healthy fish and wildlife habitat (EPA 2008). Wetlands, inlets and small streams, historic food web composition and native fish species, and natural, untouched shorelines have been lost from the historic system (Read et al. 2001). Today the river is a massive transport lane, carrying over 8,000 ships per year (ibid.), and is far from a state of rehabilitation due to many years of heavy pollution. Both shores of the river are heavily populated.

Some beach communities can be found in the NA. Though some beaches are used for recreation, some are still in a more or less natural condition. Barrier beaches are found separating the Great Lakes and Detroit River from coastal wetlands (Brunton and Oldham 1984). Vegetated beaches support communities such as Eastern Cottonwood – Willow spp. (*Populus deltoides – Salix* spp.)

Table 1.2: Ecological Systems – Essex Forests and Wetlands Natural Area

Global Habitat Type[1]	North American Ecological System[2]	Example from Southern Norfolk Sand Plain Natural Area
Forest – Temperate	North-Central Interior Beech-Maple Forest	Shagbark Hickory – Sugar Maple – Oak spp. upland forest Swamp forest (Pin Oak grades into Red Maple - Red Oak - Black Cherry - Silver Maple)
	North-Central Interior Wet Flatwoods	Red Maple – Green Ash – White Oak wet forest
Savannah – Dry	North-Central Oak Barrens	Black Oak Savannah with Pennsylvania Sedge – Woodland Sunflower – Canada Bluegrass – Smooth Aster understory Eastern Redcedar Savannah
Savannah - Moist	North-Central Oak Barrens	Pin Oak - Black Oak wet mesic savannah Black Oak – Pin Oak – Swamp White Oak – White Oak woodland
Shrubland – Temperate	None, successional community type	Dogwood – Hazel – Smooth Sumac shrub thicket Hawthorn spp. Rose spp. – Dogwood spp. – Bramble spp. open mixed shrub thicket Choke Cherry – Elderberry – Prickly Ash tall shrub layer
Grassland – Temperate	North-Central Interior Sand and Gravel Tallgrass Prairie	Big Bluestem – Little Bluestem – Yellow Indian-grass – Slender Blazing-star dry tallgrass sand prairie Prairie Cordgrass – Big Bluestem – Bluejoint tallgrass prairie
	Great Lakes Wet-Mesic Lakeplain Prairie	Pin Oak – White Oak – Carex spp. woodland
Rivers, Streams, Creeks – Permanent	None, hydrological feature	Cedar Creek, Turkey Creek, Big Creek, Canard River
Riparian Areas	None, associated with hydrological features	Ravine systems
Wetlands – Shrub dominated	North-Central Interior Wet Meadow-Shrub Swamp	Buttonbush shrub wetland
Wetlands – Bogs, Marshes, Swamps, Fens, Peatlands	North-Central Interior Freshwater Marsh	Reed spp. – Broad-leaved Cattail – Jewelweed rich marsh
	North-Central Interior and Appalachian Rich Swamp	Green Ash – Red Elm – Silver Maple wet bottomland deciduous swamp forest
Wetlands – Permanent Freshwater Marshes/Pools	None	Open water floating vegetation aquatic system (Yellow Pond-lily)

Littoral – Sandy Shorelines and/or Beaches	None	Eastern Cottonwood – Willow spp. beach

1: General habitat types based on NCC categories
2: Ecological systems from NatureServe (NatureServe 2008), crosswalked with NCC categories

Table 1.3: Globally Rare Vegetation Communities – Essex Forests and Wetlands Natural Area

Ontario Name*	Global Common Name**	Global Rank***	Comments
Moist – Fresh Tallgrass Prairie Type	Mesic Sand Tallgrass Prairie	G2	This community occurs in the southern Great Lakes region of the United States and Canada. Stands occur on level sandy glacial outwash, sandy glacial lake plains, valley trains, and in dune areas. Soils are sandy loams, loamy sands, and sands. They are moderately well-drained to imperfectly or somewhat poorly drained. Stands of this community may be dominated by grasses, mixtures of grasses and forbs, forbs, or low shrubs and grasses. Many sites of this type have been eliminated by agricultural development. {NatureServe 2008}
Moist – Fresh Black Oak – White Oak Tallgrass Woodland Moist – Fresh Black Oak Tallgrass Savannah Type	Lakeplain Mesic Oak Woodland	G2	This community is found in the southern Great Lakes lakeplain of the United States and Canada, particularly in southwestern Michigan and southwestern Ontario. Stands occur on undisturbed sand ridges and raised areas in poorly drained glacial lakeplains. The soils are very loamy sands or sometimes sand. Oaks dominate the canopy, while the ground layer is dominated by a variety of tallgrass species. Many sites have been converted for agricultural development or have succeeded to forest due to fire suppression. {NatureServe 2008}
Pin Oak Mineral Deciduous Swamp Type	Northern (Great Lakes) Flatwoods	G2	This community type is found in the midwestern United States and adjacent Canada near Lake Michigan and Lake Erie. Stands occur on poorly drained uplands or in depressions on level glacial lake plains or outwash plains. There is a layer of acidic sand over a layer of impermeable or nearly impermeable clay resulting in a shallow, perched water table. Ponding is common during the wet seasons and droughts in the summer, leading to a complex of forest upland and wetland species. Deciduous hardwoods and softwoods predominate. There are probably fewer than 100 occurrences of this community rangewide. This community has moderately restricted environmental requirements. Many sites of this community have been drained or cleared. {NatureServe 2008}
Juniper Dune Shrubland Type	Great Lakes Juniper Dune Shrubland	G3G4	Stands of this community type are found on stable dunes throughout the western Great Lakes. A mixture of deciduous and coniferous shrubs as well as some herbaceous species can be found. The community is susceptible to human disturbance which can result in blow-outs when windy conditions occur. {NatureServe 2008}
Hoptree Dune Shrubland Type	Sand Cherry Dune Shrubland	G2Q	This community type is found on southern Great Lakes dunes and inland dune systems. They are characterized by shrubby vegetation with much open ground and a sparse herb layer. Stands are restricted to stabilized foredunes and very few occurrences have been documented. {NatureServe 2008}

Red Cedar Dune Savannah Type	Cottonwood Dune Woodland	G1G2	This community occurs on stable dunes throughout the southern Great Lakes region. The canopy is open and herbaceous species are relatively scattered. Dominant trees include Red-cedar and Cottonwood. Occurrences are small, and there are likely less than 60 occurrences rangewide. Residential development of Great Lakes shores has been a major threat to this community type. {NatureServe 2008}

* Ontario Name from NHIC (2008)
** Global Common Name from NatureServe 2008
*** Global Rank from NatureServe 2008

iv. DOMINANT ENVIRONMENTAL PROCESSES

The EFW NA is dominated by eastern deciduous forests. These forests once formed the dominant matrix community throughout southern Ontario, were relatively stable, and supported wide-ranging species (Davis 1996; Anderson and Bernstein 2003). Nested within these large forests were large and small patch habitat types (Anderson and Bernstein 2003) that often resulted in response to unique or specific terrain. Within the Carolinian life zone large patch communities include marshes, savannahs and prairies.

Minimum Dynamic Area
Minimum dynamic area (MDA) is often used to determine the minimum area needed to maintain natural ecological processes and to ensure that examples of all successional stages will exist within a given habitat type under all disturbance regimes (e.g. wind, fire, insects) (Pickett and Thompson 1978). Historically most forests in southern Ontario experienced average disturbances of less than 2 ha (4 ac), and early successional stages were limited to gaps created in the canopy by windstorms, downbursts and ice-storms (Riley and Mohr 1994; Larson et al. 1999). It has been estimated that protected landscapes must be 50 to 100 times larger than average disturbance patches in order to maintain a relative equilibrium of habitats (Shugart and West 1981). In such landscapes, the proportions of different successional stages (e.g. young forest, old growth forest) would be relatively constant over time, even though the sites occupied by different stand types would change. On this basis, minimum recommended area for core forests in southern Ontario would be between 100 and 200 ha (~250 and 500 ac). Given projections for larger, more frequent storms due to climate change, a conservative strategy would recommend cores of at least 200 ha (~500 ac) in size. Only one forest patch in the EFW CAP comes close to meeting this minimum requirement, at just under 200 ha. Otherwise the large patches tend to be under 100 ha, and they are not common throughout the NA. Restoration of fragmented areas and creation of connected networks and corridors could increase the MDA of the forests in the NA, and these objectives will be discussed further in this document.

Fire
Primary disturbance regimes in the prairies and savannahs of southern Ontario were largely driven by drought and fire cycles. Most of these tallgrass systems occurred on sand plains that experienced fires every 5-15 years. Fire is a significant process in the functioning and maintenance of Ontario's remaining prairies (areas which historically supported grasses and herbs with few trees), grasslands (anthropogenic communities of grasses which occur as a result of abandoned cultural use such as farming) and savannahs [grasslands with 25-35% cover of woody species (Lee et al. 1998)]. Fire encourages species that respond to newly burned and open conditions and that benefit from the lack of competition from woody species, which are unable to become dominant in areas with active fire regimes. Natural fire regimes in southern Ontario have been suppressed or altered since European settlement, and as a result, many valuable natural areas have been, and continue to be, lost to succession. Succession of open areas is defined as the gradual increase in biomass and soil depth, which includes the encroachment of woody species, especially trees, which will cause the cover to eventually become a woodland or forest. In this setting, woody species

dominate and prairie or grassland species often die out due to competition from these plants for resources such as light and water.

Savannahs exist as a delicate balance between scattered woody species and grassland species, and grow specifically in areas wet enough to support trees but dry enough to be subject to fire. They rely on frequent fire events to prevent forested oak woodland cover from becoming dominant.

Grasslands and prairies are similar to savannahs but have less cover of fire-tolerant oak species and greater expanses of open land carpeted in herbaceous, fire-tolerant grasses. Fire is extremely important to maintaining grasslands, prairies and savannahs. Burning tallgrass prairies stimulates growth of prairie plants and the mycorrhizae that aid plants in nutrient acquisition (Bentivenga and Hetrick 1991). Periodic fires have shaped and helped maintain the prairies in the Ojibway Prairie area (MNR 1981).

Hydrology

The hydrology of the EFW NA is primarily controlled by the action of Lake Erie and the Detroit River on their shoreline areas, with a small area influenced by the energy of Lake St. Clair. In addition, the Canard River, the region's largest natural watercourse, and several smaller creeks including Cedar Creek, Big Creek and Turkey Creek play a role in the inland hydrology of the NA. Also, ravine systems such as New Canaan Valley provide significant storage for floodwaters due to their large valleys and flat gradients (Lebedyk 1994). There are no inland lakes in the NA, and most creeks drain south into Lake Erie. Lake Erie itself represents a major hydrological feature in the NA, and water levels in Lake Erie are showing a general trend towards decline, which could have implications for coastal wetlands, bays and barrier beaches associated with the lake's action. Natural hydrological function has been altered through processes such as water-taking, drainage ditching and channelization to provide water for agricultural practices and municipal usage. However, groundwater recharge by the area's many significant wetlands is likely sufficient enough that the water supply in the NA will be functional into the near future.

Erosion

Erosion is also a factor along the shoreline of Lake Erie, as the western basin is known to be the most heavily eroded portion of the lake. This is due to both natural erosive processes, but has also been accelerated by heavy shoreline and offshore water use by humans and lack of shoreline stabilization by natural plant communities (often cleared by cottagers and marinas). Human settlement along the Lake Erie coast and the subsequent hardening of the shoreline and construction of piers for harbours east and west of the Point Pelee peninsula have disrupted natural erosion and deposition processes. The five harbour piers to the west of Point Pelee peninsula (Colchester, Cedar Creek, Kingsville, Leamington and Sturgeon Creek) have trapped or permanently removed 4.3 million cubic meters of sand and gravel from the littoral cell and 87% of the shoreline from Colchester to Point Pelee National Park has been hardened (Zuzek 2007a). Similarly, Wheatley Harbour and shoreline development on the east side of the peninsula have disrupted natural processes (Zuzek 2007b). Consequently, Point Pelee Peninsula is currently experiencing significantly accelerated erosion rates on its east side, and its west side has changed from an accreting shoreline to an eroding shoreline.

The recent dramatic disappearances of the sand spit south of Point Pelee National Park is a symptom of the reduced sand supply to the tip caused by human activities along the coast of Lake Erie. Both shores of Point Pelee are currently being lost to accelerated erosive processes. Without mitigation of this erosion the land base of Point Pelee National Park will continue to decrease with the accompanying loss of rare Carolinian forest and southern Great Lakes marsh. (Craig, pers. comm.)

Overall, erosion of dynamic beach systems is a necessary process, but it is likely that in the NA this process is proceeding at a rate that could severely degrade the hydrological systems and shorelines of the

NA if intervention does not occur.

v. SIGNIFICANT SPECIES

Table 1.4, which summarizes the target species for the Essex Forests and Wetlands NA, is based on lists of significant species in the Great Lakes Conservation Blueprint for Terrestrial Biodiversity (Henson and Brodribb 2005) and the Great Lakes Conservation Blueprint for Aquatic Biodiversity (Phair et al. 2005). Some species observed in the Essex Forests and Wetlands NA that are recognized as globally or nationally rare, or are designated as Species at Risk did not appear in the Blueprint results, but have been included in Table 1.4. Additional species of conservation concern, such as those species ranked as provincially rare, can be found in Appendix C.

Table 1.4 Significant Species - Essex Forests and Wetlands Natural Area

Species	***Status* (Global/Provincial/COSEWIC/ COSSARO)/ Viability in Natural Area***	***Source/ Notes***
Acadian Flycatcher *Empidonax virescens*	G5/S2B,SZN/END/END Viability: E	Species confirmed breeding in NA between 2001-2005 (Cadman et al. 2007). Verified extant at two sites in NA in 1994 (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
American Beachgrass *Ammophila breviligulata*	G5/S4 Viability: E	Verified extant in NA in 2001 (NHIC 2008). Disjunct Blueprint target (Henson and Brodribb 2005).
American Chestnut *Castanea dentata*	G4/S2/END/END Viability: C	Species identified at four sites in the NA, with an average population viability of Fair (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
American Ginseng *Panax quinquefolius*	G3G4/S2/END/END Viability: H	Was recorded historically at three sites in the NA; recent population location data not available due to popularity of species for collection (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
American Water-willow *Jusiticia americana*	G5/S1/THR/THR Viability: U	Species identified in NA and population viability ranked as Excellent in 1988 (NHIC 2008). Data from 2007 indicates that the population is in decline, but is still viable (Jalava et al. 2008). Species at Risk (GC 2007). Blueprint target (Phair et al. 2005).
Bald Eagle *Haliaeetus leucocephalus*	G4/S4B,SZN/NAR/END Viability: E	Individual nests observed at two sites in the NA in 2002 (NHIC 2008). Up to 2009 at least 7 nests have been observed in total (Groves, pers. comm). Breeding confirmed at several sites throughout NA between 2001-2005 (Cadman et al. 2007). Blueprint target (Henson and Brodribb 2005).
Barn Owl *Tyto alba*	G5/S1/END/END Viability: H	Observed at sites in the NA in early 1980s (NHIC 2008). Breeding confirmed in 1980s, but not in recent years (Cadman et al. 2007). Species at Risk (GC 2007).

Species	*Status* (Global/Provincial/COSEWIC/ COSSARO)/ Viability in Natural Area*	*Source/ Notes*
Black Tern *Chlidonias niger*	G4/S3B,SZN/NAR/SC Viability: AB	Verified extant on Fighting Island in 1991, and at another location in the NA in 1997 where population viability was ranked as Excellent-Good (NHIC 2008). Breeding possible at two sites in the NA (Cadman et al. 2007). Blueprint target (Henson and Brodribb 2005).
Blanding's Turtle *Emydoidea blandingii*	G4/S3/THR/THR Viability: U	Three EOs (element occurrences) in NA in mid-1990s and as recently as 2003, no population viability information available, but live adults noted at two locations (NHIC 2008). Species at Risk (GC 2007).
Blue Ash *Fraxinus quadrangulata*	G5/S3/SC/SC Viability: A	Largest mainland population of Blue Ash in Ontario. Site contains mixture of saplings, seedlings and mature trees (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Broad Beech Fern *Phegopteris hexagonoptera*	G5/S3/SC/SC Viability: E	One EO observed in NA, population ranked as extant though noted to be unhealthy (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Bushy Cinquefoil *Potentilla paradoxa*	G5/S3 Viability: E	Observed in NA in 1997, no population viability information provided (NHIC 2008). Disjunct Blueprint target (Henson and Brodribb 2005).
Butler's Gartersnake *Thamnophis butleri*	G4/S2/THR/THR Viability: B,D	Multiple EOs at several sites throughout the NA between 1992-2004, population viability variable between Good and Poor (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Butternut *Juglans cinerea*	G3G4/S3?/END/END Viability: H	Has been observed repeatedly throughout history on Point Pelee, last recorded sighting verified species extant in 1992 (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Cerulean Warbler *Dendroica cerulea*	G4/S3B,SZN/SC/SC Viability: E	Recently was confirmed breeding at one site in the NA between 2001-2005 (Cadman et al. 2007).
Channel Darter *Percina copelandi*	G4/S2/THR/THR Viability: E	Verified extant at two sites in the NA in 1997 (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Phair et al. 2005).
Chimney Swift *Chaetura pelagica*	G5/S5B,SZN/THR Viability: E	Species confirmed breeding throughout the NA between 2001-2005 (Cadman et al. 2007).
Climbing Prairie Rose *Rosa setigera*	G5/S3/SC/SC Viability: CD	Verified extant at many sites in NA (Jellicoe 1984; NHIC 2008), populations mostly ranked as Fair or Poor (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Colicroot *Aletris farniosa*	G5/S2/THR/THR Viability: AB	Several EOs observed throughout NA, populations mostly ranked as "Excellent-Good" (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).

Species	*Status* (Global/Provincial/COSEWIC/ COSSARO)/ Viability in Natural Area*	*Source/ Notes*
Common Hoptree *Ptelea trifoliata*	G5/S3/THR/THR Viability: U	Intensive surveys revealed over 16,000 plants at Point Pelee in 2007 (Jalava et al. 2008). Observed at several sites in NA in last 20 years (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Dense Blazing-star *Liatris spicata*	G5/S2/THR/THR Viability: E	Verified extant at numerous sites outside Windsor in 2002, and in the southern portion of the NA in 2000; population viability ranks highly variable (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Duke's Skipper *Euphyes dukesi*	G3/S2 Viability: E	Verified extant in NA throughout 1990s, population viability variable (NHIC 2008). Blueprint target (Henson and Brodribb 2005).
Dwarf Hackberry *Celtis tenuifolia*	G5/S2/THR/THR Viability: B	Jalava et al. (2008) found 47 individuals, suggesting a significant decline since 1989. It is not possible to assess trends over the longer term because of the absence of historic population data. Species at Risk (GC 2007). Blueprint target (Phair et al. 2005).
Eastern Foxsnake *Elaphe gloydi*	G3/S3/END/THR Viability: CD	Abundant throughout the NA, many EOs recorded between 1988-2004, population viability mostly ranked as Fair or Poor (NHIC 2008). Species at Risk (GC 2007). Globally rare blueprint target (Henson and Brodribb 2005).
Eastern Mole *Scalopus aquaticus*	G5/S2/SC/SC Viability: E	Verified extant at several locations in NA in 1997, and at Point Pelee in 2000, population viability variable (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Eastern Prairie Fringed-orchid *Platanthera leucophaea*	G2/S2/END/END Viability: D	Four populations in NA were ranked as Poor in 1997 and 1999 (NHIC 2008). Species at Risk (GC 2007). Globally rare blueprint target (Henson and Brodribb 2005).
Eastern Prickly Pear Cactus *Oputnia humifusa*	G5/S1/END/END Viability: A	Extensive population of hundreds of plants scattered throughout Point Pelee National Park, observed in recent years (NHIC 2008). Blueprint target (Henson and Brodribb 2005).
Eastern Ribbonsnake *Thamnophis sauritus*	G5/S3/SC/SC Viability: U	Two unranked EOs from NA in last 20 years (NHIC 2008). Species at Risk (GC 2007).
Elusive Clubtail *Stylurus notatus*	G3/S2 Viability: E	Species verified extant in several locations across NA in past 20 years, and as recently as 2000 (NHIC 2008). Blueprint target (Phair et al. 2005).
False Hop Sedge *Carex lupuliformis*	G4/S1/END/END Viability: H	One EO recorded in NA in 1985 (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2007).
Five-lined Skink *Eumeces fasciatus*	G5/S3/END/SC Viability: AB	Recorded extant at two sites in NA in 1992, and at another in 2001 where population was ranked as Excellent-Good (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Flowering Dogwood *Cornus florida*	G5/S2/END Viability: E	Noted to be common at one site in NA in 1994 (NHIC 2008). Declining Blueprint target (Henson and Brodribb 2005).

Species	*Status* (Global/Provincial/COSEWIC/ COSSARO)/ Viability in Natural Area*	*Source/ Notes*
Goldenseal *Hydrastis canadensis*	G4/S2/THR/THR Viability: B	Observed at several sites in the NA, population viability widely variable, averaging Good across the EOs reported (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Green Dragon *Arisaema dracontium*	G5/S3/SC/SC Viability: E	Several occurrences throughout NA in 1990s, population viability is variable but has been observed in abundance at more than one site (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Phair et al. 2005).
Greenside Darter *Etheostoma blennioides*	G5/S4/NAR Viability: E	Observed at one site in NA in 1995 (NHIC 2008). Species at Risk (GC 2007).
Grey Fox *Urocyon cinereoargentus*	G5/SZB?/THR/THR Viability: E	Verified extant in NA in 2002 when one individual was observed as roadkill (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Kentucky Coffee-tree *Gymnocladius dioicus*	G5/S2/THR/THR Viability: H	Groups of trees or small populations of trees were recorded at several sites in the NA between 1977-1981 (NHIC 2008). It is likely extant in the NA today, though records of it may not be available (Jalava, pers. comm. 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
King Rail *Rallus elegans*	G4G5/S2B,SZN/END/END Viability: C	Small population observed at one site in NA in 1997, population viability ranked as fair (NHIC 2008). Breeding in NA thought to be possible in NA, but not confirmed (Cadman et al. 2007). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Least Bittern *Ixobrychus exilis*	G5/S3B,SZN/THR/THR Viability: D	Observed at one site in 1997, where one calling was heard and population viability was thus ranked as Poor (NHIC 2008). Breeding thought to be possible in NA, but not confirmed (Cadman et al. 2007). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Massasauga *Sistrurus catenatus*	G3G4/S3/THR/THR Viability: C	Small local population persists in prairie remnants of Ojibway, almost certainly in decline due to heavily populated/developed surroundings (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Milksnake *Lampropeltis triangulum*	G5/S3/SC/SC Viability: U	Observed extant at one site in NA in 1996, other observations are older (NHIC 2008). Species at Risk (GC 2007).
Mottled Duskywing *Erynnis martialis*	G3G4/S2 Viability: D	Small population observed in 1992; viability ranked as Poor (NHIC 2008). Blueprint target (Henson and Brodribb 2005).
Northern Map Turtle *Graptemys geographica*	G5/S3/SC/SC Viability: E	Several EOs throughout 1990s in NA (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Phair et al. 2005).
Panic Grass *Panicum meridionale*	G5/S1 Viability: E	Observed at one site in NA in 1992; no population viability information provided (NHIC 2008). Disjunct Blueprint target (Henson and Brodribb 2005).

Species	*Status* (Global/Provincial/COSEWIC/ COSSARO)/ Viability in Natural Area*	*Source/ Notes*
Pink Milkwort *Polygala incarnata*	G5/S1/END/END Viability: C	One EO recorded in NA in 2000, population viability ranked as Fair (NHIC 2008). Blueprint target (Henson and Brodribb 2005).
Pinweed *Lechea pulchella*	G5T4/S1 Viability: E	NA contains only non-historical element occurrences for this species; recorded extant at two sites in 1990s (NHIC 2008). Disjunct Blueprint target (Henson and Brodribb 2005).
Prothonotary Warbler *Protonotaria citria*	G5/S1S2B,SZN/END/END Viability: E	In 2002 at Holiday Beach CA, 14 individual birds (nestlings and adults) were banded (NHIC 2008). Breeding was confirmed in the same area between 2001-2005 (Cadman et al. 2007). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Pugnose Minnow *Opsopoeodus emiliae*	G5/S2/SC/SC Viability: F	Specimens collected in the Detroit River in 1994, but have Failed to Find since (NHIC 2008). Species at Risk (GC 2007).
Purple Twayblade *Liparis liliifolia*	G5/S2/END/END Viability: CD	Small populations observed at several sites throughout the NA; populations generally ranked as Poor or Fair (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Queensnake *Regina septemvittata*	G5/S2/THR/THR Viability: D	One EO 2002, population viability ranked as Poor (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Red Mulberry *Morus rubra*	G5/S2/END/END Viability: AB	One EO observed in the NA in 2004, no population viability information available; another EO in 1998 ranked population as Excellent-Good (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Red-headed Woodpecker *Melanerpes erythrocephalus*	G5/S3B,SZN/THR/SC Viability: E	Verified extant at one site in NA in 2003 (NHIC 2008). Confirmed breeding throughout the NA between 2001-2005 (Cadman et al. 2007). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Riddell's Goldenrod *Solidago riddellii*	G5/S3/SC/SC Viability: C	Verified extant at several sites in the NA in the 1990s, population viability mostly ranked as Fair (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Round Pigtoe *Pleurobema sintoxia*	G4/S1/END/END Viability: E	Verified extant in the Detroit River in 1992 (NHIC 2008). Species at Risk (GC 2007).
Round-leaved Greenbrier *Smilax rotundifolia*	G5/S2/THR/THR Viability: B	Populations recorded throughout a portion of the NA between 1989-1990; average viability rank is Good (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Scarlet Ammannia *Ammannia robusta*	G5/S1/END/END Viability: B	Verified extant at two sites in the NA in 1992 and 1997 (NHIC 2008). Blueprint target (Henson and Brodribb 2005).
Short-eared Owl *Asio flammeus*	G5/S3S4B,SZN/SC/SC Viability: E	Confirmed breeding in NA between 2001-2005 (Cadman et al. 2007).

Species	*Status* (Global/Provincial/COSEWIC/ COSSARO)/ Viability in Natural Area*	*Source/ Notes*
Shumard Oak *Quercus shumardii*	G5/S3/SC/SC Viability: E	EO in 1993 consisted of two healthy, mature trees; another EO in 2001 did not contain population viability information (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Skinner's Agalinis *Agalinis skinneriana*	G3/S1/END/END Viability: B?	A few hundred plants observed at one location in the NA in 1990 (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Slender Bush-clover *Lespedeza virginica*	G5/S1/END/END Viability: C	Two EOs in NA in 2000 ranked as Fair; NA represents only site of recorded occurrences of species in Ontario (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Spatterdock Darner *Aeshna mutata*	G3G4/S1 Viability: E	Verified extant at one site in NA in 1995 (NHIC 2008). Blueprint target (Phair et al. 2005)
Spiny Softshell *Apalone spinifera*	G5/S3/THR/THR Viability: E	Three EOs in NA involved two sightings ranked as Fair? and Poor?, and one incidence of roadkill (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Spoon-leaved Moss *Bryoandersonia illeibra*	G5/S1/END/END Viability: C	One EO noted in the NA in 2002, population viability ranked as Fair (NHIC 2008). Species at Risk (GC 2007).
Spotted Gar *Lepisosteus oculatus*	G5/S2/THR/THR Viability: E	Verified extant at one site in NA in 2003 (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Phair et al. 2005).
Spotted Sucker *Minytrema melanops*	G5/S2/SC/SC Viability: E	Verified extant in the Detroit River and Canard River in 1990 (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Phair et al. 2005).
Spotted Turtle *Clemmys guttata*	G5/S3/END/END Viability: C	Observed at one site in the NA in 1988, population viability ranked as Fair (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Stinkpot *Stenotherus odoratus*	G5/S3/THR/THR Viability: E	Three EOs observed in NA in past 20 years; most recent occurrence was on Point Pelee in 2003 (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Phair et al. 2005).
Swamp Rose-mallow *Hibiscus moscheutos*	G5/S3/SC/SC Viability: E	Multiple EOs recorded throughout NA between 1999-2007; viability extremely variable (Jalava et al. 2008; NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).
Warmouth *Lepomis gulosus*	G5/S1/SC/SC	Verified extant in NA in 1997 (NHIC 2008). Species at Risk (GC 2007). Blueprint target species (Phair et al. 2005).
Willowleaf Aster *Symphyotrichum praealtum*	G5/S2/THR/THR Viability: E	Observed at several sites in the NA with varying population information (NHIC 2008). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).

Species	*Status* (Global/Provincial/COSEWIC/ COSSARO)/ Viability in Natural Area*	*Source/ Notes*
Yellow-breasted Chat *Icteria virens*	G5/S2S3B,SZN/SC/SC Viability: E	One EO recorded in the NA in 1990 (NHIC 2008). Breeding confirmed at one site in NA, and ranked as possible and probable in other sites between 2001-2005 (Cadman et al. 2007). Species at Risk (GC 2007). Blueprint target (Henson and Brodribb 2005).

vi. SOCIO-ECONOMIC / CULTURAL CONTEXT

The Essex area was originally inhabited by First Nations people, and the landscape was likely modified to some degree by this presence, though information about this time period is not readily available. The Essex area was then visited by Europeans in the late 1600s, and two priests, Dollier and Galinee, were the first people to describe the area (Battin and Nelson 1978). It was visited several more times throughout the 1700s, with varying pressures put on the areas game such as deer, bear, beaver and fox (ibid.). Land surveying occurred throughout the early part of the 1800s until the first permanent European settlers took up residence in the 1820s-1830s (Battin and Nelson 1978; ERCA 2002). After this, the land and its natural resources were severely altered by the exploitation of the area for timber, agriculture and urban development (ERCA 2002). Prairies were among the first targets of settlers searching for fertile agricultural land, as the richness of the soil and ease of preparation of the ground led to quick destruction of these areas (Windsor Parks and Recreation date unknown). In the Ojibway Prairie area, land was spared because it was too wet to cultivate (Windsor Parks and Recreation date unknown). In addition to converting most of the prairie areas, settlers also disrupted natural fire regimes by building roads and ditches, which negatively affected the remaining prairies as succession continued and woody species began to spread into these historically treeless areas (Windsor Parks and Recreation date unknown). In areas such as Point Pelee, the marshes were drained aggressively throughout the late 1800s to "reclaim" land for agriculture; once drainage schemes were in place, the area was quickly cultivated (Battin and Nelson 1978).

Today, approximately 92% of the landscape in Essex County is comprised of agricultural and urban land use, leaving just over 7% as natural cover (ERCA 2002; Child, pers. comm.). Agriculture is the dominant land use, with most areas averaging at least 80% coverage by farmland (ERCA 2002). On average, approximately 5% of the population in Essex County is employed in the agricultural sector, though this number is higher in some areas (e.g. 14.8% in Kingsville) and obviously lower in the more urbanized centers (e.g. 1.1% in Windsor) (Statistics Canada 2006).

Essex County has a mild climate which is extremely well-suited to agriculture and allows for a wide variety of crops to be grown. The climate is moderated by Lake St. Clair and Lake Erie, which keeps temperature fluctuations to a minimum. The average temperature in Essex County in July is 22-23ºC (72-74ºF), and the average frost-free period stretches for 160-170 days. The most important crops grown in the area are corn, soybeans, winter wheat and early potatoes. Cash crops grown include white beans, black tobacco, green peas, tomatoes, cucumbers, and melons. The area is not noted for livestock production, though 5% of the farms are dairy operations that supply milk products to Windsor and other larger municipalities. There are several large farms in the area, with an average size of 40.5 ha (100 ac), though there are several larger operations. {Chapman and Putnam 1984}

The NA borders the large urban centre of Windsor, which has a population of 216,473. Within the NA boundaries, several municipalities (Leamington, LaSalle, Amherstburg, Kingsville and Essex) have

populations around 25,000. The population trend in the area is generally towards growth (average growth between 2001 and 2006 was 6%), and population densities can vary widely, from 424 people/km^2 in LaSalle to 72 people/km^2 in Essex. Generally the number of homes in these areas used as secondary dwellings, including cottages and summer homes, is approximately 5-6%, showing that there is a definite presence of summer residential use in the NA, particularly along the Great Lakes shoreline. {Statistics Canada 2006} Table 1.5 summarizes the statistics for the five largest communities in the NA.

Table 1.5 – Summary of Population Information in the Essex Forests and Wetlands Natural Area

Name	**Population***	**2001-2006 Population Growth**	**Population Density (persons/km^2)**	**% of Dwellings as Secondary Homes**
Leamington	28,883	6.2%	110.1	6.2%
LaSalle	27,652	9.4%	423.8	2.2%
Amherstburg	21,748	6.9%	117.1	5.0%
Kingsville	20,908	6.6%	84.7	5.0%
Essex	20,032	-0.3%	72.1	8.8%

* all information from Statistics Canada 2006

B. BIODIVERISTY TARGETS AND ASSOCIATED THREATS

i. BIODIVERSITY TARGETS

Biodiversity targets are native biological entities (i.e., *ecosystems*, *communities* and/or *species*) that the Conservation Action Plan is aiming to conserve. For this project threats to the targets were identified through the EFW NA project team, past studies and a review of the literature. Based on this review, eight biodiversity targets were selected (Table 1.6). These targets represent the biodiversity of the NA and include multiple nested species of conservation concern. The distribution of these targets throughout the NA can be seen in Figures 3.1-3.7 and Figure 6.

The health of all targets was assessed based on an assessment of size, condition and landscape context (Low 2003). This assessment was informed by background target information collected from the NA, a review of literature and expert opinion. The overall viability of the NA is ranked as Poor (Table 1.6).

Table 1.6: Summary of Biodiversity Target Health – Essex Forests and Wetlands Natural Area

Biodiversity Targets	Habitat / Species Type	Ecological Justification	Size	Condition	Landscape Context	Viability Rank	Viability Rationale	Nested Targets
Upland Deciduous Forests	Forest – Temperate	Provide habitat to a variety of species and show representation of eastern, Carolinian and northern species within their range.	Fair	Fair	Poor	Fair	Though the landscape is mainly in agriculture and urban development, the size of upland deciduous forest patches in the NA is viable, though below standard "healthy" sizes for MDA. The condition of the forests has been affected by Garlic Mustard and other NIS (Non-indigenous species), but still maintains some original character and composition of typical Carolinian forest habitat. See Figures 3.1 and 3.2.	Acadian Flycatcher, American Chestnut, American Ginseng, Bald Eagle, Broad Beech Fern, Butternut, Cerulean Warbler, Chimney Swift, Eastern Foxsnake, Eastern Mole, Five-lined Skink, Flowering Dogwood, Goldenseal, Grey Fox, Kentucky Coffee-tree, Milksnake, Purple Twayblade, Red Mulberry, Red-headed Woodpecker, Round-leaved Greenbrier, Scarlet Ammannia, Shumard Oak, Small Pocket Moss, Spoon-leaved Moss

Biodiversity Targets	Habitat / Species Type	Ecological Justification	Size	Condition	Landscape Context	Viability Rank	Viability Rationale	Nested Targets
Prairies and Savannahs	Savannah – Dry, Savannah – Moist, Grassland - Temperate	Includes savannah, woodland, and prairie communities. Supports populations of rare, significant and SAR species.	Poor	Poor	Poor	Poor	The prairies and savannahs which remain in the NA are almost exclusively referred to as "patches", as no contiguous tracts of this habitat type can be found. Even in larger tracts such as Ojibway, the condition is poor due to lack of a suitable fire regime and the presence of NIS and overgrowth of woody species. Some prairie remnants are directly abutted by urban and agricultural development and some are surrounded entirely by these incompatible land uses. See Figure 3.3.	Barn Owl, Butler's Gartersnake, Climbing Prairie Rose, Colicroot, Dense Blazing-Star, Eastern Foxsnake, Eastern Prairie Fringed-orchid, Massassauga, Milksnake, Pink Milkwort, Riddell's Goldenrod, Skinner's Agalinis, Slender Bush-clover, Willowleaf Aster, Yellow-breasted Chat
Inland Wetlands and Swamps	Wetlands – Bogs, Marshes, Swamps, Fens, Peatlands, Wetlands – Shrub Dominated	Inland wetlands include mostly marsh and swamp habitat. These wetlands provide habitat for many species such as amphibians, reptiles and plants, many of which are significant or rare.	Poor	Poor	Fair	Poor	Most inland wetlands in the NA are small, and tend to be isolated. Though they are often considered fair in a landscape context (e.g. abutted by other natural areas vs. incompatible development), overall the target is outside its range of natural variation. The presence of invasive species has degraded species composition, and drains and water use have affected the innate character of these habitats. See Figure 3.4.	Barn Owl, Black Tern, Blanding's Turtle, Eastern Foxsnake, Eastern Prairie Fringed-orchid, Eastern Ribbonsnake, False Hop Sedge, Green Dragon, Kentucky Coffee-tree, Least Bittern, Northern Map Turtle, Prothonotary Warbler, Pugnose Minnow, Queensnake, Riddell's Goldenrod, Scarlet Ammannia, Short-eared Owl, Spotted Turtle, Stinkpot, Yellow-breasted Chat

Biodiversity Targets	Habitat / Species Type	Ecological Justification	Size	Condition	Landscape Context	Viability Rank	Viability Rationale	Nested Targets
Coastal Marshes	Wetlands – Bogs, Marshes, Swamps, Fens, Peatlands	Wetlands along the shores of Lake Erie and the Detroit River include mostly marsh systems. Wetlands are heavily influenced by the action of Lake Erie and the Detroit River. They provide significant bird stopover habitat and are home to other significant or rare species.	Fair	Poor	Fair	Fair	Coastal marshes are slightly more viable than their inland counterparts, mainly because all coastal marshes in the NA have some protection through the PSW designation. The marshes are spread over somewhat sizeable areas, though not large enough, and are often adjacent to urban development, roads and agricultural lands. Their condition is generally poor due to disturbance, loss of habitat through shoreline modification and presence of invasive species. See Figure 3.4.	Bald Eagle, Black Tern, Blanding's Turtle, Eastern Foxsnake, King Rail, Least Bittern, Northern Map Turtle, Prothonotary Warbler, Pugnose Minnow, Stinkpot, Swamp Rose-mallow
Beaches and Shorelines	Littoral – Sandy Shorelines and/or Beaches	Systems support many sensitive, rare and significant species, and represent unique, dynamic ecosystems	Poor	Poor	Poor	Poor	Natural beach and shoreline habitat patches are declining over time as shoreline development and modification continues. Natural beach species are poorly represented in remaining portions of target. Areas tend to be highly disturbed. See Figure 3.5.	Bald Eagle, Chimney Swift, Common Hoptree, Eastern Foxsnake, Small-flowered Lipocarpha

Biodiversity Targets	Habitat / Species Type	Ecological Justification	Size	Condition	Landscape Context	Viability Rank	Viability Rationale	Nested Targets
Ecological Services on Farms	Grasslands – Temperate, Shrubland – Temperate, Anthropogenic habitats	Farms provide a variety of ecological services, including excellent habitat for some significant species, including rare grassland birds, migratory birds and some snakes.	Fair	Fair	Fair	Fair	Ecological services provided by farms are often not a high priority for conservation, and their condition is only ranked as Fair across the NA. Some farmers do not conserve the ecological values of their farms, and often surrounding landscape activities can impact the ability of farms to provide these services (e.g. pollution of wetlands, fragmentation of forest habitat). See Figure 6 for the distribution of annual ecosystem goods and services across the NA.	Barn Owl, Climbing Prairie Rose, Colicroot, Dense Blazing-star, Eastern Prairie Fringed-orchid, False Hop Sedge, Grey Fox, Milksnake, Red-headed Woodpecker, Short-eared Owl, Willowleaf Aster, Yellow-breasted Chat
Riparian, River and Creek Systems	Rivers, Streams, Creeks – Permanent, Rivers, Streams, Creeks – Seasonal/ Intermittent/ Irregular, Riparian Areas	Includes all of the NA's extensive watercourses (rivers, creeks, streams), valleys, floodplain forests and ravines. Habitat is home to a variety of significant species and provides a matrix habitat with many connections.	N/A	Poor	Poor	Poor	Riparian cover, where present, rarely meets standards for maintaining dynamic nature of system in face of disturbance. Areas are highly disturbed by recreational boating, and ATVs as well as heavily modified through dams, drains and shoreline hardening. Condition is also affected by invasive species; natural composition of riparian vegetation is highly compromised. See Figure 3.6.	Butternut, Channel Darter, Eastern Foxsnake, Greenside Darter, Grey Fox, Prothonotary Warbler, Pugnose Minnow, Queensnake, Red-headed Woodpecker, Round Pigtoe, Spiny Softshell, Spotted Sucker, Yellow-breasted Chat

Biodiversity Targets	Habitat / Species Type	Ecological Justification	Size	Condition	Landscape Context	Viability Rank	Viability Rationale	Nested Targets
Reptiles and Amphibians	Species guild		Poor	Poor	Poor	Poor	Many species have very small ranges, small population sizes and poor reproductive ability. Though some species are functioning within acceptable range of variability, most are severely under-represented, subsisting in fragmented habitat and in danger of being lost from the system permanently. See Figure 3.7.	Blanding's Turtle, Butler's Gartersnake, Eastern Foxsnake, Eastern Ribbonsnake, Massassauga, Milksnake, Northern Map Turtle, Queensnake, Spiny Softshell, Spotted Turtle, Stinkpot
Overall Biodiversity Target Health Rank for the Natural Area:						Poor		

Very Good	**Optimal Health**: The biodiversity target is functioning at an ecologically desirable status, and requires little management.
Good	**Minimum Health**: The biodiversity target is functioning within its range of acceptable variation; it may require some management.
Fair	**Likely Degradation**: The biodiversity target lies outside of its range of acceptable variation and requires management. If unchecked, the biodiversity target will be vulnerable to serious degradation.
Poor	**Imminent Loss**: Allowing the biodiversity target to remain in this condition for an extended period will make restoration or preventing extirpation practically impossible.
Unknown	**Research Need**: The biodiversity target is known to occur, but information on this viability criterion is currently is unknown.
NA	**Not Applicable**: This criterion is not significant for assessing the health of this biodiversity target.

ii. THREATS

Threats are the proximate activities or processes that have caused, are causing or may cause the destruction, degradation and / or impairment of one or more of the identified biodiversity targets. Threats impact the target's viability and/or the critical factors.

Threats to biodiversity targets were identified by the EFW NA project team, by project partners, from past studies and from a review of the literature. These threats were ranked based on scope, scale and irreversibility using the Conservation Action Planning Workbook (Low 2003), and were categorized using established international taxonomy (IUCN-CMP 2006a), with local descriptions. Table 1.7 provides a summary of the threats identified from the EFW NA, and Figure 4 illustrates the distribution of some threats, such as primary road networks and other infrastructure, across the NA.

The highest threats include those with a high overall threat rank and a high rank for a particular target. Municipal and agricultural drains were identified as the highest overall threat to the NA. Six out of the eight targets received Very High overall threat ranks, while Upland Deciduous Forests and Ecological Services on Farms had High threat ranks. The overall threat to the targets and the NA was determined to be Very High. {Table 1.7}

Table 1.7 Summary of Threats - Essex Forests and Wetlands Natural Area

Threats	Upland Deciduous Forest	Prairies and Savannahs	Inland Wetlands and Swamps	Coastal Marshes	Beaches and Shorelines	Eco-logical Services on Farms	Rivers, Creeks and Ravine Systems	Reptiles and Amphibians	Overall Threat Rank	Notes on Current/Future Condition
7.2 Dams & Water Management/ Use *7.2.1 Municipal and agricultural drains*			Very High		Medium	Medium	Very High		**Very High**	Municipal and agricultural drains cause a myriad of related issues in the NA, including flash floods, changes to the water table, draining of inland wetlands, and pollution of wetlands and waterways. If more drains are permitted, this threat will continue to increase into the future.
1.1 Housing and Urban Areas ***1.1.1 Residential and cottage development***	High	Medium	Medium	Low	Very High	High	Low	Medium	**High**	Development of natural inland and shoreline areas has occurred to a great extent in the NA. Housing and shoreline cottage developments will continue to be built through most of the NA, encroaching further into natural areas into the future.

Threats	Upland Deciduous Forest	Prairies and Savannahs	Inland Wetlands and Swamps	Coastal Marshes	Beaches and Shorelines	Eco-logical Services on Farms	Rivers, Creeks and Ravine Systems	Reptiles and Amphibians	Overall Threat Rank	Notes on Current/Future Condition
8.1 Invasive Non-Native/Alien Species *8.1.1 Common Reed*		High	High	High	High			High	**High**	Common Reed is a significant threat in many aquatic and terrestrial habitats in the NA. Forming dense monocultures, it can change the inherent character of systems and make conditions unsuitable for native plants and animals, including rare and sensitive species. It is exceedingly difficult to control, and unless effective control methods are developed, it will persist as a greater problem into the future.
8.2 Problematic Native Species *8.2.1 Mesopredators such as raccoons, skunk and opossums*				High	Medium	Medium		Very High	**High**	Subsidized mesopredators are problematic in a variety of habitats as they prey on young and/or sensitive native wildlife such as birds and reptiles and can severely diminish populations. Their current rate of reproduction indicates they will continue to be a problem into the future.
8.1 Invasive Non-Native/Alien Species *8.1.2 Terrestrial invasive species such as Garlic Mustard*	High	High			High	Medium	High		**High**	Terrestrial invasive species known from the NA include Garlic Mustard, Dog-Strangling Vine, Buckthorn, White Mulberry, Greater Celandine, Autumn Olive, Emerald Ash Borer, Butternut Canker, and Black Locust among many others. The populations of these species are spreading rapidly, and are for the most part difficult to control and will likely persist as a problem into the future.
6.1 Recreational Activities *6.1.1 Terrestrial recreational activities such as ATVs.*	High	High	Low		High	Low	High		**High**	ATV use is highly pronounced throughout the NA. Off road vehicles on beaches, and hikers through sensitive ecosystems are also significant threats. As the population in the NA continues to grow, this threat will persist and expand.

Threats	Upland Deciduous Forest	Prairies and Savannahs	Inland Wetlands and Swamps	Coastal Marshes	Beaches and Shorelines	Eco-logical Services on Farms	Rivers, Creeks and Ravine Systems	Reptiles and Amphibians	Overall Threat Rank	Notes on Current/Future Condition
4.1 Roads & Railroads *4.1.1 Existing roads, new roads, redeveloped roads, and maintenance of these roads*	High	High	High		High	Low			**High**	New roads are created as population and residential development increases, and these often fragment or degrade natural habitats. The development of the Detroit River International Crossing, an upgrade to existing roads in the NA, may be a future threat to adjacent natural areas. Additional maintenance and redevelopment of existing roads can also be problematic, adding pollutants and debris into natural spaces.
4.3 Shipping Lanes ***4.3.1 Shipping lanes through the Detroit River and related effects of dredging and channel widening***				Very High	Medium				**High**	To date coastal areas have been significantly affected by the creation and use of shipping lanes, whether by shoreline hardening, sediment dredging or direct habitat loss. The amount of traffic in the DR (Detroit River) will likely only increase as time goes by, meaning this threat will be significant into the future.
8.1 Invasive Non-Native/Alien Species *8.1.3 Aquatic invasive species such as Purple Loosestrife*			High	High			High		**High**	Currently several aquatic invasive species are having an impact on the NA, including Purple Loosestrife, Water Hyacinth and Common Carp. Many aquatic species have proved very difficult to eradicate to date and without effective control methods, many existing and new aquatic invasives will persist into the future in the NA.
4.2 Roads & Railroads *4.1.2 Roadkills of sensitive species*								Very High	**High**	Roads in the area have very serious impacts on sensitive reptile species. This problem has been especially pronounced on Point Pelee. Education may help mitigate this threat, but it is very likely to continue into the future and its impact will worsen as the status of reptiles becomes even more imperilled.

Threats	Upland Deciduous Forest	Prairies and Savannahs	Inland Wetlands and Swamps	Coastal Marshes	Beaches and Shorelines	Eco-logical Services on Farms	Rivers, Creeks and Ravine Systems	Reptiles and Amphibians	Overall Threat Rank	Notes on Current/Future Condition
2.1 Annual & Perennial Non-Timber Crops *2.1.1 Fragmentation of natural habitat from agricultural lands and the expansion of existing lands into natural areas*	High	Low	High	Low	Low	Medium	Medium	Medium	**High**	Agriculture comprises the backbone of the NA and much of its economy. As a result, a large number of sizeable farms have been created which have heavily fragmented the natural landscape and disrupted natural corridors. When these existing farms expand, they nibble further into already fragmented habitats. The expansion issue will continue into the future as food prices increase as well as demand.
9.3 Agricultural & Forestry Effluents *9.3.1 Effluents from agricultural practices affecting aquatic habitats, plants and wildlife*				Medium		Medium	High	High	**High**	Pesticides, excess nutrients and sediments enter aquatic habitats in the NA as a result of point and nonpoint agricultural sources. Again, as farming practices expand and intensify into the future, this threat will likely heighten in intensity.
7.3 Other Ecosystem Modifications *7.3.1 Shoreline hardening modifying sediment transport and natural habitats*				Medium	High		High		**High**	Shoreline hardening occurs through a variety of means, including cottagers, marinas and the creation of shipping lanes. It disrupts natural sediment transport processes and can directly destroy habitat for sensitive species. As shipping, cottaging and recreation increase into the future, this threat will likely also continue to grow.

Threats	Upland Deciduous Forest	Prairies and Savannahs	Inland Wetlands and Swamps	Coastal Marshes	Beaches and Shorelines	Eco-logical Services on Farms	Rivers, Creeks and Ravine Systems	Reptiles and Amphibians	Overall Threat Rank	Notes on Current/Future Condition
9.1 Household Sewage & Urban Waste Water *9.1.1 Urban pollutants such as salt, drain effluent and household contaminants such as bacteria*				Medium	Medium		High		**Medium**	The wide variety of pollutants from urban and residential areas is impacting water quality in a variety of habitats throughout the NA. Without proper water treatment and regulation, this threat will continue into the future and expand laterally with urban and rural areas.
5.3 Logging & Wood Harvesting *5.3.1 Unsustainable forest management practices*	High		Medium			Low			**Medium**	Lack of tree-cutting by-law, opportunistic commercial harvesters on private lots, and lack of forestry knowledge have all led to unsustainable harvesting practices on private lands. This threat can be reversed with proper intervention, but otherwise will continue into the future.
7.2 Dams & Water Management/ Use *7.2.2 Drain management*							High		**Medium**	Management of agricultural and municipal drains has significant negative impacts on rivers and creeks in the NA as pollutants are released into these habitats, which are often home to significant aquatic species. This threat will continue into the future without proper regulation for drain management.
8.1 Invasive/Non-native Alien Species *8.1.4 Impact of domestic cats on sensitive wildlife*								High	**Medium**	Feral cats are a significant problem in the NA due to their impact on sensitive wildlife such as reptiles, birds, insects and small mammals. Their population is increasing, and has been noted to be at record high levels in other portions of Carolinian Canada, indicating the problem could still worsen in the NA if not adequately addressed.

Threats	Upland Deciduous Forest	Prairies and Savannahs	Inland Wetlands and Swamps	Coastal Marshes	Beaches and Shorelines	Eco-logical Services on Farms	Rivers, Creeks and Ravine Systems	Reptiles and Amphibians	Overall Threat Rank	Notes on Current/Future Condition
5.1 Hunting & Collecting Terrestrial Animals *5.1.1 Persecution of snakes; collection of turtles and snakes for pet trade*		Medium	Medium		Medium	Low		Medium	**Medium**	Species in the NA most at risk for collection and sale to the pet trade are a variety of turtle species and Eastern Foxsnake. Snakes are often victims of persecution by humans due to fear. Without proper education this threat will continue into the future.
9.5 Air-Borne Pollutants *9.5.1 A variety of airborne toxins are deposited into natural habitats*	Low	Medium			Low				**Low**	The details from this threat are largely unknown , but air-borne toxicants have been noted to be problematic in some of the terrestrial habitats in the NA to date. They are also likely stressors to aquatic habitats, but more information is needed to further understand this threat.
7.1 Fire & Fire Suppression *7.1.1 Suppression of natural fire regime in traditionally open areas*		Medium				Low			**Low**	Open areas such as prairies and fields, able to support rare and disjunct species, are threatened by lack of natural fire in the NA. Without regular burning, these areas will eventually succumb to succession and habitat for species which utilize them will be lost.
7.3 Other Ecosystem Modifications *7.3.2 Afforestation of open areas*		Medium			Low				**Low**	Often well-intentioned, the planting of trees in traditionally open areas can cause a loss of specialized habitat for the native species which utilize these areas. With education, this threat can likely be eliminated in the future.
6.1 Recreational Activities *6.1.2 Aquatic recreational activities such as jet-skiing*				Medium			Low		**Low**	Aquatic recreational activities are very popular in the wide expanses of aquatic habitat which border the NA and are found throughout it (e.g. rivers). These activities can be disruptive to shoreline communities and native aquatic species through pollution and physical disturbance. This threat is likely to remain in the future as cottage and summer use of nearshore area expands.

Threats	Upland Deciduous Forest	Prairies and Savannahs	Inland Wetlands and Swamps	Coastal Marshes	Beaches and Shorelines	Eco-logical Services on Farms	Rivers, Creeks and Ravine Systems	Reptiles and Amphibians	Overall Threat Rank	Notes on Current/Future Condition
1.2 Commercial & Industrial Areas *1.2.1 Creation of "big box" stores and related development in natural areas*	Low					Low			**Low**	Trend towards large retail "box" stores is a threat to terrestrial natural areas, including farms that provide ecological goods and services, which may be bought out by large corporations eager to expand their operations into the NA. This threat will likely persist into the future as population in the NA continues to expand.
Threat Status for Targets and Project	**High**	**Very High**	**Very High**	**Very High**	**Very High**	**High**	**Very High**	**Very High**	**Very High**	

Very High	The threat is likely to *destroy or eliminate* the biodiversity target.
High	The threat is likely to *seriously degrade* the biodiversity target.
Medium	The threat is likely to *moderately degrade* the biodiversity target.
Low	The threat is likely to *only slightly impair* the biodiversity target.

Dams and Water Regulation
Damming occurs in some places in the NA, including between Lake Erie and its coastal wetlands (Klinkenberg 1984), as well as along waterways which transect the NA such as Big Creek which is dammed at its mouth. In addition to manmade dams, drains are a major issue in terms of water management in the NA. Drains for both municipal and agricultural purposes can cause problems such as lowered water tables, loss of inland wetlands, increased water pollution and contributions to flash floods. They can also act as barriers and prevention of natural migration by aquatic organisms.

Residential Development
Urban and cottage development poses a substantial threat to the portions of the NA still supporting natural cover. Wetlands in the NA have been heavily disturbed by urban development immediately adjacent to these sensitive areas (Falls et al. 1990). River mouths such as Cedar Creek and beaches such as those found in the Big Creek system have been mostly built up with cottages and houses immediately adjacent to the river, which pose threats such as pollution, recreational use and disturbance of shoreline and beach vegetation (Oldham 1983). Development removes beach vegetation, and degrades coastal communities and processes throughout most of the NA (Oldham 1983; NHIC 2008). From a human perspective, the area is desirable for second home development, and as urban areas such as Windsor continue to expand, and populations continue to grow, the area will continue be threatened by housing developments well into the future.

Invasive Non-native/Alien Species
The invasive species issue in the NA is threefold with non-native invaders taking the form of terrestrial species, aquatic species and species which can thrive in both terrestrial and aquatic areas. Terrestrial invasive species of concern include several well-known invaders such as Garlic Mustard (*Alliaria petiolata*), European Swallow-wort (*Cyanchum rossicum*, locally referred to as Dog-strangling Vine), Buckthorn (*Rhamnus cathartica*), White Mulberry (*Morus alba*), Greater Celandine (*Chelidonium majus*), Autumn Olive (*Elaeagnus umbellata* var. *parviflora*), Emerald Ash Borer (*Agrilus planipennis*), Butternut Canker (*Sirococcus clavigignenti-juglanacearum*), Black Locust (*Robinia pseudo-acacia*) and feral Domestic Cats (*Felis catus*). Aquatic invasive species of concern include Purple Loosestrife (*Lythrum salicaria*), Common Water Hyacinth (*Eichhornia crassipes*), and Common Carp (*Cyprinus carpio*). Residual impacts from aquatic invaders such as Zebra Mussel (*Dreissena polymorpha*) still exist. These mussels had impacts on the Detroit River and Lake Erie food webs through the 1990s, of which the effect is still largely unknown but has been linked to phenomenon such as harmful algal blooms (Eedy et al. 2005). Finally, one of the largest invasive species threats is the exotic variety of Common Reed (*Phragmites australis*) which has been expanding rapidly in the NA in a variety of different habitats. This species degrades waterfowl habitat and reduces biodiversity. It was introduced in the mid-1990s and began to expand rapidly (Wilcox et al. 2003).

Problematic Native Species
Native species which are the largest problem in the NA are subsidized wildlife species such as Raccoon (*Procyon lotor*), Virginia Opossum (*Didelphis virginiana*) and Striped Skunk (*Mephitis mephitis*) that thrive from feeding on the wide variety of agricultural crops throughout the area, and prey on rare and sensitive species such as birds and reptiles, as well as their eggs. Species such as Raccoons have caused significant damage to sensitive wildlife populations to date, and without control of their populations on the landscape, they will remain a significant threat which may grow with increasing populations and food availability.

Recreation
Recreation is a significant land use in the NA (ERCA 2002). The NA is subject to recreational usage from hiking trails which dissect some of the area's only remaining natural patches, as well as camping which has cleared substantial patches of the natural cover within the NA (Oldham 1983). ATVs are the largest terrestrial recreational threat, as they often use sensitive natural areas and can degrade or destroy

habitat quality in just a few passes. There is also a threat from aquatic recreation, such as boats and jet-skis, and the proximate impact from marinas including further shoreline hardening and pollution.

Roads and Railroads
The major road through the NA is Highway 3, which bisects the middle portion of the NA and several natural areas. In addition, Highway 77 cuts through the NA, and Highway 401, one of the busiest highways in the world, is just north of the northern boundary of the site. Border traffic travelling into and out of the United States makes use of the major roads in the area, leading to often high traffic levels. In the future, these roads could be further expanded to support a growing population and increases in transportation through the area, which could further impact and fragment natural habitats. As residential development continues to increase, more roads will need to be built, bringing with them a myriad of other issues, including disturbance from road maintenance activities and pollution from road debris and road salt.

Traffic on roads causes mortality of sensitive species. Roadkills of snakes and turtles are common in areas where roads are paved and heat up in the sun. Since snakes and turtles bask in these areas, and turtles especially are too slow-moving to react to danger from oncoming traffic, many are killed by vehicles. This unnatural source of mortality is likely to have a disproportionate effect on populations which are already small and fragmented due to habitat loss.

Shipping
Commercial navigation occurs to a significant degree throughout the Detroit River, which acts as a connecting channel between the upper and lower Great Lakes (Canadian Heritage Rivers System, date unknown). Traffic on the river occurs throughout most of the year and with only a short stoppage occurring during the winter months. Not only is the river polluted by runoff from nearby urban and industrial areas, it also is at risk from pollution from the shipping traffic (IBA Canada 2004b). Additional threats related to the use of the Detroit River for shipping are channel dredging which can destroy benthos and their habitat, as well as shoreline hardening which can completely eliminate certain habitat types and the species that reside within them.

Agriculture
Agriculture in the area was responsible for a great deal of the initial land clearing in the natural area, and continues to impact the landscape in many ways. The NA has the highest amount of land cover in Ontario devoted to agriculture, up to 82% in some areas (Klinkenberg 1984). Many of the area's wetlands have been drained for agriculture (Klinkenberg 1984) and some constructed agricultural drains (such as the Richmond Drain in the Marshfield Life Science Site) have permanently changed the hydrology of the area, robbing streams of their original headwaters (ERCA 1994). Agriculture also poses threats through disturbance to remaining woodlots by grazing livestock (Oldham 1983), and via runoff of agricultural fertilizers and pesticides polluting the area's valuable wetlands (IBA Canada 2004a). Cultural eutrophication and nutrient loading has been a significant problem in the NA since the 1980s-1990s, and remains relatively unchanged to date (Eedy et al. 2005). Finally, agriculture poses a significant threat to an already fragmented landscape when existing agricultural areas are allowed to "nibble" further into the natural areas that surround them, further reducing habitat at these sites and overall landscape connectivity.

Shoreline Hardening
Along riparian corridors, beaches and other land/water interfaces in the NA, impervious surfaces (e.g. pavement and hardened shorelines) are a significant problem. Overall, thresholds for percentage impervious cover are mostly exceeded throughout the Detroit River corridor section of the NA (ERCA 2002). As an example, 96-97% of the coastal wetland habitat on the Detroit River (note that total is international) has lost its coastal wetland habitat due to development (Read et al. 2001).

C. OPPORTUNITIES

The Carolinian Canada Coalition (CCC) has been a major partner in facilitating the preparation of the CAP and engaging critical partners in the process.

Essex Region Conservation Authority (ERCA) and the Nature Conservancy of Canada (NCC) will co-lead much of the implementation of the Essex Forests and Wetlands CAP over the next five years.

NCC is a national conservation organization which has focused a great deal of work in Carolinian Canada to date. Their mission consists of securing land which contains significant biodiversity values, and stewarding that land to conserve its value and protect against threats. In addition NCC works towards community outreach, influencing policy and legislation and are especially adept at obtaining the funding through a variety of funding programs to carry out conservation work in significant Natural Areas. NCC has worked to execute several Natural Area Conservation Plans, similar to Conservation Action Plans, and has successfully implemented a variety of conservation actions to date.

ERCA has much strength to bring to the CAP as a result of years of planning and implementing conservation on the ground. ERCA is involved in many projects ranging from land acquisition to stewardship to raising awareness in the community. To date they have protected nearly 1,000 ha (2,470 ac) of natural habitat in Conservation Areas. They provide support to landowners to assist with restoration projects in a variety of habitats including forests, prairies, wetlands and riparian areas. This expertise will be extremely beneficial in achieving the restoration and property stewardship actions laid out in this plan.

Essex County Stewardship Network (ECSN) is also a valuable partner in this plan, with substantial experience in landowner contact, property stewardship and restoration of natural cover to the landscape. This organization, a branch of the MNR, has experience dealing specifically with numerous Essex County landowners and assisting in restoration on private properties, with particular experience in meadow and prairie plantings. The ECSN also has a network of contacts with the farming community.

The Canada South Land Trust (CSLT) was established in the NA in 2002. At present, the organization is a small, volunteer-run not-for-profit group which specializes in land securement through easements, ecological gifts and fee simple purchase. The land trust will be expanding in capacity through the life of this CAP and will likely be in a position to contribute to property securement through participating in NCC's Natural Areas Conservation Fund.

Parks Canada owns and manages the forests, beaches and wetlands of Point Pelee. They have expressed a great deal of interest in the CAP and are willing to work to help achieve certain objectives which pertain to the ecosystems and species of Point Pelee. In particular, reptiles and amphibians are of significant concern on the Point Pelee peninsula and Parks Canada staff are actively involved in their monitoring and conservation.

The Detroit River International Wildlife Refuge is located directly west of the Natural Area in the vicinity of the lower Detroit River and the western shore of Lake Erie on the U.S. side. The U.S. Fish and Wildlife Service works with public and private organizations to manage this refuge of over 2023 ha (5000 ac) to benefit wildlife and people. Discussions are being held on the Canadian side to consider a Canadian counterpart to this U.S refuge.

Other potential partners is implementing the CAP include the Essex County Field Naturalists, and various watershed-based "friend of" groups. As well, Greater Essex County District School Board is leading the way in environmental education. The Board joined the EcoSchools Environmental Stewardship program

in 2006 and were the first school board in the province to make it a required part of every school's daily activity. Through this program, many schools are involved in restoring native habitat in their schoolyard and ERCA has been a critical partner in this initiative.

2. VISION AND GOALS

A. CONSERVATION VISION

The Essex Forests and Wetlands support a variety of terrestrial and aquatic habitats, including characteristic Carolinian forest and rich wetland areas. Species at Risk thrive in a variety secure habitats, which contribute to the overall connected matrix of natural cover. Natural cover is restored to at least 12%, and management focuses on further conserving and enhancing the biodiversity value of the area. The local community takes pride in the area and members of all sectors and heritage participate in stewardship and conservation. Relationships between conservation partners are strong and reciprocal, allowing for maximum success in conservation efforts across the interconnected, functional landscape.

B. GOALS

Conservation Goals	Allied Biodiversity Targets[1]
1. *To maintain existing and establish new functional ecological linkages between core conservation areas.*	UDF, PS
2. *To complete securement of core conservation areas.*	UDF, PS, IWS, CM, BD, RCRS, RA
3. *To maintain and recover viable populations of Species at Risk, including reducing anthropogenic mortality of all reptile species.*	All
4. *To manage invasive species populations so no net increase in population density occurs.*	All
5. *To increase natural cover through restoration to a total of 12% of the landscape.*	UDF, PS, ESF, RCRS
6. *To enhance community support and understanding of Essex Forests and Wetlands and to promote community participation in its conservation, including enforcement of policies and regulations.*	All
7. *To enhance information and monitoring of biodiversity values, natural processes and threats.*	UDF, PS, IWS, CM, BD, RCRS, RA
8. *To support and enhance conservation partnerships across the Natural Area.*	All

[1] Biodiversity Targets: **UDF**: Forests, **PS**: Prairies and Savannahs, **IWS**: Inland Wetlands and Swamps, **CM**: Coastal Marshes, **BD**: Beaches and Dunes, **ESF**: Ecological Services on Farms, **RCRS**: Rivers, Creeks and Ravine Systems, **RA**: Reptiles

3. CONSERVATION / BUSINESS ACTIONS AND MEASURES OF SUCCESS

Table 3.1 provides a summary of the conservation actions to be implemented from 2009-2014. These actions are linked to relevant biodiversity targets and threats described earlier in the document. Conservation actions were categorized using established international taxonomy (IUCN-CMP 2006b), modified by the Nature Conservancy of Canada (NCC 2007), with local descriptions. All actions are ranked based on their importance:

- ***Urgent:*** Conservation actions that without implementation would clearly result in the reduction of viability of a biodiversity target or the increase in magnitude of a critical threat within the next 5-10 years. Also includes research information that is needed before key decisions can be made on the management of biodiversity targets.

- ***Necessary***: Conservation actions that are needed to maintain or enhance the viability of biodiversity targets or reduce critical threats. Also research that will assist in decisions on management of biodiversity targets.

- ***Beneficial***: Conservation actions that will assist in maintaining or enhancing viability of biodiversity targets and reducing threats.

The most urgent action in the CAP involves the securement of a minimum of 500 ha (1235 ac) of Priority 1 and Priority 2 lands over the five year timeframe of the plan. The distribution of lands which are a priority for securement can be found in Figure 5, and the methodology by which these sites were selected is described in further detail in Appendix E. Additional conservation actions will include the preparation of Interim Stewardship Statements, Property Management Plans for NCC and partner properties, and assisting in the restoration of up to 400 ha (988 ac) of native habitat on secured lands. In addition, efforts to enhance public awareness of biodiversity targets and threats will be undertaken. Lead partners will also work together to introduce positive incentive programs for farmers to encourage them to maintain biodiversity values on their lands.

Through direct securement activities this plan will increase the land under protection in the Natural Area from approximately 10,700 ha (9.8%) to 11,200 ha (10.2%) (includes strict protection categories as well as ANSIs and PSWs). The CAP will influence conservation actions over much of the NA through communication and outreach and by optimizing implementation of conservation actions.

Table 3.1. Summary of Conservation Actions – Essex Forests and Wetlands Natural Area

Draft Conservation Actions for Discussion	Importance/ Associated Goals	Biodiversity Target(s)[1]	Threat(s)	Measures of Success (MOS)[2]/ Notes	Organizational Lead
1. Securement - Land/ Water Protection 1.1 Site/Area Protection *1.1.1 Secure a minimum of 500 hectares (1235 acres) of Priority 1 and 2 lands by 2014.*	URGENT 1, 2, 5	UDF, PS, IWS, CM, BS, RCRS, RA	1.1.1, 6.1.1, 7.2.1, 2.1.1, 4.1.1, 7.3.1, 5.3.1, 5.1.1, 7.1.1, 7.3.2, 1.2.1	MOS-I and E: A minimum of 500 hectares (1235 acres) of Priority 1 and 2 lands are placed in conservation ownership by 2014, of which at least 70% of land is Priority 1. At least 90% of secured land area will be owned by ERCA.	NCC and ERCA
2. Stewardship – Land/Water Management 2.1 Site/Area Management *2.1.1 Prepare Interim Stewardship Statements within one year and prepare Property Management Plans (PMPs) following NCC's approved Stewardship Performance Standards for secured properties within two years of securement. Implement key PMP-directed stewardship actions on acquired properties by 2014.*	NECESSARY 1, 3, 4, 5, 7	UDF, PS, IWS, CM, BS, RCRS, RA	7.2.1, 8.1.1, 8.2.1, 8.1.2, 6.1.1, 8.1.3, 4.1.2, 7.3.1, 5.3.1, 7.2.2, 8.1.4, 5.1.1, 6.1.2	MOS-I and E: Interim Stewardship Statements completed within one year of closing. Inventories are completed and Property Management Plans (PMPs) developed and approved within two years of property closing for all land protection projects. MOS-E: Urgent actions are completed and targets are maintained or enhanced as per the PMPs by 2014.	ERCA and NCC
2. Stewardship – Land/Water Management 2.1 Site/Area Management *2.1.2 Work with Tallgrass Ontario and other partners to identify and map species richness and condition of all prairie/savannah remnants throughout the NA by 2011.*	NECESSARY 7, 8	PS	7.1.1, 1.1.1, 8.1.1, 2.1.1, 8.1.2, 7.3.2	MOS-I: Mapping of prairie and savannah, including species richness and degree of succession, completed for natural area by 2011. MOS-E: Mapping helps direct management actions for 2 sites.	Tallgrass Ontario and Ontario Parks, City of Windsor, MNR

[1] [1] Biodiversity Targets: **UDF**: Upland Deciduous Forests, **PS**: Prairies and Savannahs, **IWS**: Inland Wetlands and Swamps, **CM**: Coastal Marshes, **BD**: Beaches and Dunes, **ESF**: Ecological Services on Farms, **RCRS**: Rivers, Creeks and Ravine Systems, **RA**: Reptiles and Amphibians

[2] Proposed implementation measures for NACP annual progress report. More detailed measures for some actions will be developed as part of action

2. Stewardship - Land/ Water Management 2.1 Site/Area Management *2.1.3 Complete Baseline Documentation Reports at the time of registration for properties secured under conservation easement following NCC's approved Stewardship Performance Standards. Monitor all easement properties annually starting in 2009.*	NECESSARY 7	ALL	ALL	MOS-I: A Baseline Documentation Report (BDR) signed by NCC and the landowner, is in place at the time of registration for any easement properties. Easement monitored annually and completed reports on file in the regional office. MOS-E: Easement restrictions are complied by and conservation targets maintained or enhanced.	ERCA and NCC
2. Stewardship – Land/Water Management 2.1 Site/Area Management *2.1.4 Restore fire regime to Ojibway Prairie sites via prescribed burns at regular intervals by 2012.*	NECESSARY 1, 3, 4	PS	7.1.1, 8.1.2, 8.1.1, 7.3.2	MOS-I: At least 50 acres of Ojibway Prairie are burned by 2012. MOS-E: Presence of target prairie species increased in net percent cover within 2 years of burn.	City of Windsor
2. Stewardship – Land/Water Management 2.1 Site/Area Management *2.1.5 Communicate with partners to keep informed about the latest research and fieldwork regarding prairie management including burn regimes in 2010.*	BENEFICIAL 7, 8	PS	7.1.1, 8.1.2, 8.1.1, 7.3.2	MOS-I: The latest techniques for prairie management are included where relevant in PMPs for acquired lands by 2012. MOS-E: PMP actions result in maintenance of prairie communities.	ERCA, City of Windsor, ECSN
2. Stewardship – Land/Water Management 2.2 Invasive/Problematic Species Control *2.2.1 Keep informed on current research to control Common Reed in key prairie, beach and wetland sites beginning in 2009, annually. Establish a pilot control site and prepare a regional-scale control program if/when proven viable.*	NECESSARY 4, 7	PS, BS, IWS, CM	8.1.1	MOS-I: Communicate regularly with Common Reed/Phragmites Working Group, evaluate options and test in a pilot site. Develop control plan if viable by 2014. MOS-E: Regional-scale solutions initiated and Common Reed presence reduced by 5%. Note: Small-scale control efforts are generally ineffective due to prolific surrounding seed sources.	NCC, ERCA, MNR
2. Stewardship – Land/Water Management 2.2 Invasive/Problematic Species Control *2.2.2 Participate in Emerald Ash Borer response program, monitor forest lands and replant alternative species of tree seedling in areas of high ash die off starting in 2010.*	BENEFICIAL 4, 8	UDF, IWS, RCRS	8.1.2	MOS-I: Maintain contact with response program and plant tree seedlings as appropriate starting in 2010. MOS-E: Forest regeneration enhanced through tree planting.	ERCA

2. Stewardship – Land/Water Management 2.2 Invasive/Problematic Species Control *2.2.3 Research raccoon abundance and compare with other sites to determine acceptable levels and support management mechanisms as deemed necessary to protect biodiversity targets from further predation and damage by 2014.*	NECESSARY 3, 7	RA	8.2.1	MOS-I: Collate information on raccoon populations and initiate or support management and control mechanisms as necessary by 2014. MOE-E: Landowners and hunters informed of raccoon population status and encouraged to support management.	Graduate student from University of Windsor or University of Western Ontario
2. Stewardship – Land/Water Management 2.2 Invasive/Problematic Species Control *2.2.4 Educate community conservation groups about impact of Garlic Mustard and advise about use of Roundup in a control program that targets rosettes in winter to minimize ecological impact of pesticide by 2010.*	BENEFICIAL 4, 6, 8	UDF, RCRS, IWS	8.1.2	MOS-I: Distribute information about Garlic Mustard control to at least 3 active groups in priority areas (i.e., "friends of" groups) via direct contact and brochure/factsheets. MOS-E: At least one group initiates an annual Garlic Mustard control program by 2011.	ERCA, conservation groups
2. Stewardship – Land/Water Management 2.3 Habitat & Natural Process Restoration *2.3.1 Restore 120 ha (300 acres) of native habitat on secured lands using tested and successful techniques such as pit and mound, vernal pool restoration and mixed prairie and tree seeding by 2014. Total restoration in the NA likely to be much higher (400 ha) due to existing restoration efforts by ERCA and Essex County Stewardship Network (MNR).*	NECESSARY 1, 5, 3	ALL	8.1.1, 7.2.1, 1.1.1, 8.1.2, 6.1.1, 4.1.1, 8.1.3, 2.1.1, 9.3.1, 9.1.1, 7.3.1, 5.3.1, 7.2.2, 7.1.1, 7.3.2, 6.1.2, 1.2.1	MOS-I: 120 ha (300 acres) restored to native habitat by 2014. MOS-E: Survival rate of native seedlings planted on restored lands is at least 75% after 2 years. At least 60% of stock planted is from ecological Seed Zone 38.	ERCA, MNR
3. Stewardship – Species Management 3.1 Species Management *3.1.1 Work with herptile recovery group to identify location of core reptile habitat; mapping will be used to determine where to buffer, link and protect reptile habitat and quantify total amount by 2011.*	NECESSARY 1, 2, 3, 8	RA	1.1.1, 8.1.1, 8.2.1, 4.1.2, 2.1.1, 9.3.1, 8.1.4, 5.1.1	MOS-I: Mapping completed with input from local reptile experts by 2011. MOE-E: Property is secured in at least one core reptile habitat by 2013.	ECSN, Herptile Recovery Team
3. Stewardship - Species Management 3.1 Species Management *3.1.2 Work with partners in the hunting community to facilitate hunting as appropriate on ERCA and NCC lands beginning in 2009.*	NECESSARY 6, 8	RA, UDF, RCRS, IWS	8.2.1	MOS-I: Turkey and deer hunting is encouraged on secured lands as identified in PMPs. MOS-E: Successful hunting on properties is reported by hunters by 2010.	NCC and ERCA

3. Stewardship – Species Management 3.1 1 Species Management *3.1.3 Enhance populations of Round-leaved Greenbrier by collecting and propagating local seeds to restore mixed-gender dynamic to existing populations; assess all existing sites and implement restoration within two key sites by 2012.*	NECESSARY 3	UDF	1.1.1, 8.1.2, 6.1.1, 4.1.1, 2.1.1, 9.5.1	MOS-I: Seed collected, propagated and planted into existing populations in two sites by 2012. MOS-E: Survival rate of reintroduced plants is 70% and includes both genders.	University of Windsor graduate student
3. Stewardship – Species Management 3.1 Species Management *3.1.4 Enhance populations of Kentucky Coffee-tree by including this species in restoration plantings where appropriate. Collect and propagate local seeds to restore mixed-gender dynamic to existing populations; assess all existing sites and implement restoration strategy at four key sites by 2013.*	NECESSARY 3	UDF, IWS	1.1.1, 8.1.2, 4.1.1, 2.1.1, 9.5.1	MOS-I: Kentucky Coffee-tree planted in at least 4 new sites by 2013. MOS-E: Survival rate of reintroduced trees is 70% and includes both genders.	ERCA, ECSN
4. Communications, Education and Awareness 4.1 Formal Education *4.1.1 Offer an education program based on hands-on activities related to ecology for local school children to encourage stewardship in younger age groups by 2010.*	BENEFICIAL 6	ALL	ALL	MOS-I: Program offering schoolyard restoration and field trips is available and utilized by at least 10 schools each year by 2010. MOS-E: Students participate in hands-on learning and restoration.	ERCA
4. Communications, Education and Awareness 4.3 Awareness & Communications *4.3.1 Facilitate a coordinated multi-partner landowner contact program which targets and educates landowners on the Endangered Species Act by 2011.*	NECESSARY 3, 6	ALL	7.2.1, 1.1.1, 6.1.1, 4.1.1, 4.1.2, 2.1.1, 9.3.1, 7.3.1, 9.1.1, 5.3.1, 7.2.2, 8.1.4, 5.1.1, 7.3.2, 6.1.2	MOS-I: Landowner contacts are coordinated with other groups and materials are received by 50 group members and landowners by 2011. MOS-E: Landowners are more aware of implications of the Act by receiving information materials.	ERCA and MNR
4. Communications, Education and Awareness 4.3 Awareness & Communications *4.3.2 Create 5 year funded communication program modeled after similar Georgian Bay or Kawartha programs to promote support/awareness of vulnerable reptile species in NA by 2013.*	BENEFICIAL 3, 6	RA	4.1.2, 6.1.1, 8.1.4, 6.1.2, 5.1.1, 9.3.1, 9.1.1, 7.2.2	MOS-I: Reptile awareness road signs are posted in 4 locations and educational materials are distributed to at least 30 landowners throughout key reptile habitat sites in NA by 2013. MOS-E: Signs are maintained and local awareness is increased.	Point Pelee National Park, ERCA

4. Communications, Education and Awareness 4.3 Awareness & Communications *4.3.3 Meet with local ATV groups by 2010 to increase awareness about potential impact of activity, and work with groups to come up with a strategy that directs use away from sensitive natural areas.*	NECESSARY 3, 4, 6	UDF, PS, IWS, BS, ESF, RCRS	6.1.1, 8.1.2	MOS-I: Meeting with partners held and strategy developed to reduce ATV impact by 2011. MOS-E: Open communication is maintained with local ATV groups and ATV impacts are reduced by closing and/or rerouting existing trails.	ERCA, NCC, other partners
5. Government Relations, Law and Policy 5.2 Policies & Regulation *5.2.1 Provide input into Essex County Official Plan when applicable throughout 2009-2014 and ensure that appropriate natural heritage policies exist for natural habitat over 2 ha (5 ac) in size by 2011.*	NECESSARY 1, 3, 4, 6, 8	ALL	ALL	MOS-I: Review and provide input to Official Plan regarding designation and mapping of natural heritage features and restoration opportunities by 2011. MOE-E: Natural heritage features are given increased protection in the next Official Plan to be completed by 2011.	ERCA
5. Government Relations, Law and Policy 5.4 Compliance & Enforcement *5.4.1 Increase surveillance, monitoring and enforcement of violations regarding policies related to recreation and animal and plant gathering in the NA. Suggest to Ontario Finance Minister that fines from violations be directed into natural area restoration by 2012.*	NECESSARY 3, 6, 7, 8	ALL	6.1.1, 6.1.2, 5.1.1	MOS-I: Prepare and present a proposal to the provincial government describing the enforcement problem and solution by 2011. MOS-E: Provincial government receives information and responds by 2012.	ERCA, MNR
6. Stewardship – Livelihood, Economic and Other Incentives 6.3 Market Forces *6.3.1 Research and promote positive incentive approaches for farmers to conserve biodiversity on their land such as Alternative Land Use Services-type initiatives, Ecosystem Goods and Services cost-benefit analyses and Environmental Farm Plan cost-sharing by 2012.*	NECESSARY 1, 3, 4, 5, 6, 7, 8	UDF, PS, IWS, ESF, RCRS, RA	7.2.1, 6.1.1, 4.1.2, 2.1.1, 9.3.1, 9.1.1, 5.3.1, 7.2.2, 7.3.2	MOS-I: Participate in information sessions regarding conservation incentive programs and promote to farmers via at least 3 farm organizations such as the Essex County Federation of Agriculture, ESCIA Essex Conservation Club and Christian Farm Groups by 2012. MOS-E: Farm organizations receive this information and internally recruit at least 5 members to participate.	NCC, ERCA, ECSN

7. Philanthropy, Marketing and Capacity Building 7.2 Alliance & Partnership Development *7.2.1 Seek partnership with Drainage Superintendents who are responsible for mapping Species at Risk and ordering clean-ups of municipal drains; align objectives to maximize success in meeting mutual goals and implement protective measures by 2012.*	BENEFICIAL 3, 6, 8	IWS, BS, CM, RCRS, RA	7.2.1, 9.3.1, 9.1.1	MOS-I: Upper level discussions occur between Drainage Superintendents, ERCA and MNR and a process to protect SAR affected by drain maintenance activities is identified by 2010. MOS-E: Drain maintenance activities are altered in at least 2 drains to reduce potential impact on SAR by 2012.	ERCA,MNR, Drainage Superintendents, NCC
7. Philanthropy, Marketing and Capacity Building 7.2 Alliance & Partnership Development *7.2.2 Support and complement ongoing efforts to address the ecological integrity of Point Pelee National Park and Hillman Marsh and the associated public process currently underway starting in 2009.*	NECESSARY 1, 3, 4, 6, 8	UDF, PS, IWS, CM, BS, RCRS, RA	ALL	MOS-I: Maintain regular contact with partners involved in assessing options for lands between Point Pelee and Hillman Marsh. Keep informed and support partners as appropriate starting in 2009. MOS-E: Positive and supportive relationships are maintained throughout plan.	ERCA, NCC
7. Philanthropy, Marketing and Capacity Building 7.3 Conservation Finance *7.3.1 Raise required funds to implement all actions within the CAP by 2014.*	URGENT ALL	ALL	ALL	MOS-I/E: Required funds raised by 2014.	NCC, ERCA

A budget for the implementation of securement-related actions has been prepared by NCC and ERCA. A more detailed budget regarding the implementation of stewardship and other related actions is to be developed by respective organizations.

4. MAPS

Please see maps, provided as attached files.

Figure	Figure Title
Figure 1	Natural Area Location
Figure 2.1	Conservation Context
Figure 2.2	Conservation Context: Conservation Blueprint Portfolio
Figure 3.1	Biodiversity Targets: Upland Deciduous Forests - Blueprint Scores
Figure 3.2	Biodiversity Targets: Upland Deciduous Forests – Interior Habitat
Figure 3.3	Biodiversity Targets: Prairies and Savannahs
Figure 3.4	Biodiversity Targets: Inland Wetlands and Swamps & Coastal Marshes
Figure 3.5	Biodiversity Targets: Beaches and Shorelines
Figure 3.6	Biodiversity Targets: Riparian, River and Creek Systems
Figure 3.7	Biodiversity Targets: Reptiles and Amphibians
Figure 4	Threats: Infrastructure
Figure 5	Confidential analysis of priority land parcels for securement – not included
Figure 6	Assessment of Ecosystem Goods and Services

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6. APPENDICES

Appendix A
Glossary of Ontario Biodiversity and Conservation Terms

Area of Natural and Scientific Interest (ANSI): means areas of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education (Provincial Policy Statement 2005)

Biodiversity: Biological diversity - or biodiversity - is the term given to the variety of life on Earth and the natural patterns it forms. The biodiversity we see today is the fruit of billions of years of evolution, shaped by natural processes and, increasingly, by the influence of humans. It forms the web of life of which we are an integral part and upon which we so fully depend (Convention on Biological Diversity).

Biodiversity Target: an element of biodiversity selected as a focus for conservation assessment, planning or action. Biodiversity targets most commonly include species, vegetation communities and ecological systems.

Committee on the Status of Endangered Wildlife in Canada (COEWIC): is a national committee of experts that assesses and designates which wild species are in danger of disappearing from Canada. COSEWIC assigns the following status to species:

Extinct (EXT)	A species that no longer exists
Extirpated (EXP)	A species no longer existing in the wild in Canada, but occurring elsewhere in the wild
Endangered (END)	A species facing imminent extirpation or extinction throughout its range
Threatened (THR)	A species likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction
Special Concern (SC)	A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events, but does not include an extirpated, endangered or threatened species
Not At Risk (NAR)	A species that has been evaluated and found to be not at risk
Data Deficient (DD)	A species for which there is insufficient information to support a status designation

Committee on the Status of Species at Risk in Ontario (COSSARO): a provincial group of experts whose mandate is to evaluate and recommend a provincial status to candidate species and re-evaluate current species at risk for the Ontario Ministry of Natural Resources. COSSARO employs a uniform, scientifically-based, defensible approach to status evaluations. The committee evaluates species by considering factors such as population size, trends and distribution, habitat trends and known threats. Based on its evaluation, COSSARO recommends the appropriate provincial status category for each candidate species.

Conservation Lands: Lands that are managed or regulated for long-term conservation. The conservation lands identified in the Great Lakes Conservation Blueprint included regulated protected areas (e.g. Provincial Parks), policy areas (e.g. Provincially Significant Wetlands) and lands owned by conservation organizations.

Declining Species: exhibit significant, long-term declines in habitat and/or abundance, are subject to a high degree of threat, or may have unique habitat or behavioural requirements that expose them to a great risk.

Disjunct Species: have populations that are geographically isolated from each other by at least one ecoregion.

Ecodistrict: a subdivision of an ecoregion characterized by distinctive assemblages of relief, geology, landforms and soils, vegetation, water, fauna, and land use.

Ecological Functions: the natural processes, products or services that living and non-living environments provide or perform within or between species, ecosystems and landscapes. These may include biological, physical and socio-economic interactions.

Ecological System: dynamic spatial assemblages of ecological communities characterized by both biotic and
abiotic components that 1) occur together on the landscape; 2) are tied together by similar ecological processes (*e.g.,* fire, hydrology), underlying environmental features (*e.g.,* soils, geology) or environmental gradients (*e.g.,* elevation, hydrologically-related zones); and 3) form a robust, cohesive and distinguishable unit on the ground.

Element Occurrence (EO): an area of land and/or water in which a species or natural community is, or was,
present. An EO should have practical conservation value for the element (species or vegetation community) as evidenced by potential continued (or historical) presence and/or regular recurrence at a given location. For species, the EO often corresponds with the local population, but when appropriate may be a portion of a population (*e.g.,* long-distance dispersers) or a group of nearby populations (*e.g.,* metapopulation). For vegetation communities, the EO may represent a stand or patch of a natural community or a cluster of stands or patches of a natural community. The Natural Heritage Information Centre is the central repository for Element Occurrence records.

Endemic: a species or ecological system that is restricted to a region, such as the Great Lakes ecoregion. Many endemic species and systems are generally considered more vulnerable to extinction due to their dependence on a single area for their survival.

Focal Species: have spatial, compositional, and functional requirements that may encompass those of other species in the region and may help address the functionality of ecological systems. Examples include keystone species, wide-ranging species, and cave-dwelling species.

Global Rank (GRANK): the overall status of a species or ecological community is regarded as its "global" status; this range-wide assessment of condition is referred to as its global conservation status rank. Global conservation status assessments are generally carried out by NatureServe scientists with input from relevant natural heritage member programs (such as the NHIC in Ontario) and experts on particular taxonomic groups, and are based on a combination of quantitative and qualitative information. The factors considered in assessing conservation status include the total number and condition of occurrences; population size; range extent and area of occupancy; short- and long-term trends in these previous factors; scope, severity, and immediacy of threats, number of protected and managed occurrences, intrinsic vulnerability and environmental specificity.

Rank	Definition
GX	**Presumed Extinct** (species): Not located despite intensive searches and virtually no likelihood of rediscovery. **Eliminated** (ecological communities): Eliminated throughout its range, with no restoration potential due to extinction of dominant or characteristic species.
GH	**Possibly Extinct** (species): Missing; known from only historical occurrences but still some hope of rediscovery. **Presumed Eliminated**: Historic, ecological communities)-Presumed eliminated throughout its range, with no or virtually no likelihood that it will be rediscovered, but with the potential for restoration, for example, American Chestnut Forest.
G1	**Critically Imperilled**: At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
G2	**Imperilled**: At high risk of extinction due to very restricted range, very few populations (often 20 or

	fewer), steep declines, or other factors.
G3	**Vulnerable**: At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
G4	**Apparently Secure**: Uncommon but not rare; some cause for long-term concern due to declines or other factors.
G5	**Secure**: Common; widespread and abundant.

Variant Ranks

Rank	Definition
G#G#	**Range Rank**—A numeric range rank (e.g., G2G3) is used to indicate the range of uncertainty in the status of a species or community. A G2G3 rank would indicate that there is a roughly equal chance of G2 or G3 and other ranks are much less likely. Ranges cannot skip more than one rank (e.g., GU should be used rather than G1G4).
GU	**Unrankable**—-Currently unrankable due to lack of information or due to substantially conflicting information about status or trends. Whenever possible, the most likely rank is assigned and a question mark qualifier may be added (e.g., G2?) to express minor uncertainty, or a range rank (e.g., G2G3) may be used to delineate the limits (range) of uncertainty.
GNR	**Unranked**—Global rank not yet assessed.
GNA	**Not Applicable**—A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

Rank Qualifiers

Rank	Definition
?	**Inexact Numeric Rank**—Denotes some uncertainty about the numeric rank (e.g. G3? - Believed most likely a G3, but some chance of either G2 or G4).
Q	**Questionable taxonomy**—Taxonomic distinctiveness of this entity at the current level is questionable; resolution of this uncertainty may result in change from a species to a subspecies or hybrid, or the inclusion of this taxon in another taxon, with the resulting taxon having a lower-priority conservation priority.
C	**Captive or Cultivated Only**—At present extant only in captivity or cultivation, or as a reintroduced population not yet established.

Infraspecific Taxon Conservation Status Ranks

Infraspecific taxa refer to subspecies, varieties and other designations below the level of the species. Infraspecific taxon status ranks (T-ranks) apply to plants and animal species only; these T-ranks do not apply to ecological communities.

Rank	Definition
T#	**Infraspecific Taxon** (trinomial)—The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank. Rules for assigning T-ranks follow the same principles outlined above for global conservation status ranks. For example, the global rank of a critically imperilled subspecies of an otherwise widespread and common species would be G5T1. A T-rank cannot imply the subspecies or variety is more abundant than the species as a whole-for example, a G1T2 cannot occur. A vertebrate animal population, such as those listed as distinct population segments under the U.S. Endangered Species Act, may be considered an infraspecific taxon and assigned a T-rank; in such cases a Q is used after the T-rank to denote the taxon's informal taxonomic status. At this time, the T rank is not used for ecological communities.

Limited Species: are nearly restricted to the Great Lakes ecoregion. These are species that are not "true" endemics because there may be populations outside the ecoregion. However, the core part of the species range is in the Great Lakes ecoregion.

Natural heritage system: means a system made up of natural heritage features and areas, linked by natural corridors which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species and ecosystems. These systems can include lands that have been restored and areas with the potential to be restored to a natural state (Provincial Policy Statement).

Peripheral: species or ecological systems that are located closer to the outer boundaries of an ecoregion than
to the centre and are not widespread throughout the ecoregion (*e.g.*, where the Great Lakes ecoregion is the extreme edge of the species' range).

Protected Areas: natural area designation that is regulated under legislation such as the National Parks Act,
Provincial Parks Act or the Public Lands Act. Protected areas identified in the Great Lakes Conservation Blueprint include National Parks, National Wildlife Areas, Migratory Bird Sanctuaries, Provincial Parks and Conservation Reserves.

Provincially Significant: in regard to wetlands, coastal wetlands and areas of natural and scientific interest, an area identified as provincially significant by the Ontario Ministry of Natural Resources using evaluation procedures established by the Province, as amended from time to time (Provincial Policy Statement).

Species at Risk (SAR): species designated as Endangered, Threatened or Special Concern by either the Ontario Ministry of Natural Resources (OMNR) or the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

Secondary Target: an element of biodiversity (species or vegetation community) that is of some conservation concern in the Ontario portion of the Great Lakes. Occurrences of secondary biodiversity targets were included in the Conservation Blueprint portfolio where their occurrence coincided with a primary target occurrence, a protected area or conservation land.

Sub-national (Provincial) Rank: provincial ranks are used by the Ontario Natural Heritage Information Centre to set conservation priorities for rare species and vegetation communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario. Comparison of global and provincial ranks, gives an indication of the status and rarity of an element in Ontario in relation to its overall conservation status, therefore providing insight into the urgency of conservation action for it in the province. The NHIC evaluates provincial ranks on a continuous basis and produces updated lists annually.

Subnational (S) and National (N) Conservation Status Ranks

Status	Definition
NX **SX**	**Presumed Extirpated**—Species or community is believed to be extirpated from the nation or state/province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
NH **SH**	**Possibly Extirpated** (Historical)—Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become NH or SH without such a 20-40 year delay if the only known occurrences in a nation or state/province were destroyed or if it had been extensively and unsuccessfully looked for. The NH or SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences.
N1 **S1**	**Critically Imperilled**—Critically imperilled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
N2 **S2**	**Imperilled**—Imperilled in the nation or state/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.
N3 **S3**	**Vulnerable**—Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other

	factors making it vulnerable to extirpation.
N4 **S4**	**Apparently Secure**—Uncommon but not rare; some cause for long-term concern due to declines or other factors.
N5 **S5**	**Secure**—Common, widespread, and abundant in the nation or state/province.
NNR **SNR**	**Unranked**—Nation or state/province conservation status not yet assessed.
NU **SU**	**Unrankable**—Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
NNA **SNA**	**Not Applicable** —A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
N#N# **S#S#**	**Range Rank** —A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
Not Provided	Species is known to occur in this nation or state/province. Contact the relevant natural heritage program for assigned conservation status.

Threats Assessment: The threat ranking method assigns Severity, Scope, and Irreversibility directly to the sources of stress. The following two matrices show how Severity and Scope are combined to create a Threat Magnitude rank, which is then combined with the Irreversibility Rank to deliver an Overall Threat Rank.

		Scope			
		4-Very High	3-High	2-Medium	1-Low
Severity	4-Very High	4-Very High	3-High	2-Medium	1-Low
	3-High	3-High	3-High	2-Medium	1-Low
	2-Medium	2-Medium	2-Medium	2-Medium	1-Low
	1-Low	1-Low	1-Low	1-Low	1-Low

The **Overall Threat Rank** is calculated by integrating **Threat Magnitude** and a third rating variable (in this case **Reversibility**):

		Irreversibility			
		4-Very High	3-High	2-Medium	1-Low
Magnitude	4-Very High	4-Very High	4-Very High	4-Very High	3-High
	3-High	4-Very High	3-High	3-High	2-Medium
	2-Medium	3-High	2-Medium	2-Medium	1-Low
	1-Low	2-Medium	1-Low	1-Low	1-Low

Viability: the status or health of a species population or vegetation community occurrence. Viability indicates the ability of the biodiversity target to withstand or recover from natural and anthropogenic disturbances and probability of persistence of long periods of time. The viability rank provides a measure on the quality of occurrence which can be useful in determining probability of conservation success (i.e. will the target likely persist) and restoration/ management needs. The more viable a species or community is, the higher its EO rank and the higher its conservation value (see Table). Viability ranks are based solely on factors that reflect present quality. There are three viability rank factors, each reflecting what is currently known about a species or community:
Size + Condition + Landscape Context = Viability

Rank	Definition
A	Excellent estimated viability
B	Good estimated viability
C	Fair estimated viability
D	Poor estimated viability
E	Verified Extant (viability not assessed)
H	Historical
F	Failed to find
X	Extirpated

Wetlands: means lands that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the surface. In either case the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic plants or water tolerant plants. The four major types of wetlands are swamps, marshes, bogs and fens.

Wide-ranging Species: are highly mobile species that require large tracts of habitat for their survival. These
include top-level predators, migratory mammals, birds and insects. The design of fully functioning networks of conservation sites needs to take into account the habitat requirements of such species, including factors such as linkages, natural corridors, interior habitats and roadless areas.

Widespread: species or ecological systems occurring naturally throughout the Great Lakes ecoregion and considerably beyond the ecoregion.

Appendix B: Natural Heritage Designations in the Essex Forests and Wetlands Natural Area

Natural Area Name	Natural Heritage Designation	Size (ha)
Conservation Authority Properties (75 total)	CA Properties[1]	471.9
Big Creek Marsh	CCS[2]	1391.77
Canard River Kentucky Coffee-Tree Woods	CCS	99.2
Cedar Creek	CCS	818.82
Ojibway Prairie Remnants	CCS	250
Oxley Poison Sumac Marsh	CCS	48.13
Miner Crown Game Preserve	CGP[3]	880.4
Allied Chemical Quarry	ES-ANSI[4]	8
Brunner Mond Quarry	ES-ANSI	1
Harrow Site Esker	ES-ANSI	9.4
Holiday Beach/Big Creek CA	IBA[5]	1,426.1
Lower Detroit River	IBA	7,386.30
Point Pelee	IBA	7,071.90
Barretville Clay Plain	IBP[6]	44.5
Cedar Creek Clay Slope and Floodplain	IBP	8.5
Colchester Sand Plains	IBP	34.4
Malden Centre Marsh	IBP	273.2
Marshfield Clay Plain	IBP	56.7
The Windsor Prairie Nature Reserve	IBP	80.9
Cameron Scott's Woods	IBP	35.6
Hillman Sand Hills	IBP	9.3
Leamington Sand Hills	IBP	14.2
Wheatley Sand Hills	IBP	26.3
Arner Spleenwood Woods	LS-ANSI[7]	10
Barretville Clay Plain Forest	LS-ANSI	80
Big Creek Marsh	LS-ANSI	710.1
Canard River Kentucky Coffee-Tree Woods	LS-ANSI	99.2
Canard River Mouth Marsh	LS-ANSI	952
Canard River Scout Camp	LS-ANSI	35
Cedar Creek	LS-ANSI	560.9
Colchester Sand Plain Woods	LS-ANSI	35
Marshfield Clay Plain Forest	LS-ANSI	110

[1] Conservation Authority properties (includes conservation areas)
[2] Carolinian Canada Sites
[3] Crown Game Preserve
[4] Earth Science Areas of Natural and Scientific Interest
[5] International Bird Areas
[6] International Biological Program Sites
[7] Life Science Areas of Natural and Scientific Interest

Ojibway Prairie Provincial Nature Reserve	LS-ANSI	65.71
Oxley Poison Sumac Swamp	LS-ANSI	42.9
Prairie Remnants (Blackoak Woods)	LS-ANSI	94.5
Prairie Remnants (Ojibway Park)	LS-ANSI	67.52
Prairie Remnants (Southeast of Nature Reserve)	LS-ANSI	64.25
Prairie Remnants (Springgarden Forest)	LS-ANSI	115.39
Prairie Remnants (Titcombe Road North)	LS-ANSI	51.19
Ruthven Rocky Woods	LS-ANSI	0
Cameron Scott's Woods	LS-ANSI	40.0
Leamington Sand Hills Complex	LS-ANSI	40.0
Point Pelee	LS-ANSI	1488.6
Hillman Creek Marsh and Woodlots	LS-ANSI	0.0
Kopegaron Woods	LS-ANSI	11.0
Heaton	NCC[8]	39.9
Steimer – Ojibway Prairie	NCC	2.2
Callon Corporation – Cedar Creek	NCC	70.1
Point Pelee National Park	NP[9]	1565.7
Ojibway Prairie Provincial Nature Reserve	PP-NR[10]	65.12
Big Creek Marsh - Wetland	PSW[11]	668.5
Canard River Marshes	PSW	181.4
Cedar Creek - Wetland	PSW	437.9
Detroit River Marshes	PSW	30.6
Fighting Island - Wetland	PSW	78.2
Fox Creek - Wetland	PSW	10.5
Lypps Beach Wetland Complex	PSW	14.1
Mans' Marsh	PSW	53.6
Oxley Poison Sumac Swamp	PSW	30.3
Turkey Creek - Wetland	PSW	20.6
Point Pelee - Wetland	PSW	811.5
Sturgeon Creek - Wetland	PSW	20.6
Hillman Marsh - Wetland	PSW	151.7
Muddy Creek	PSW	5.6
Point Pelee	RAMSAR[12]	1564.0

[8] Nature Conservancy of Canada properties and projects
[9] National Park
[10] Provincial Park – Nature Reserve type
[11] Provincially Significant Wetland
[12] Ramsar Wetland of International Importance

Appendix C: Additional Species of Conservation Concern in the Essex Forests and Wetlands Natural Area

Common Name *Scientific Name*	G-Rank/ S-Rank/ COSEWIC/ COSSARO	Notes
Arrow-feather Three-awn *Aristida purpurascens*	G5T5/S1	
Azure Bluet *Enallagma aspersum*	G5/S3	
Beach Dune Tiger Beetle *Cicindela hirticollis*	G5/S2?	
Bicknell's Sedge *Carex bicknellii*	G5/S2	
Biennial Gaura *Gaura biennis*	G5/S2	
Big Shellbark Hickory *Carya laciniosa*	G5/S3	
Black Gum *Nyssa sylvatica*	G5/S3	
Blue-tipped Dancer *Argia tibialis*	G5/S3	
Bristled Slitmouth *Stenotrema barbatum*	G5/S2	
Broad-banded Forestsnail *Allogona profunda*	G5/S2S3	
Burning Bush *Euonymus atropurpurea*	G5T5/S3	
Bushy Cinquefoil *Potentilla paradoxa*	G5/S3	
Carolina Mantleslug *Philomycus carolinianus*	G5/S1S2	
Citrine Forktail *Ischnura hastata*	G5/S2	
Clinton's Leafless Bulrush *Trichophorum clintonii*	G4/S2	
Cobra Clutail *Gomphus vastus*	G5/S1	
Cream Violet *Viola striata*	G5/S3	
Culver's Root *Veronicastrum virginicum*	G4/S2	
Davis' Sedge *Carex davisii*	G4/S2	
Domed Disc *Discus patulus*	G5/S2S3	

Dune Little Bluestem *Schizachyrium scoparium* ssp. *littorale*	G5T?/S2?
Eastern Few-fruited Sedge *Carex oligocarpa*	G4/S2
Eastern Pipistrelle *Pipistrellus subflavus*	G5/S3?
Eastern Yellow Star-grass *Hypoxis hirsuta*	G5/S3
Emory's Sedge *Carex emoryi*	G5/S3
Fall Witchgrass *Digitaria cognata*	G5T5/S1
False Indigo *Amorpha fruticosa*	G5/S1
Fernleaf Yellow False-foxglove *Aureolaria pedicularia*	G5/S3
Field Dodder *Cuscuta campestris*	G5/S2
Field Sedge *Carex conoidea*	G5/S3
Flaccid Sedge *Carex glaucodea*	G5/S1
Frank's Sedge *Carex frankii*	G5/S2
Giant Ironweed *Vernonia gigantea*	G5/S1?
Giant Swallowtail *Papilio cresphontes*	G5/S2
 Glyphyalinia luticola	G4/S1S2
Gray-headed Coneflower *Ratibida pinnata*	G5/S2S3
Great Plains Ladies'-tresses *Spiranthes magnicamporum*	G4/S3
Greene's Rush *Juncus greenei*	G5/S3
Grey Hairstreak *Strymon melinus*	G5/S3
Hackberry Emperor *Asterocampa celtis*	G5/S2
Hairy Bedstraw *Galium pilosum*	G5T5?/S3
Hairy Mountain-mint *Pycnanthemum verticillatum* var. *pilosum*	G5T5/S1

Hairy Pinweed *Lechea villosa*	G5/S3
Hairy Slitmouth *Stenotrema hirsutum*	G5/S1
Hayhurst's Scallopwing *Staphylus hayhurstii*	G5/S1
Hirsute Sedge *Carex hirsutella*	G5/S3
Hoary Puccoon *Lithospermum canescens*	G5/S3
Honey Locust *Gleditsia triacanthos*	G5/S2
Juniper Hairstreak *Callophrys gryneus*	G5/S2
Large Purple Agalinis *Agalinis purpurea*	G5/S1
Lilypad Forktail *Ischnura kellicotti*	G5/S1
Lizard's Tail *Saururus cernuus*	G5/S3
Longleaf Dropseed *Sporobolus asper*	G5/S1S2
Many-fruit False Loosestrife *Ludwigia polycarpa*	G4/S2
Mead's Sedge *Carex meadii*	G4G5/S2
 Mesodon pennsylvanicus	G?/S1
Missouri Ironweed *Vernonia missurica*	G4G5/S3?
Muskingum Sedge *Carex muskingumensis*	G4/S2
Narrowleaf Sedge *Carex amphibola*	G5/S2
Nebraska Sedge *Carex jamesii*	G5/S3
Nut-rush *Scleria pauciflora*	G5/S1
Ohio Spiderwort *Tradescantia ohiensis*	G5/S2
Orange-grass St. John's-wort *Hypericum gentianoides*	G5/S1
Painted Skimmer *Libellula semifasciata*	G5/S2

Pawpaw *Asimina triloba*	G5/S3
Pepper and Salt Skipper *Amblyscirtes hegon*	G5/S3?
Perfoliate Tinker's-weed *Triosteum perfoliatum*	G5/S1
Pin Oak *Quercus palustris*	G5/S3
Plains Puccoon *Lithospermum caroliniense*	G4G5T4T5/S3
Prairie Rosinweed *Silphium terebinthinaceum*	G4G5/S1
Pronghorn Clubtail *Gomphus graslinellus*	G5/S3
Pumpkin Ash *Fraxinus profunda*	G4/S2
Purple Love Grass *Eragrostis spectabilis*	G5/S2
Purple Meadow-parsnip *Thaspium trifoliatum*	G5T5/S2
Purple Milkweed *Asclepias purpurascens*	G4G5/S2
Pumpkin Ash *Fraxinus profunda*	G4/S2
Purple Love Grass *Eragrostis spectabilis*	G5/S2
Purple Meadow-parsnip *Thaspium trifoliatum*	G5T5/S2
Purple Milkweed *Asclepias purpurascens*	G4G5/S2
Red-root Flatsedge *Cyperus erythrorhizos*	G5/S3
Reflexed Sedge *Carex retroflexa*	G5/S1
River Bluet *Enallagma anna*	G5/S2
Rock-geranium *Heuchera americana*	G5/S2
Rough Bugleweed *Lycopus asper*	G5/S2
Round-fruit St. John's-wort *Hypericum sphaerocarpum*	G5/S1
Royal River Cruiser *Macromia taeniolata*	G5/S1

Rush *Juncus biflorus*	G5/S1
Rush *Juncus tenuis var. anthelatus*	G5T/S1?
Schweinitz's Flatsedge *Cyperus schweinitzii*	G5/S3
Sedge *Carex albicans* var. *albicans*	G4T4T5/S2
Sedge *Carex annectens* var. *xanthocarpa*	G5T?/S2
Sedge *Carex suberecta*	G4/S2
Seedbox *Ludwigia alternifolia*	G5/S1
Sharp-fruit Rush *Juncus acuminatus*	G5/S3
Sharp-wing Monkeyflower *Mimulus alatus*	G5/S2
Short-fruit Rush *Juncus brachycarpus*	G4G5/S1
Shrubby St. John's-wort *Hypericum prolificum*	G5/S2
Sleepy Duskywing *Erynnis brizo*	G5/S1
Slender Paspaulum *Paspalum setaceum*	G5/S2
Slender Sedge *Carex gracilescens*	G5?/S3
Slender Walker *Pomatiopsis lapidaria*	G5/S3
Small-flower Groovebur *Agrimonia parviflora*	G5/S3
Smith’s Club-rush *Schoenoplectus smithii*	G5?/S2?
Southern Flying Squirrel *Glaucomys volans*	G5/S2S3/NAR
Southern Tickseed *Bidens coronata*	G5/S2
Spring Avens *Geum vernum*	G5/S3
Squarrose Sedge *Carex squarrosa*	G4G5/S2
Stiff Cowbane *Oxypolis rigidior*	G5/S2

Stiff Goldenrod *Solidago rigida* ssp. *rigida*	G5T5/S3
Succinea ovalis	G5/S3S4
Sullivant's Milkweed *Asclepias sullivantii*	G5/S2
Swamp Darner *Epiaeschna heros*	G5/S2S3
Swan's Sedge *Carex swanii*	G5/S3
Sweet Joe-pye-weed *Eupatorium purpureum*	G5T5?/S3
Sweet Pignut Hickory *Carya glabra*	G5/S3
Tall Coreopsis *Coreopsis tripteris*	G5/S2
Tall Gay-feather *Liatris aspera*	G4G5T4T5/S2
Tawny Emperor *Asterocampa clyton*	G5/S2S3
Three-awn *Aristida longespica* var. *geniculata*	G5T5?/S2
Tick-trefoil *Desmodium canescens*	G5/S2
Toothed Globe *Mesodon zaletus*	G5/S1S2
Trumpet Creeper *Campsis radicans*	G5/S2
Tufted Titmouse *Baeolophus bicolor*	G5/S2S3
Two-flowered Cynthia *Krigia biflora*	G5/S2
Unicorn Clubtail *Arigomphus villosipes*	G5/S2S3
Upright Greebrier *Smilax ecirrhata*	G5?/S3?
Variegated Meadowhawk *Sympetrum corruptum*	G5/S3
Veined Skullcap *Scutellaria nervosa*	G5/S1
Violet Bush-clover *Lespedeza violacea*	G5/S1
Virginia Yellow Flax *Linum virginianum*	G4G5/S2

Viscid Bushy Goldenrod *Euthamia gymnospermoides*	G5/S1
Walter's Barnyard Grass *Echinochloa walteri*	G5/S3
Water Leaf *Hydrophyllum appendiculatum*	G5/S2
Wax-leaved Meadow-rue *Thalictrum revolutum*	G5/S2
Whip Nutrush *Scleria triglomerata*	G5/S1
White Blue-eyed Grass *Sisyrinchium albidum*	G5?/S1
White-eyed Vireo *Vireo griseus*	G5/S2B,SZN
White-hair Witchgrass *Panicum villosissimum*	G5/S3
Wild Bean *Strophostyles helvula*	G5/S3
Wild Indigo Duskywing *Erynnis baptisiae*	G5/S1
Wild Lupine *Lupinus perennis*	G5T4?/S3
Winged Sumac *Rhus copallina*	G5T5/S3S4
Wood-vetch *Vicia caroliniana*	G5/S2
Woodland Bluegrass *Poa sylvestris*	G5/S2
Woodland Lettuce *Lactuca floridana*	G5T5?/S2
 Xolotrema denotatum	G5/S2S3
Yellow False-foxglove *Aureolaria flava*	G5/S3
Yellow Pond-lily *Nuphar advena*	G5T5/S3?
Yellow Wild-indigo *Baptisia tinctoria*	G5/S2