Environment



Goshen Wind, Inc. **Goshen Wind Energy Centre**

Natural Heritage Assessment and Environmental Impact Study Report Third Addendum

Prepared by: AECOM
 215 – 55 Wyndham Street North
 519 763 7783 tel

 Guelph, ON, Canada N1H 7T8
 519 763 1668 fax
 www.aecom.com

Project Number: 60301207

Date: November, 2013

Goshen Wind, Inc. Goshen Wind Energy Centre Natural Heritage Assessment and Environmental Impact Study Report Third Addendum

AECOM Signatures

Olgathurad

Report Prepared By:

Report Reviewed By:

Olga Hropach, (Hon) B.Sc. Terrestrial Ecologist

Wal

Jessica M. Ward, (Hon) B.Sc., Ph.D. Ecologist

.Ellis

Julie Ellis, (Hon) B.Sc. Terrestrial Ecologist

Gary Epp, B.Sc. (Hon), M.Sc., Ph.D. Senior Terrestrial Ecologist

Table of Contents

		page
Intro	duction	1
1.1	Overview of Project Changes	
1.2	Summary of NHA Addendum	
Ame	ndments to the Records Review	3
Ame	ndments to the Site Investigation	3
3.1	Methods	
3.2	Results	
	3.2.1 Wetlands	
	3.2.2 Woodlands	
	3.2.3 Wildlife Habitat	
Ame	ndments to the Evaluation of Significance	7
4.1	Methods	7
	4.1.1 Wildlife Habitat	7
4.2	Results	7
	4.2.1 Amphibian Wetland Breeding Habitat	7
	4.2.2 Plant Species of Conservation Concern Habitat	
Ame	ndments to the Environmental Impact Study	8
5.1	Transmission Line	
	5.1.1 Preferred Transmission Line Route	
	5.1.2 Rationale for Selecting the Preferred Transmission Line Route	9
5.2	Significant Wetlands	9
5.3	Significant Woodlands	
Sum	mary and Conclusions	14
Refe	rences	
	Intro 1.1 1.2 Ame 3.1 3.2 Ame 4.1 4.2 Ame 5.1 5.2 5.3 Sum Refe	Introduction 1.1 Overview of Project Changes 1.2 Summary of NHA Addendum Amendments to the Records Review Amendments to the Site Investigation 3.1 Methods 3.2 Results 3.2.1 Wetlands 3.2.2 Woodlands 3.2.3 Wildlife Habitat Amendments to the Evaluation of Significance 4.1 Methods 4.2.1 Amphibian Wetland Breeding Habitat 4.2.2 Plant Species of Conservation Concern Habitat 4.2.2 Plant Species of Conservation Concern Habitat 5.1 Transmission Line 5.1.1 Preferred Transmission Line Route 5.1.2 Rationale for Selecting the Preferred Transmission Line Route 5.2 Significant Wetlands 5.3 Significant Woodlands Summary and Conclusions References

List of Figures

Figure 1.	Project Location	2
Figure 2.	Woodland and Wetland Features	5
Figure 3.	Significant Wildlife Habitat Features	6

List of Tables

Table 1.	Summary of Changes to NHA and EIS	. 3
Table 2.	Determination of Significance for Amphibian Wetland Breeding Habitat	. 7
Table 3.	Determination of Significance for Plant Species of Conservation Concern Habitat	. 8
Table 4.	Additional Potential Effects on Significant Wetlands and Mitigation Measures	12

Appendices

- Appendix A. MNR Confirmation and Re-confirmation Letters
- Appendix B. Goshen Wind Energy Centre Bat Monitoring Report & EIS Amendment (NRSI, 2013)
- Appendix C. Field Notes
- Appendix D. Vascular Plant Species List

Glossary of Terms

Area of Investigation	Area encompasses by 120 m setback from Project Location boundary
EIS	Environmental Impact Study
MNR	Ministry of Natural Resources
O. Reg. 359/09	Ontario Regulation 359/09
Project Location	The area encompassing all construction activities and project components
REA	Renewable Energy Approval

1. Introduction

Goshen Wind, Inc., a wholly owned subsidiary of NextEra Energy Canada, ULC (NextEra), is proposing to construct a wind energy project in Bluewater and South Huron, Huron County, Ontario. AECOM Canada Ltd. (AECOM) was retained by NextEra to prepare a Natural Heritage Assessment (NHA) and Environmental Impact Study (EIS) for the proposed Goshen Wind Energy Centre (the Project), in accordance with the requirements of the Renewable Energy Approval (REA) process and O.Reg. 359/09. The Goshen Wind Energy Centre Natural Heritage Assessment and Environmental Impact Study Report (AECOM, 2013a) was submitted to the Ontario Ministry of Natural Resources (MNR) in January 2013. AECOM later prepared two Natural Heritage Assessment and Environmental Impact Study Report Addenda (AECOM, 2013b and 2013c) in respect to modifications to the Project Location proposed after the original submission of the NHA and EIS to MNR.

MNR issued confirmation and re-confirmation letters on January 15 and 16, 2013 and October 22, 2013 stating that the Natural Heritage Assessment and Environmental Impact Study Report (AECOM, 2013a), the first Natural Heritage Assessment and Environmental Impact Study Report Addendum (AECOM, 2013b) and the Second NHA Addendum (AECOM, 2013c), respectively, met all requirements in accordance with the REA regulation for this Project (refer to **Appendix A**). The Natural Heritage Assessment and Environmental Heritage Assessment and Environmental Heritage Assessment and Environmental First and Second NHA Addenda are hereafter collectively referred to as the approved NHA and EIS.

This NHA Addendum has been prepared as a supplement to the approved NHA and EIS in accordance with the requirements of the REA process and O. Reg. 359/09, with respect to a modification to the transmission line proposed after MNR confirmation of the approved NHA and EIS.

1.1 Overview of Project Changes

Goshen Wind Inc. is proposing the following modification to the transmission line:

• Replacement of underground transmission line infrastructure with above-ground transmission line infrastructure within the same construction disturbance area on private property, in the vicinity of the Ausable River crossing, to optimize project design/constructability.

There is no change to the extent of the Project Location and its associated 120 m Area of Investigation as a result of the proposed modification (**Figure 1**).

The proposed modification is within 120 m of Natural Area 609. Features (*i.e.*, woodlands, wetlands, significant wildlife habitat and/or Areas of Natural and Scientific Interest) within 120 m of this modification include the following:

- Significant Wetland Feature WET-012 (minimum distance reduced to 0 m; transmission line above Feature);
- Significant Woodland Features WOD-104 and WOD-109 (minimum distance reduced to 0 m; transmission line above Features);
- Significant Valleyland Feature VAL-02 (no change to minimum distance; 0 m); and
- Generalized Candidate Significant Wildlife Habitat: Plant Species of Conservation Concern, Seeps and Springs, Bat Maternity Colony and Amphibian Wetland Breeding Habitat (minimum distance reduced to 0 m; transmission line above Feature); Reptile Hibernaculum (no change to minimum distance; 14 m).



Path: F:\GIS \Nextera\GIS Spatia\MX Ds\ReportMXDs\NHA_Mapping\Gosher\NHA_A mendment_20130814\60155032_GSH_ProjectLocation_3Addendum_09132013.mxd



According to a recent amendment to O. Reg. 359/09, Significant Valleylands are no longer included as a natural feature requiring a Natural Heritage Assessment or Environmental Impact Study; therefore, Significant Valleyland Feature VAL-02 is not considered further in this NHA Addendum.

1.2 Summary of NHA Addendum

Changes required to the approved NHA and EIS in order to address the proposed modification are summarized in **Table 1** below. The relevant sections of this NHA Addendum pertaining to these changes are also provided in the table below.

Approved NHA and EIS Section		Change	Refer to Addendum Section(s)
2.	Records Review	Methods: No changes.	Section 2
		Results: No changes.	
3.	Site Investigation	Methods: Site investigations were conducted in Natural Area 609 to confirm the presence of candidate Bat Maternity Colony Features. In addition, where minimum distances from the transmission line to Significant Wildlife Habitat Features changed as a result of the proposed modification, the Features were re-examined to determine whether the modifications resulted in changes to the designation of candidate Significant Wildlife Habitat and Generalized Candidate Significant Wildlife Habitat.	Section 3.1
		 Results: The following Features were carried forward to the Evaluation of Significance as a result of the proposed modification: Candidate Significant Amphibian Wetland Breeding Habitat Feature AWE-30; and Candidate Significant Plant Species of Conservation Concern Habitat Features SCP-18, SCP-19, SCP-20, SCP-21 and SCP-22. 	Section 3.2
4.	Evaluation of Significance	Methods: Evaluation of Significance studies were completed for candidate Significant Amphibian Wetland Breeding Habitat Feature AWE-30, and candidate Significant Plant Species of Conservation Concern Habitat Features SCP-18, SCP-19, SCP-20, SCP-21 and SCP-22, following the methods described in the approved NHA and EIS.	Section 4.1
		Results: None of the evaluated Features were confirmed to be significant; therefore, no new Features were carried forward to the EIS as a result of the proposed modification.	Section 4.2
5.	EIS	 Changes to the potential effects, mitigation measures and monitoring commitments are required (and described herein) for the following Features: Significant Wetland Feature WET-012; and Significant Woodland Features WOD-104 and WOD-109. 	Section 5

Table 1. Summary of Changes to NHA and EIS

2. Amendments to the Records Review

There is no change to the extent of the Project Location and its associated 120 m Area of Investigation as a result of the proposed modification (**Figure 1**). Consequently, no changes to the Records Review are required as a result of the proposed modification.

3. Amendments to the Site Investigation

3.1 Methods

Site investigations were conducted in Natural Area 609 to confirm the presence of candidate Bat Maternity Colony Features. The methods used to conduct these surveys are described in detail in **Appendix B**.

Where the minimum distance from the transmission line to Significant Wildlife Habitat Features changed as a result of the proposed Project Location modification, these Features were re-examined to determine whether the modification resulted in changes to the designation of candidate Significant Wildlife Habitat and Generalized Candidate Significant Wildlife Habitat as per Appendix D of the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2012).

3.2 Results

3.2.1 Wetlands

As result of the proposed modification, the minimum distance from the transmission line to wetland Feature WET-012 decreased from >0.1 m to 0 m, as the above-ground transmission line is now above this Feature (refer to **Figure 2** for location). The attributes, composition and functions of wetland Feature WET-012 remain the same as described in the approved NHA and EIS and are therefore not repeated here.

As described in the approved NHA and EIS, two Provincially Significant Wetlands, Hay Swamp and McDonald Marsh Wetland, form a portion of WET-012 (although the mapped boundaries of these evaluated wetlands do not extend into the Project Location). Therefore, this Feature did not require re-evaluation as a result of the proposed modification, but was carried forward to the EIS of this NHA Addendum to ensure that any potential effects of the modified transmission line are addressed through appropriate mitigation measures.

3.2.2 Woodlands

As a result of the proposed modification, the minimum distances from the transmission line to woodland Features WOD-104 and WOD-109 decreased from >0.1 m to 0 m, as the above-ground transmission line is now above these Features (refer to **Figure 2** for locations). The attributes, composition and functions of woodland Features WOD-104 and WOD-109 remain the same as described in the approved NHA and EIS and are therefore not repeated here. These Features did not require re-evaluation as a result of the proposed modification but were carried forward to the EIS of this NHA Addendum to ensure that any potential effects of the modified transmission line are addressed through appropriate mitigation measures.

3.2.3 Wildlife Habitat

The following Generalized Candidate Significant Wildlife Habitats previously identified in Natural Area 609 in the approved NHA and EIS changed to candidate Significant Wildlife Habitat because the minimum distance from the transmission line to these Features decreased from >0.1 m to 0 m, as the above-ground transmission line is now above these Features (refer to **Figure 3** for locations):

- Generalized Candidate Significant Amphibian Wetland Breeding Habitat was changed to candidate Significant Amphibian Wetland Breeding Habitat Feature AWE-30; and
- Generalized Candidate Significant Plant Species of Conservation Concern Habitat Features were changed to candidate Significant Plant Species of Conservation Concern Habitat Features SCP-18, SCP-19, SCP-20, SCP-21 and SCP-22.

These Features were carried forward to the Evaluation of Significance of this NHA Addendum to ensure that any potential effects of the modified transmission line are addressed through the application of appropriate mitigation measures, if required.



Path: F:\GIS Wextera \GIS Spatia/MXDs\ReportMXDs\NHA_Mapping\Goshen\NHA_Amendment_20130814\60155032_GSH_ProjectLocation_3Add_Fig2_09132013 mxd



Path: 1:GISIN exteral GIS Spatial IM XDsIReportM XDsIN HA_MappinglGosh en IN HA_Amendment_2013 0814 \601 5503 2_GSH_ProjectLocation_3 Add_Fig4_091 3201 3.mxd

A Generalized Candidate Seep and Spring Habitat Feature was previously identified in Natural Area 609 due to the presence of watercress, a seep indicator species. Upon review of the site investigation field notes for Natural Area 609 (provided in Appendix B of the approved NHA and EIS) as well as the vascular plant surveys conducted in support of this NHA Addendum (refer to **Appendix C**), there is no record of watercress at this location, nor were any other indicators of seeps or springs observed. Consequently, the Generalized Candidate Seep and Spring Habitat Feature in Natural Area 609 is not considered further in this NHA Addendum.

Generalized Candidate Bat Maternity Colony Features were previously identified in Natural Area 609, in two woodlands that are now overlapped by the transmission line. Site investigations were conducted in these woodlands to confirm the presence of candidate Bat Maternity Colony Features. The results of these surveys are described in detail in **Appendix B**. No candidate Bat Maternity Colony Features were identified through these surveys, therefore the Generalized Candidate Bat Maternity Colony Features in Natural Area 609 are not considered further in this NHA Addendum.

4. Amendments to the Evaluation of Significance

4.1 Methods

4.1.1 Wildlife Habitat

Evaluation of significance studies were conducted for the following candidate Significant Wildlife Habitat Features using the methods described for this Significant Wildlife Habitat type in the approved NHA and EIS:

- Candidate Significant Amphibian Wetland Breeding Habitat Feature AWE-30; and
- Candidate Significant Plant Species of Conservation Concern Habitat Features SCP-18, SCP-19, SCP-20, SCP-21 and SCP-22.

4.2 Results

4.2.1 Amphibian Wetland Breeding Habitat

The results of Evaluation of Significance surveys completed for candidate Significant Amphibian Wetland Breeding Habitat Feature AWE-30 are summarized in **Table 2**. Field notes are provided in **Appendix C**. The qualifications of the field personnel were previously provided in Appendix C of the approved NHA and EIS.

Feature Habitat			Surveys T	argeting Vocalizing	g Amphibians	Amphibians Surveys Target vocalizing A		Determination of
	Assessment		Round 1	Round 2	Round 3	Egg Mass Survey	Larval Survey	Significance
AWE-30	Pond with depth	Date, Time	April 17, 2013	May 15, 2013	June 19, 2013	April 17, 2013	May 15, 2013	No – not
	greater than 1 m and	and Weather	•	22:57 – 23:00	23:18 – 23:21		10:10 – 10:40	Significant
	potential to hold	Conditions	Survey was	Wind (Beaufort	Wind (Beaufort	Survey was	Wind (Beaufort	Wildlife Habitat.
	water until July;		attempted but	Scale): 2	Scale): 1	attempted but	Scale): 5	
	surrounded by thick		could not be	Cloud Cover: 0%	Cloud Cover: 10%	could not be	Cloud Cover: 0%	No amphibians
	vegetation including		completed due	Background Noise:	Background Noise:	completed due to	Temperature:	observed.
	Willow and Dogwood		to inaccessibility	1	1	inaccessibility of	16°C	
	species; considered		of the Feature,	Temperature: 8°C	Temperature: 13°C	the Feature, as the	Precipitation:	
	potentially suitable to		as the site was	Precipitation: None	Precipitation: None	site was	None	
	support breeding	Results	completely	No amphibians	No amphibians	completely	No amphibians	
	amphibians.		flooded.	heard calling.	heard calling.	flooded.	observed.	

Table 2. Determination of Significance for Amphibian Wetland Breeding Habitat

Feature AWE-30 was determined not to be Significant Wildlife Habitat; therefore, this Feature was not carried forward to the EIS of this NHA Addendum.

4.2.2 Plant Species of Conservation Concern Habitat

Vascular plant inventories in Natural Area 609 were completed on June 19 and August 14, 2013, for the purpose of this NHA Addendum. A summary of the results of vascular plant inventories conducted in Features SCP-18, SCP-19, SCP-20, SCP-21 and SCP-22 is provided in **Table 3**. Field notes are provided in **Appendix C** and a complete list of plant species observed is provided in **Appendix D**. The qualifications of all field personnel were provided in Appendix C of the approved NHA and EIS.

No plant Species of Conservation Concern were observed at any of these Features and thus none were carried forward to the EIS phase of this NHA Addendum.

Feature ID	Natural Area	ELC Unit	Plant Species of Conservation Concern Observed	Carried Forward to EIS
SCP-18	609	SWD2-2	No	No – not Significant Wildlife Habitat
SCP-19	609	SWT2-2	No	No – not Significant Wildlife Habitat
SCP-20	609	SWT2-2	No	No – not Significant Wildlife Habitat
SCP-21	609	SWT2-2	No	No – not Significant Wildlife Habitat
SCP-22	609	SWD2-2	No	No – not Significant Wildlife Habitat

Table 3. Determination of Significance for Plant Species of Conservation Concern Habitat

5. Amendments to the Environmental Impact Study

5.1 Transmission Line

In the approved NHA and EIS, the transmission line was to be directionally drilled in one location to avoid affecting Significant Wetland Feature WET-012. Construction was to follow the same process described in the approved NHA and EIS for directionally drilling the collection line system.

According to the amended O. Reg. 359/09, applicants may seek an exemption from the prohibition on development within a Provincially Significant Wetland for the construction or installation of a transmission line. In support of this exemption, the EIS Report must provide an explanation for why it is not reasonable for the transmission line to be entirely outside the wetland, including a review of alternative transmission line routes and a description of how the proposed route has the fewest effects and is most easily mitigated. A description of the preferred transmission line route (spanning the wetland) is provided below, followed by an explanation for why it is not reasonable for the transmission line to be entirely outside Significant Wetland Feature WET-012.

5.1.1 Preferred Transmission Line Route

At the location of the crossing of Significant Wetland Feature WET-012, the 115 kV electrical transmission line is proposed to be located above-ground on private property (**Figure 2**). At this location, the transmission line will be mounted on new transmission line poles. The poles are proposed to be constructed of wood, concrete or steel. The transmission line poles will generally be 24 m above grade; however the poles will be taller (43 m above grade) at the crossing of Significant Wetland Feature WET-012 to reduce impacts to this feature. These taller poles will eliminate the need to remove trees within Wetland Feature WET-012, as the line will span above the trees within this feature and be set back far enough on either side of the feature.

Holes for new transmission line poles are typically augered in the ground using a truck mounted auger device. The poles will then be inserted using special cranes to a typical depth of 2 m to 3 m below grade. The taller (43 m above grade) poles on either side of the crossing will be installed approximately 7 m below grade. A concrete foundation may be required for these taller poles. The poles are typically "dressed" (made ready to accept conductors) on the ground prior to installation. All transmission line poles will be set back at least 5 m from the boundaries of Significant Wetland Feature WET-012.

5.1.2 Rationale for Selecting the Preferred Transmission Line Route

The preferred transmission line route was selected based on the following assessment of alternatives:

- Significant Wetland Feature WET-012 extends along the floodplain of the Ausable River within the Project Study Area. The Ausable River must be crossed by the transmission line at some point to reach the Project's Point of Interconnection with the Independent Electricity System Operator (IESO)-controlled grid.
- There are no road right-of-ways in the immediate vicinity (within 750 m) of the proposed crossing of Significant Wetland Feature WET-012. Significant Wetland Feature WET-012 extends to either side of the nearest road right-of-way (Kirkton Road) to the north. To the south, the nearest road right-of-way (Crediton Road) has many homes fronting on it.
- The landowner at the crossing location is willing to host the transmission line on private property.
- Burying the transmission line under Significant Wetland Feature WET-012 using horizontal directional drilling would require termination structures at the transition from the overhead to underground line; these structures would be large and have a visual impact. In addition, a specialized crew would be required for the installation of the underground transmission line as well as to repair the underground transmission line in the case of a failure; no such specialized crew is available locally. Finally, the transition to an underground transmission line cable causes the line to be less efficient and would result in higher losses of energy during transmission.

5.2 Significant Wetlands

The minimum distance from Significant Wetland Feature WET-012 to the nearest infrastructure (transmission line) is reduced from >0.1 to 0 m (transmission line above Feature) as a result of the proposed modification. A detailed vegetation species inventory was conducted in Wetland Feature WET-012 in support of this NHA Addendum. A complete list of the plant species observed during the inventory is provided in **Appendix D**.

On the west bank of the Ausable River, the transmission line will be installed above a Willow Mineral Thicket Swamp (SWT2-2) vegetation community. As described in the approved NHA and EIS, the sparse canopy within this mid-age thicket swamp community consists of a few crack willow and green ash. The dominant shrub layer consists of sandbar willow, alternate-leaved dogwood and red-osier dogwood. The ground cover consists of reed canary grass, wood nettle, spotted jewelweed and goldenrod species. A representative photograph of this community is provided below (**Photograph 1**). A complete list of plant species observed during the detailed vegetation inventory conducted in support of this NHA Addendum is provided in **Appendix D**.

On the east bank of the Ausable River, the transmission line will be installed above a Green Ash Mineral Deciduous Swamp Type (SWD2-2) vegetation community. As described in the approved NHA and EIS, the canopy layer of this mid-age deciduous swamp community consists of green ash and Freeman's maple. The sub-canopy layer consists of Freeman's maple and green ash. The shrub layer consists of wild red raspberry, Freeman's maple and green ash. The shrub layer consists of wild red raspberry, Freeman's maple and green ash. The shrub layer consists of well evelweed and blue flag iris. Representative photographs of this community are provided below (**Photographs 2 and 3**). A complete list of plant species observed during the detailed vegetation inventory conducted in support of this NHA Addendum is provided in **Appendix D**.



Photograph 1. Willow Mineral Thicket Swamp Type (SWT2-2) Vegetation Community (Foreground)



Photograph 2. Green Ash Mineral Deciduous Swamp Type (SWD2-2) Vegetation Community



Photograph 3. Green Ash Mineral Deciduous Swamp Type (SWD2-2) Vegetation Community

Potential effects of transmission line construction/decommissioning and operation, mitigation measures, monitoring commitments and contingency measures to address potential effects to WET-012 are described in **Table 4** below.

5.3 Significant Woodlands

The minimum distances from Significant Woodland Features WOD-104 and WOD-109 to the nearest Project infrastructure (transmission line) are reduced from >0.1 to 0 m (transmission line above Feature) as a result of the proposed modification. These features are overlapped by Wetland Feature WET-012 (refer to **Figure 2**). Therefore, the mitigation measures described for Wetland Feature WET-012 in **Table 4** above will be applied to Woodland Features WOD-104 and WOD-109.

Table 4.	Additional Potential Eff	fects on Significant	Wetlands and Mitic	ation Measures
	/ daitional i otoritiai Eri	looto on orginnount	Trouging and mining	

Significant Wetland	Potential Effects	Performance Objectives	Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan and Contingency Measures
WET-012 (0 m; transmission line above Feature)	Construction/ Decommissioning • Accidental intrusion into Significant Wetland resulting in damage to vegetation and disturbance to wildlife.	Avoid accidental damage to Significant Wetland.	 For construction activities outside the Significant Wetland: Install transmission line poles outside the boundaries of the Significant Wetland. Apply a minimum setback of 5 m during installation of transmission line poles. Where construction occurs within 30 m, install and maintain protective fencing to clearly define the construction area and prevent accidental damage to vegetation. For construction activities inside the Significant Wetland: Pull the transmission line across the Significant Wetland either by helicopter or by hand with the use of a winch. If required, branches may be selectively removed under the supervision of an arborist or forester by hand-held equipment (e.g. chainsaws) and accessed by foot to prevent soil compaction. Cut branches will be left in place in the wetland but will be cut up to lie low on the ground. No heavy equipment will be used within the Significant Wetland should take place in the wither (November 1 to March 15), if possible, or outside the breeding bird season (May 1 to July 31). If this is not possible, MNR will be consulted regarding additional mitigation measures that may be required. 	 Accidental damage will be avoided through clear delineation of boundaries and protective fencing. Negligible residual effects. 	 Undertake weekly site inspections by an Environmental Monitor to ensure that protective fencing is intact and that there is no damage caused during construction. Conduct a post-construction survey to confirm that the disturbance to Significant Wetland Feature WET-012 is minimal. Contingency Measures: Repair protective fencing if damaged. Prune any damaged trees through implementation of proper arboricultural techniques, under supervision of an Arborist or Forester. If excessively disturbed areas are detected through the post-construction survey, restoration planting may be implemented as a contingency measure. These plantings should consist of suitable native wetland species such as nannyberry, silky dogwood, buttonbush, spicebush, or slender willow.
	Increased erosion and sedimentation resulting from clearing and grubbing, excavation, backfilling and stockpiling.	 Minimize erosion and sedimentation from clearing, grubbing, excavation, backfilling and stockpiling. 	 For construction activities outside the Significant Wetland: Install transmission line poles outside the boundaries of the Significant Wetland. Apply a minimum setback of 5 m during installation of transmission line poles. Install sediment and erosion control fencing along edge of construction area as per Ontario Provincial Standard Specifications (OPSD 219.130). For construction activities inside the Significant Wetland: Pull the transmission line across the Significant Wetland by hand or by helicopter. No heavy equipment will be used within the Significant Wetland. 	 Sedimentation avoided or minimized through application of mitigation measures. Minimal residual effects. 	 Monitor on-site conditions (<i>i.e.</i>, erosion and sediment control, flooding, etc.) by an Environmental Monitor where construction occurs within 30 m of the Significant Wetland on the following basis: Daily during active construction periods; Prior to, during and post forecasted large rainfall events (>20 millimetres in 24 hours) or significant snowmelt events (<i>i.e.</i>, spring freshet); Daily during extended rain or snowmelt periods; where the site is left alone for 30 days or longer.

Table 4. Additional Potential Effects on Significant Wetlands and Mitigation Measures

Significant Wetland	Significant WetlandPotential EffectsPerformance Objectives		Mitigation Measures	Likelihood and Significance of Residual Effects	Monitoring Plan and Contingency Measures	
					 Contingency Measures: Suspend work if excessive flows of sediment discharges occur until additional mitigation measures are in place (e.g., install the extra erosion and sediment control materials kept on site, such as heavy duty silt fencing, straw bales, etc.). 	
	 Risk of soil or water contamination resulting from accidental spills of fuel, etc. 	 Minimize soil or water contamination. 	Develop and implement emergency spills plan outlining steps to contain any chemicals or to avoid contamination of adjacent Significant Wetland feature.	 Soil and water contamination avoided or minimized through application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	 Contractor to conduct routine inspections of construction equipment for leaks / spills. Develop an emergency spills plan. Contingency Measures: Immediately stop all work until the spill is cleaned up. Notify MOE's Spills Action Centre of any leaks or spills. If a spill enters Significant Wetland, collect and analyze water samples for appropriate parameters. Monitor daily until cleanup is completed. 	
	 Risk of spread of invasive species into Significant Wetland as a result of construction disturbance. 	Avoid spread of invasive species into Significant Wetland.	 Ensure all equipment, including clothing/boots, is thoroughly washed before entering the Significant Wetland to avoid introducing seeds or fragments of invasive species into the Significant Wetland. 	 Spread of invasive species avoided or minimized through the application of mitigation measures. Low likelihood and limited magnitude of effect as a result. 	 Daily monitoring of areas where construction activities are occurring within the Significant Wetland by Environmental Monitor. Conduct post-construction survey, as described above. 	
	 Operation Risk of soil or water contamination from oil, gas, etc. during maintenance of the transmission line. 	No off-site contamination of soil and no contamination of groundwater or surface water.	 Develop and implement an emergency spills plan outlining steps to contain any spills during maintenance activities to avoid contamination of Significant Wetland. 	Residual effects considered negligible.	 No monitoring required. Contingency Measures: Report the details of the spill to MOE, including a description of any assessment and remediation undertaken. 	

6. Summary and Conclusions

As was the case for the original proposed Project (as described in the approved NHA and EIS), the significance of anticipated residual effects associated with the proposed modification is predicted to be low provided that the recommended mitigation measures are properly implemented and proactively managed throughout the duration of construction and post-construction activities.

7. References

AECOM, 2013a:

Goshen Wind Energy Centre Natural Heritage Assessment and Environmental Impact Study Report. Prepared for Goshen Wind, Inc. January, 2013.

AECOM, 2013b:

Jericho Wind Energy Centre Natural Heritage Assessment and Environmental Impact Study Report Addendum. Prepared for Goshen Wind, Inc. January, 2013.

AECOM, 2013c:

Jericho Wind Energy Centre Natural Heritage Assessment and Environmental Impact Study Report Second Addendum. Prepared for Goshen Wind, Inc. September, 2013.

- Ontario Ministry of Natural Resources (MNR), 2011a: Birds and Bird Habitats: Guidelines for Wind Power Projects.
- Ontario Ministry of Natural Resources (MNR), 2011b: Bats and Bat Habitats: Guidelines for Wind Power Projects.

Ontario Ministry of Natural Resources (MNR), 2012: Natural Heritage Assessment Guide for Renewable Energy Projects. 2nd Edition.



Appendix A

MNR Confirmation and Re-confirmation Letters



January 15, 2013

NextEra Energy Canada 5500 Service Road, Suite 205 Burlington, ON L7L 6W6

RE: NHA Confirmation for Goshen Wind Energy Centre

Dear Tom Bird:

In accordance with the Ministry of the Environment's (MOE's) Renewable Energy Approvals (REA) Regulation (O.Reg.359/09), the Ministry of Natural Resources (MNR) has reviewed the *Natural Heritage Assessment Report – Goshen Wind Energy Centre* for the Goshen Wind Energy Centre project located in the Municipalities of Blue Water and South Huron, and submitted by Nextera Energy Canada, ULC on January 15, 2013.

In accordance with Section 28(2) and 38(2)(b) of the REA regulation, MNR provides the following confirmations following review of the natural heritage assessment:

- The MNR confirms that the determination of the existence of natural features and the boundaries of natural features was made using applicable evaluation criteria or procedures established or accepted by MNR.
- 2. The MNR confirms that the site investigation and records review were conducted using applicable evaluation criteria or procedures established or accepted by MNR, if no natural features were identified.
- 3. The MNR confirms that the evaluation of the significance or provincial significance of the natural features was conducted using applicable evaluation criteria or procedures established or accepted by MNR.
- 4. The MNR confirms that the project location is not in a provincial park or conservation reserve.
- 5. The MNR confirms that the environmental impact study report has been prepared in accordance with procedures established by the MNR.

In accordance with Section 28(3)(c) and 38(2)(c), MNR also offers the following comments in respect of the project.

Turbines 9, 46, 47 and 82

At this time, information available in the Natural Heritage Assessment and Environmental Impact Study is insufficient to support development of turbines 9, 46, 47 and 82. Candidate significant waterfowl stopover and staging habitats WSST-15 (near turbine 9) and WSST-36 (near turbines 46, 47 and 82) require additional wildlife surveys and information about potential negative environmental effects. As a result, this letter does not confirm the following section of the Environmental Impact Study:

• Table 5.6 as it relates to Waterfowl Stopover and Staging Areas

The alternative infrastructure layout proposed in a memo submitted January 14, 2013 has been accepted and supersedes information provided in the Natural Heritage Assessment and Environmental Impact Study.

Preconstruction Monitoring

In accordance with Appendix D of MNR's NHA Guide, a commitment has been made to complete pre-construction assessment(s) of habitat use for the following candidate significant wildlife habitats:

- Bat Maternity Colonies (features BMC-235, BMC-242, BMC-249, BMC-267, BMC-282, BMC-285, BMC-352, BMC-358, BMC-372, BMC-648, BMC-720)
- Turtle Wintering Ares (features TOW-01, TOW-03)
- Reptile Hibernacula (features RH-01, RH-02, RH-03, RH-04, RH-05, RH-06, RH-07, RH-08)
- Amphibian Woodland Breeding Habitat (features AWO-02, AWO-33, AWO-34, AWO-35)
- Colonial Nesting Bird Breeding Habitat (feature CNB-01; Note: this habitat was deemed significant but requires supplemental data collection)

MNR has reviewed and confirmed the assessment methods and the range of mitigation options. Pending completion of the assessments and determination of significance, the appropriate mitigation is expected to be implemented, as committed to in the environmental impact study.

Post-Construction Monitoring

A commitment has been made in the Environmental Impact Study to conduct postconstruction monitoring and if determined necessary, implement mitigation measures. For the Goshen Wind Energy Centre this includes the following significant natural features:

- Bat Maternity Colonies (features BMC-189, BMC-229, BMC-326, BMC-342, BMC-757)
- Amphibian Woodland Breeding Habitat (features AWO-14, AWO-25, AWO-27, AWO-30)
- Colonial Nesting Bird Breeding Habitat (feature CNB-01)
- Habitat for Plant Species of Conservation Concern multiple species (featuresSCP-12, SCP-13, SCP-14, SCP-15, SCP-16, SCP-17)
- Habitat for Bird Species of Conservation Concern Red-headed Woodpecker (feature SCB-03)

The following candidate significant natural features will also be monitored postconstruction if they are deemed significant during pre-construction surveys:

- Bat Maternity Colonies (features BMC-235, BMC-242, BMC-249, BMC-267, BMC-282, BMC-285, BMC-352, BMC-358, BMC-372, BMC-648, BMC-720)
- Turtle Wintering Ares (features TOW-01, TOW-03)
- Reptile Hibernacula (features RH-01, RH-02, RH-03, RH-04, RH-05, RH-06, RH-07, RH-08)
- Amphibian Woodland Breeding Habitat (features AWO-02, AWO-33, AWO-34, AWO-35)

In addition to the NHA and EIS, an Environmental Effects Monitoring Plan (EEMP) that address post-construction mortality monitoring and mitigation for birds and bats must be prepared and implemented. Environmental Effects Monitoring Plans for birds and bats must be prepared in accordance with MNR Guidelines and should be reviewed by MNR in advance of submitting a REA application to MOE in order to minimize potential delays in determining if the application is complete. Comments provided by the MNR with respect to the EEMP must be submitted as part of the application for a REA.

This confirmation letter is valid for the project as proposed in the natural heritage assessment and environmental impact study, including those sections describing the Environmental Effects Monitoring Plan and Construction Plan Report. Should any changes be made to the proposed project that would alter the NHA, MNR may need to undertake additional review of the NHA.

Where specific commitments have been made by the applicant in the NHA/EIS with respect to project design, construction, rehabilitation, operation, mitigation, or monitoring, MNR expects that these commitments will be considered in MOE's Renewable Energy Approval decision and, if approved, be implemented by the applicant.

In accordance with S.12 (1) of the Renewable Energy Approvals Regulation, this letter must be included as part of your application submitted to the MOE for a Renewable Energy Approval.

Please be aware that your project may be subject to additional legislative approvals as outlined in the Ministry of Natural Resources' *Approvals and Permitting Requirements Document.* These approvals are required prior to the construction of your renewable energy facility.

If you wish to discuss any part of this confirmation or additional comments provided, please contact Jim Beal at <u>Jim.Beal@ontario.ca</u> or 705-755-3203.

Sincerely,

Kazia Milian Regional Planning Supervisor Southern Region MNR

CC

Jim Beal, Southern Region Renewable Energy Coordinator, MNR Amy Cameron, Renewable Energy Planning Ecologist, MNR Ian Hagman, Guelph District Manager, MNR Narren Santos, Environmental Approvals Access & Service Integration Branch, MOE Zeljko Romic, Environmental Approvals Access & Service Integration Branch, MOE Ministry of
Natural ResourcesMinistère des
Richesses naturellesRenewable Energy Operations Team300 Water Street4th Floor, South Tower
Peterborough, Ontario K9J 8M5



January 16, 2013

NextEra Energy Canada 5500 Service Road, Suite 205 Burlington, ON L7L 6W6

RE: Modifications to Goshen Wind Energy Centre Project Location

Dear Tom Bird:

The Ministry of Natural Resource (MNR) has received the document dated January 15, 2013, which describes modifications to the Goshen Wind Energy Centre project location made subsequent to MNR's letter confirming the Natural Heritage Assessment in respect of the project.

Upon review of the modifications, MNR is satisfied that the Natural Heritage Assessment requirements of Ontario Regulation 359/09 have been met. Please add this letter as an addendum to the confirmation letter issued January 15, 2013 for the Goshen Wind Energy Centre project.

If you wish to discuss, please contact Jim Beal at Jim.Beal@Ontario.ca or 705-755-3203.

Sincerely,

Kazia Milian Regional Planning Supervisor Southern Region MNR

СС

Jim Beal, Southern Region Renewable Energy Coordinator, MNR Amy Cameron, Renewable Energy Planning Ecologist, MNR Ian Hagman, Guelph District Manager, MNR Narren Santos, Environmental Approvals Access & Service Integration Branch, MOE Zeljko Romic, Environmental Approvals Access & Service Integration Branch, MOE Ministry of Natural Resources Southern Region 300 Water Street 4th Floor, South Tower Peterborough, Ontario K9J 8M5 Telephone: 705-755-3243 Fax: 705-755-3292 Ministère des Richesses naturelles



October 22, 2013

Tom Bird NextEra Energy Canada, ULC 390 Bay Street, Suite 1720 Toronto, ON M5H 2Y2 thomas.bird@nee.com

RE: Goshen Wind Energy Centre NHA Second Addendum

Dear Mr.Bird,

The Ministry of Natural Resources (MNR) has received the document dated October 2013 that describes modifications to the Goshen Wind Energy Centre made subsequent to MNR's letter confirming the Natural Heritage Assessment in respect of the project.

Upon review of the modifications, MNR is satisfied that the Natural Heritage Assessment requirements of Ontario Regulation 359/09 have been met. Please add this letter as an addendum to the confirmation letter issued January 15, 2013, the re-confirmation letter issued on January 16, 2013, and the update to NHA confirmation letter (Waterfowl (Tundra Swan) Stopover and Staging Areas (Terrestrial) Pre-construction Evaluation of Significance Survey Results) issued on June 26, 2013 for the Goshen Wind Energy Centre project.

If you wish to discuss this matter further, please contact Lindsay Kingdon at Lindsay kingdon@ontario.ca or 705-755-3215

Sincerely,

Kathy Woeller Southern Region Land Use Planning Supervisor Southern Region MNR

Joe Halloran, A\ Renewable Energy Coordinator, Southern Region MNR
 Jessica Mackay Ward, AECOM
 Narren Santos, Environmental Approvals Access & Service Integration Branch, MOE
 Zeljko Romic, Environmental Approvals Access & Service Integration Branch, MOE



Appendix B

Goshen Wind Energy Centre Bat Monitoring Report & EIS Amendment (NRSI, 2013)



Memo

Project No. 1076-D

- To: Marc Rose
- CC: Jessica McKay Ward
- From: Andrew Ryckman
- Date: September 11, 2013

Re: Goshen Wind Energy Centre Bat Monitoring Report & EIS Amendment

Natural Resource Solutions Inc. (NRSI) was retained in June 2010 by AECOM, on behalf of NextEra Energy Canada, ULC (NextEra), to conduct a natural environment resource assessment specific to bats and bat habitat, in accordance with the Renewable Energy Approval (REA) Regulation. This assessment included a records review, site investigation, and evaluation of significance and impact assessment of any potentially significant bat habitats at a proposed 102MW wind energy facility in Huron County, within the Municipalities of Bluewater and South Huron, Ontario. This wind energy project is proposed by Goshen Wind, Inc., a subsidiary of NextEra. The Project is referred as the Goshen Wind Energy Centre (the "Project").

The proposed Project is located in Huron County, within the Municipalities of Bluewater and South Huron. The Project is proposed to be 102MW in size, and consisting of up to 71 GE 1.6-100 Wind Turbine generator locations and pad mounted step-up transformers and 1 GE 1.5-100 Wind Turbine generator location and pad mounted step-up transformer (however, only 63 turbines are proposed to be constructed), as well as supporting infrastructure and development activities. This includes turbine laydown and storage areas (including temporary staging areas, cranepads, and turnaround areas surrounding each wind turbine), construction laydown areas, a transformer substation and ancillary equipment, 34.5kV electrical collection lines, a 115kV transmission line, turbine access roads, permanent meterological towers, and an operations/maintenance building and ancillary equipment. As identified in the REA Regulation, the proposed layout of these features is collectively referred to as the 'Project location'. For the purposes of this memo, NRSI will refer to the areas within 120m of the Project location as the 'Project area'.

The records review, site investigation, evaluation of significance, and environmental impact study (EIS) pertaining to bat habitats for the Goshen Wind Energy Centre were completed by NRSI during the period of 2010 to 2013 as part of the Natural Heritage

Assessment (NHA). The Goshen Wind Energy Centre NHA (AECOM 2013) confirmation was granted in January 2013 by the Ministry of Natural Resources' Renewable Energy Operations Team. As part of this confirmation, several preconstruction commitments were identified along with the commitment for the proponent to inform the MNR of any changes made to the Project that would alter the NHA.

In order to obtain the greatest efficiency in utilities placement and construction, the construction plan for the transmission line has been slightly modified from the proposed original construction plan that was presented in the approved NHA. The purpose of this memo is to review the proposed modifications to the layout and discuss any effects they may have on candidate or confirmed significant bat habitats as they were presented in the NHA.

Staff Roles

The requirements of the REA process indicate that the name and qualifications of all staff participating in the NHA should be provided. This staffing information is provided in the Goshen Wind Energy Centre NHA and its appended Bat Monitoring Report and Environmental Impact Study (AECOM 2013). The qualifications and roles of key staff participating in the amendment to this Project's NHA as it pertains to bat habitats have been outlined below.

Andrew G. Ryckman, B.Sc.

Andrew is a Terrestrial and Wetland Biologist with 8 years of environmental experience. He routinely manages the natural heritage aspects of renewable energy projects, with specific expertise relating to bats and herpetofauna. Andrew is certified in Ecological Land Classification (2010), and has successfully completed a Bat Conservation International (BCI) Acoustic Monitoring Workshop (2008).

Andrew's role in the Project was to act as the project manager, overseeing all aspects of the records review, site investigation, evaluation of significance, and environmental impact study, including all associated field work and reporting.

Christy Humphrey, B.E.S.

Christy is a Terrestrial and Wetland Biologist with more than 5 years of environmental consulting experience, working on a variety of project tasks. Her areas of expertise are vegetation mapping and floral inventories, as well as acoustic bat monitoring, but she has experience conducting bird assessments, amphibian studies, and other fauna assessments. Christy is certified in both the ELC for Southern Ontario (2010) and Northeastern ELC (2010), as well as the OMNR Wetland Evaluation System (2012). She has also participated in the Ontario MNR Bat Monitoring Workshop for Wind Power Projects (2010) and has received training in Eastern Bat Acoustic Field Techniques (Bat Conservation and Management Inc. 2012).

Christy organized and conducted field work for the site investigation, and compiled, interpreted, and reported on the results of the site investigation. She assisted with the completion of this memo.

Andrew Dean, B.E.S.

Andrew is a Terrestrial and Wetland Biologist with over 3 years of environmental consulting and not-for-profit work experience. He specializes in environmental monitoring and natural area inventories including vegetation community mapping and vascular plant identification. He is certified in both the ELC for Southern

Ontario (2010) the OMNR Wetland Evaluation System (2012). Andrew has experience conducting pre-construction vegetation and wildlife monitoring, including acoustic and visual bat surveys, as well as post-construction monitoring of fauna for wind power projects in Ontario.

Andrew conducted field work for the site investigation, quantitatively assessing the number of suitable cavity trees within woodlands.

Proposed Layout Modifications

The proposed layout modifications relate to the construction of the transmission line across the Ausable River as an above-ground line. The transmission line was originally presented as a directionally-drilled below ground line within the original NHA. A detailed list of proposed Project modifications can be found within the Goshen Wind Energy Centre NHA Amendment (AECOM 2013). The proposed Project layout is shown on Figure 1 below.

Table 1. Changes to the Goshen Wind Energy Centre Layout

Project Component	Location	Description of Change	Closer to Features or Habitat Within 120m?	Affected Bat Habitats with a Potential Operational Effect	Reference Figure(s)
Transmission Line	Feature 609 (Ausable River)	Transmission Line will now be placed above ground rather than below.	Two new forested polygons will be overlapped by the transmission line.	Feature 609 (2 polygons)	1

Amendments to the Records Review Report

The study area initially examined for the Goshen Wind Energy Centre Records Review Report included the area within 120m of the proposed modifications in the Project, as the location of the transmission line has not changed. In the original Records Review, it was identified that 2 woodlands are shown to overlap the transmission line (NRSI 2013, AECOM 2013). However, the transmission line was previously planned to be directionally drilled beneath these features and as a result the Project infrastructure was not considered to be within the features themselves. Therefore the woodlands were not identified for the potential to contain candidate significant bat maternity colony habitat.

As a result of the proposed modifications to the Project, the Records Review identifies that 2 woodland polygons will be overlapped by the above-ground transmission line, and will require site investigation to identify candidate significant bat maternity colony habitats.

Amendments to the Site Investigation Report

As part of a review of alternatives for the Project at an earlier stage, the site investigations of these woodlands were conducted in June and July of 2012. In accordance with the REA Regulation, NRSI recorded the date, time, duration, and weather conditions during the site investigation. This information has been summarized in Table 2 below. The crew lead for the survey is indicated in bold font within the table. Detailed descriptions of staff roles and qualifications can be found above, and detailed field forms have been appended to this memo (Appendix I).



Table 2. Site Investigation Survey Dates

Purpose	General Methods	Feature ID	Date (2012)	Time(s) and Duration	Weather	Staff
Bat Habitat Assessment	Quantitative assessment of wildlife trees	609A	June 7	17:40 – 18:20 40 minutes	20°C, 0% Cloud Cover, Wind Speed 2, No precipitation.	Christy Humphrey, Matt Dil
Bat Habitat Assessment	Quantitative assessment of wildlife trees	609D	July 26	15:50 – 16:55 1 hr 5 minutes	27°C, 70% Cloud Cover, Wind Speed 3, No precipitation.	Andrew Dean , Colin Oaks

Identification of Bat Habitat

Bat maternity colonies can be found in any of the following Community Types: Deciduous Forest (FOD), Mixed Forest (FOM) that have greater than 10/ha wildlife trees (snags or cavity trees) which are greater than 25cm diameter at breast height (DBH) (OMNR 2012). Candidate significant bat hibernacula are found in caves, mine shafts, underground foundations, karsts or one of the following Community Types: Crevice (CCR), Cave (CCA), but do not include buildings (OMNR 2012)

The site investigation conducted for the woodlands (609A and 609D) which are proposed to be overlapped by the transmission line followed the most recent OMNR guidance document, *Bats and Bat Habitats: Guidelines for Wind Power Projects* (2011), which indicates that the number of cavity trees per hectare can be determined using 0.05ha plots (circular plots with a radius of 12.6m), which are randomly placed throughout each woodland being investigated. The document stipulates that a minimum of 10 plots should be used for woodlands which are 10ha or less in size, with one additional plot for every additional hectare for larger woodlands (up to a maximum of 35 plots). NRSI randomly selected circular plots within the portions of these woodlands for which access was granted. The number of suitable cavity trees within these plots were documented. Field notes for these assessments are appended to this report (Appendix I).

Site Investigation Results

NRSI used habitat criteria outlined by the Significant Wildlife Habitat Ecoregion 6E and 7E Criterion Schedules (OMNR 2012) and Bats and Bat Habitat Guidelines (OMNR 2011) to compare site-specific habitat conditions to potential bat habitats. No candidate bat hibernacula were identified by NRSI or AECOM biologists within the revised Goshen Wind Energy Centre.

The results of the site investigation for bat habitat in features 609A and 609D are included in Table 3 below.

Table 3. Summary of Site Investigation Results and Consideration for Candidate Significant Bat Habitats

			Quantitative A	ssessment	Evaluation of
Feature ID	Size (ha)	Composition	Number of Sample Plots	# Wildlife Trees per ha	Significance Required (Y/N)
609A	0.54	SWD2-2	4*	0	No
609D	0.62	SWD2-2	9*	2.22	No

*Note the number of plots sampled was limited by the size of forest found on properties for which access was granted.

In addition, NRSI biologists have also reviewed the potential for additional generalized candidate significant wildlife habitat (GCSWH) that may be present within 120m of the updated Project location. As the footprint of the Project has not changed, there are no new potential habitats found within 120m of the Project location and as a result, no new GCSWH for bats.

Changes in Distances to Bat Habitats

As the Project location has not changed considerably and there were no new candidate significant bat habitats identified, there have been no changes in distances to bat habitats within the Project area.

Amendments to the Evaluation of Significance

As part of this NHA amendment, NRSI biologists have reviewed the potential for changes to the Evaluation of Significance phase of this Project. After examining the changes in the Project layout and completing a site investigation of 2 new natural features, it has been determined that no new candidate significant bat habitats exist within 120m of the Project location. Therefore, no additional bat habitats require evaluation of significance at the Goshen Wind Energy Centre as a result of these modifications.

Amendments to the Environmental Impact Study

Because no new significant bat habitats were identified within the Project area and there were no changes in distance from significant bat habitat to the Project location, there are no changes required to the Environmental Impact Study relating to bat habitat(s).

Summary and Conclusions

In accordance with the REA Regulation, NRSI biologists have completed a comprehensive records review, site investigation, evaluation of significance, and EIS of the Goshen Wind Energy Centre Project area. Following the review of proposed adjustments to the Project location (as discussed above), NRSI has re-considered all aspects of the Natural Heritage Assessment for bats within this report to determine if there are new bat habitats, changes in distance to Project location, or new mitigation measures or monitoring commitments required to ensure that potential environmental impacts to bats are mitigated, minimized, and/or studied appropriately.

A total of 2 new woodlands were identified by the records review to be overlapped by the proposed Project modifications. These 2 woodlands were then investigated to identify if any candidate significant bat habitats are present within these woodlands. Neither woodland was identified as candidate significant bat habitat based on low snag densities. As a result, no new significant bat habitats were identified and no changes to the EIS were required.

With this amendment, it is maintained that with the implementation of the planned mitigation measures, monitoring programs, and contingency plans as presented in the Goshen Wind Energy Centre Natural Heritage Environmental Impact Study (AECOM 2013) and its appended Bat Monitoring Report and Environmental Impact Study (NRSI 2013) there are unlikely to be any significant impacts to bat habitats.

Appendix I Field Notes: Site Investigation for Bat Maternity Colony Habitats

Candidate Bat	Maternity Roost	Data Form			Project Manager Us	e Only:	
Use this form in l			ATURAL RESOURCE SOLU	itions Inc.	Woodland Number	609A	1. markate
Project Name:	Goswan_	Project #: _107 6B	quatic. Terrestrial and Wetland Biologists		in occurrent and in occurrent of	Page	1 of 2
Start Time 17	40	End Time 18:20	Date: June 7 2	012	Observer(s):	outh MIND	
Area # 609	Parcel Numbers	6542717	W	eather Conditions	20°C NOD	rein, Wind 2	000%
	# live or dead					1	
	cavity trees ≥						1.1
Plot Number	25cm dbh	Plot Center UTM (Zone:	177.)		Comments		
Plot 1	0	457229 4745155	gre	en asl	n swamp		
Plot 2	0	457201 4795167	0		U		
Plot 3	0	457 221 47951	76				
Plot 4	0	457211 47951	63		(-)		
Plot 5			could	not pit	any mo	re plots un.	teins
Plot 6			area	aprope	the Uwith	access gra	wed)
Plot 7				· · · ·	0	U	<u> </u>
Plot 8	. (i						
Plot 9							
Plot 10			£				
Plot 11							
Plot 12							
Plot 13							
Plot 14							
Plot 15		T	2		(a)		
Plot 16							
Plot 17			*				
Plot 18					C		
Plot 19							
Plot 20							
Plot 21							
Plot 22							
Plot 23							
Plot 24							
Plot 25					(4)		
Plot 26						-	
Plot 27		2				N	
Plot 28							
Plot 29							
Plot 30							
Plot 31							
Plot 32							
Plot 33							
Plot 34							2
Plot 35							
	0						

Number of Plots: Sites ≤10ha: 10 plots (minimum); each extra ha: 1 plot (up to max 35 plots) Plots = 0.05ha or 12.6m radius

Select plots randomly

Identification of Suitable Candidate Wildlife Trees for Evaluation of Significance

Tree #	Species	# of Cavities	DBH (cm)	UTM	Photo Number(s)
1		 C 			
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
Section Project Ma	nager Use Only	Formula: Total # Candidate = $0/(4 \times 0.05)$ =	$Trees / (\# Plots \times 0.05ha)$ = 0 / 0.2 = 0	> or = 10/ha? Yes No	lf >10/ha: BMA-

Candidate Bat	Maternity Roost		RESOURCE SOLUTIONS INC
Use this form in F	OD, FOM, SWD, SW	M Aquatic, Terrestr	ial and Wetland Biologists
Project Name:	(Josh CM	Project #: 10 100	Page 1 of 2
Start Time 15-3	0	End Time 1655	Date: July 26, 2012 Observer(s): CMO AMD
Area # 609	Parcel Numbers_	GSH7717	Weather Conditions: Clardy, 27°C, wind 3/NW, 70% CC.
	# live or dead		
	cavity trees ≥	175	
Plot Number	25cm dbh	Piot Center UTM (Zone: 1 (1)	Comments
Plot 1	0	045/122 11 15/12	
Plot 2	0	0451015115121	
Plot 3	1	0451051 4115110	
Plot 4	0	0457013 4713107	
Plot 5	0	0451014 41950CA	
Plot 6	0		
Plot 7	0.	ausaac uagea29	
Plot 8	0.	045/035 4/15021	
Plot 9		0437003 4714117	
Plot 10			
Plot 11			
Plot 12			
Plot 13			
Plot 14		<i></i>	
Plot 15			
Plot 16			
Plot 17			
Plot 18			
Plot 19			- ta
Plot 20			
Plot 21			
Plot 22		·	
Plot 23		-	· · · · · · · · · · · · · · · · · · ·
Plot 24			
Plot 25			
Plot 26			
Plot 27			
Plot 28			· · · · · · · · · · · · · · · · · · ·
Plot 29			
Plot 30		×	
Plot 31			
Plot 32			
Plot 33			
Plot 34			
Plot 35	10.15		

Number of Plots: Sites ≤10ha: 10 plots (minimum); each extra ha: 1 plot (up to max 35 plots) Plots = 0.05ha or 12.6m radius

Select plots randomly

Identification of Suitable Candidate Wildlife Trees for Evaluation of Significance
 Identify the best candidate wildlife trees in the applicable woodland/polygon: <10ha in size = up to 10</th>

 Tree #
 Species
 # of Cavities
 DBH (cm)
 >10ha in size = 1 additional for each ha up to 25 UTM Photo Number(s) DBH (cm) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 Formula: Total # Candidate Trees / (# Plots x 0.05ha) This Section Project Manager Use Only lf >10/ha: (9×0,05) = 1/6.45 = 2.22 > or = 10/ha? Yes No BMA-

12

Final Wodland Tally



Appendix C

Field Notes

- C1. Vascular Plant Inventory
- C2. Amphibian Wetland Breeding Habitat Evaluation of Significance Surveys



C1. Vascular Plant Inventory

Plant Species List 2012

Trees & Shrubs	1	2	3	4	Tree & Shrubs	1	2	3	4	5	Graminoids	1	2	3	4 5
Confers Delear Fis (Abias balanmas)		+	╞	+	Deciduous	∔	+	-	-	L	Grasses		_	Ц	┢
Balsam Fir (Abies balsamea)	Þ	4	╀	++	White Oak (Quercus alba)	6	+	⊢		<u> </u>	Giant Redtop (Agrostis gigantea)		_	Н	+
Eastern Red Cedar (Juniperus viminiana)	┝	1.1	╀	++	Bur Oak (Quercus macrocarpa)	₩		<u> </u>			Aurilops Promo (Promuo inormio)	D	n	Н	+
Tamarack (Larix Jaricina)	┢	+	╈	++	Alder Buckthom (Rhamous alnifolia)	╋	+	┢			Romus	Р	R.	\vdash	+
Norway Spruce (Picea abies)	Ŧ		+		Common Buckthorn (Rhamnus cathartica)	+-	+				Blue-joint Grass (Calamagrostis canadensis)			H	+
White Spruce (Picea glauca)	F		1		Smooth Sumac (Rhus glabra)						Orchard Grass (Dactylis glomerata)	R	R	\square	\top
Black Spruce (Picea mariana)	<u> </u>				Staghorn Surnac (Rhus hirta)						Poverty Oat Grass (Danthonia spicata)			\square	
Jack Pine (Pinus banksiana)	L	1		\square	Wild Black Currant (Ribes americanum)	1_					Quack Grass (Elymus repens)	K.	R		
Red Pine (Pinus resinosa)	-	+	⊢	++	Prickly Gooseberry (Ribes cynosbati)	┢	+	<u> </u>			Virginia Wild Rye (Elymus virginicus)			\square	
Sosteb Pine (Pinus subjectris)	r.	+	╉	╞┼┼	Swamp Black Currant (Ribes racustre)	┢	╂	–			Elymus			\vdash	+
Canada Yew (Tayus canadensis)	1	+		++	Rihes	┢	\vdash	\vdash		\vdash	Four Manna Grass (Glucoria striata)		FI	0	+
Eastern White Cedar (Thuia occidentalis)	÷.	+			Black Locust (Robinia pseudo-acacia)	+	+		\vdash		Givoaria	-	w	Р	+
Eastern Hemlock (Tsuga canadensis)	F	1	1		Prickly Rose (Rosa acicularis)	┢	\vdash		\square		Rice Cut Grass (Leersia oryzoides)				+
		1	1		Smooth Rose (Rosa blanda)						Tall Fescue (Lolium arundinaceum)				
	L		\bot	\square	Multiflora Rose (Rosa multiflora)		K				Muhlenbergia				
Deciduous	<u> </u>	10	<u> </u>	\square	Rosa	┶					Witch-grass (Panicum capillare)	_		\square	\perp
Manitoba Maple (Acer negundo)	μ	ĪR	-	\vdash	Com. Blackberry (Rubus allegheniensis)	+			\square		Panicum			_	
Nonway Maple (Acer nigrum)	^	+	+-		Plack Paspherry (Rubus occidentalia)	μ			-		Keed Canary Grass (Phalaris arundinacea)	ĸ	_	ν	+
Red Maple (Acer rubrum)	⊢	+	⊢	\vdash	Purple-fl Raspherry (Rubus odoratus)	+-	\vdash		\vdash	Н	Common Reed (Phragmites sustralis)	5 A .	ø	2	+
Silver Maple (Acer saccharinum)		1-	+	\square	Dwarf Raspberry (Rubus pubescens)				\square		Canada Blue Grass (Poa compressa)		Б	М	+
Freeman's Maple (Acer X freemanii)		lu		\square	Rubus	1					Fowl Meadow Grass (Poa palustris)		11	+	+
Sugar Maple (Acer saccharum)		Γ	1		Peach-leaved Willow (Salix amygdaloides)						Kentucky Bluegrass (Poe pratensis)				+
Mountain Maple (Acer spicatum)					Bebb's Willow (Salix bebbiana)					1	Yellow Foxtail (Setaria pumila)				
Speckled Alder (Alnus incana)		1			Pussy Willow (Salix discolor)						Green Foxtail (Setaria viridis)		_		
Downy Serviceberry (Amelanchier arborea)			_	$ \downarrow \downarrow$	Missouri Willow (Salix eriocephala)	-		F					_		\perp
Serviceberry (Amelanchier sanguinea)	-	-	-	\vdash	Sandbar Willow (Salix exigua)	4-	-	E				_	_	\rightarrow	4
White Birch (Betule neourifere)	\vdash	┝	⊢	\mathbb{H}	Black Willow (Salix ridra)	+	$\left \right $	Η					_	+	+
European Birch (Betula pendula)		+-	⊢	\vdash	Slender Willow (Salix netiolaris)	+-	\vdash	Н		-			_	+	+
Blue Beech (Carpinus caroliniana)		\vdash	\vdash	++	Salix		\vdash	Η	Η	\neg		-	_	+	+
Bitternut hickory (Carya cordiformis	-		1		Hybrid Crack Willow (Salix X rubens)	R	Π	- 1			-	+		+	
Shagbark Hickory (Carya ovata)			1		Black-berried Elder (Sambucus nigra)	ſ						-		+	+
Climbing Bittersweet (Celastrus scandens)					Red-berried Elder (Sambucus racemosa)		K							\neg	
Common Hackberry (Celtis occidentalis)			L		Buffaloberry (Shepherdia canadensis)						Sedges				
Buttonbush (Cephalanthus occidentalis)		<u> </u>			Eur. Mountain Ash (Sorbus aucuparia)						Drooping Wood Sedge (Carex arctata)				
Altleaved Dogwood (Cornus alternitolia)		<u>IN</u>	<u> </u>		Narrow Meadow-sweet (Spiraea alba)	┢				_	Golden-fruited Sedge (Carex aurea)	\downarrow		_	
Silky Dogwood (Cornus amomum)		μ	╞	\vdash	Common Lilac (Syringa vulgaris)	10	p				Graceful Sedge (Carex gracillima)	+		+	+
Grav dogwood (Corrus recemose)	-	1 4	\vdash		Climbing Poison-ivy (Toxicodendron radicans)	12	5				Inland Sedge (Carex Intenor)	+	-	+	-+-
Round-leaved Dogwood (Cornus rugosa)		P^	⊢		White Elm (Ulmus americana)	T ^K	Ŕ			-	ake-hank Serine (Carex Incurrescens)	+		+	+
Red-osier Dogwood (Cornus sericea)		te a		\vdash	Siberian Elm (Ulmus pumila)	+				-	Hop Sedge (Carex Jupulina)	+	-	+	
American Hazel (Corylus americana)		1	\square		Slippery Elm (Ulmus rubra)		R				Pennsylvania Sedge (Carex pensylvanica)	1		+	+
Beaked Hazel (Corylus cornuta)					Low Blueberry (Vaccinium angustifolium)						Awl-fruited Sedge (Carex stipata)	T		1	1
Cockspur Thorn (Crataegus crus-galli)					Maple-leaf Viburnum (Viburnum acerifolium)						Fox Sedge (Carex vulpinoidea)				
English Hawthom (Crataegus monogyna)		⊢	L		Hobblebush (Viburnum lantanoides)	┢				_	Carex bebbii	_	И	\rightarrow	
Large-fruited Thorn (Crataegus punctata)		_	<u> </u>		Nannyberry (Viburnum lentago)	+	\square				Carex rostrate (CF)*	-	и	+	
Crataogus	_			\vdash	Gueider-Rose (Viburnum opulus)	\vdash	\square			-	Carex Jup, IIne	-	М	+	
Bush Honeysuckle (Diervilla Ionicera)				\vdash	Riverbank Grane (Vitis riperia)	1	14			-	Carey		-	+	+
Russian Olive (Elaeagnus angustifolia)					Am. Prickly-ash (Zanthoxylum americanum)					-1	Carex	+	+	+	+
Autumn Olive (Elaeagnus umbellata)										-	Carex	+	+	+	
Run. Strawberry-bush (Euonymus obovata)					tilamer		R				Carex			+	
American Beech (Fagus grandifolia)											Carex	Τ			
Glossy Buckthorn (Frangula alnus)	_				ROJA SP (SWHMP KOSE ?)		ĸ		_		Carex	_		\perp	
White Ash (Fraxinus americana)	_				Ferns & Allies				+	_	Carex	_	-	+	\perp
Green Ash (Fraxinus nigra)	15		\square		Lady Fem (Athynum mix-femina)	\vdash	\vdash	-	-	-	Charles	-+	\rightarrow	-+	+
Witch-hazel (Hamamelis virginiana)	1. V	۲	\vdash		Bulbet Bladder Fern (Cystonteris bulbifere)	H	\vdash		+	+	Redroot Spike-rush (Fleocharis en/thropode)	+	+	+	+
Winterberry (llex verticilata)			\vdash	-	Spin. Wood Fern (Dryopteris carthusiana)	H		-	+	+	Fleocharis	-+	+	+	+
Butternut (Jugians cinerea)			\square		Crested Wood Fern (Dryopteris cristata)			-	-1	-†	Hard-stem Bulrush (Schoenoplectus acutus)	+	+	+	++
Black Walnut (Juglans nigra)	R	R			Marginal Wood Fern (Dryopteris marginalis)				_1		Three-square Bulrush (Sch. pungens)			T	
Common Privet (Ligustrum vulgare)					Dryopteris			1	1		Soft-stem Bulrush (Sch. tabernaemontani)				\Box
Spicebush (Lindera benzoin)	_	H		+	Ostrich Fern (Matteuccia struthiopteris)		Ц	_	_	_[Dark-green Bulrush (Scirpus atrovirens)	1	_[_[
Clauseus Honoysuckie (Lonicera canadensis)	_	Н	Н	+	Sensitive Fem (Onoclea sensibilis)	\square	\vdash		+	-	Wool-grass (Scirpus cyperinus)	-	-	+	$\downarrow \downarrow$
Morrow's Honeysuckie (Lonicere morrowia	-	Н	-	+	Interninted Fem (Osmunda clantamomea)		\vdash	-	+	+		+	+	+	+
Tartarian Honeysuckle (Lonicere tatarice)	0	2	Н	+	Roval Fem (Osmunda regelis)	\vdash	\vdash	-+	+	+		+	-	+	+-
Common Apple (Malus pumila)	Ø	Ŕ	Η	+	Christmas Fern (Polystichum acrostichoides)	\vdash		+	+	+		+	+	+	-+-/
White Mulberry (Morus alba)	4	Ľ	Η	+	Eastern Bracken-fern (Pteridium aquilinum)	\square	\square	+	+	\uparrow		+	+	+	+
Sweet Gale (Myrica gale)					Marsh Fern (Thelypteris palustris)				+		Other Graminoids	-+	+	+	+
Ironwood (Ostrya virginiana)											Broad Bur-reed (Sparganium eurycarpum)			_	\square
Thicket-creeper (Parthenocissus inserta)		И	R					T	\square		Narrow-leaved Cattail (Typha angustifolia)	T			
Ninebark (Physocarpus opulifolius)		Ш		1	Field Horsetail (Equisetum arvense)		RÍ	1	_[_	Broad-leaved Cattail (Typha latifolia)	T	I		
Balsam Poplar (Populus balsamifera)				-	Scouring-rush (Equisetum hyemale)	\square		-	+		Broad-leaved Cattail (Typha X glauca)		4	4	\square
Lastern Cottonwood (Populus deltoides)	\neg	K,	\square		variegated Horsetail (Equisetum variegatum)	H	\square	+	_	-	Articulated Rush (Juncus articulatus)	+	-	+	+
Trembling Aspen (Populus tremulaidentata)	\dashv	\vdash	\vdash	+	Ground-ceder/Lyconodium disitatum)	\vdash		+	-	-	Path Rush (Juncus enusus)	+	+	+	+
Sweet Cherry (Prunus avium)	\neg	\vdash		+	Shining Clubross (Lycopodium lucidulum)	\vdash		+	+	+	luncus	-	+	+	+
Pin Cherry (Prunus pensvivanica)	-	Η		1	Ground-pine (Lycopodium obscurum)	\vdash	+	+	+	ť	luncus	+	+	+	+
Black Cherry (Prunus serotina)				1				+	+	ť		+	+	+	+
Choke Cherry (Prunus virginiana)								1		+	Maha na	I	T	<u>r</u> t	+
Prunus An		R						1				ľ	Ť	1	
D - Dominant: represented by large numbers; generally	form	ning	>10	% grou	d cover or >25% vegetation cover in any one stratum										
r - rainy common (=Abundant in ELC); generally wide	spra	ad r	apra ar "	sented	y fairly large numbers of individual clumps; usually forming	>10%	6 gro	und	cova	r	H fall into this astronom *				
C - Oncommon (=Occasional in ELC): present as wides R - Rare: represented in the polynon hy lass than should in the polynon hy lass than should in the polynon hy lass than should in the polynomial in the pol	prei Ive i	ad S indiv	oaπê idu≠	and If K 3 of +*	rrueus or represented by one or more ciumps of many indivi- ell olumps	ayada	s (ma	isi si	J8C/8	IS W	tak Into Ints Catergory)			_	
Map Number _09 CSLI 226/1/2012/2020			l		(1)03		1	1	T	ĺ.	340	Т	Т	Ť	
152712317/24712495	-				GIN 2-2		-+	+	-+-	+		+	+	-+-	
une Mr. WIS	-				SMUZZ	5				4		_	_		-+
surveyons: Kob Hitken +Jess Prette					JW12-2										

* CF - compares favorably

 \bigcirc

(

 \bigcirc

Page 2 of 2

Plant Species List 2012

Dicot Herbs - Asteraceae	1	2	3	4 5	Dicot Herbs	1	2	3	4	5	Dicot Herbs	1	2	3	4	5
Common Yarrow (Achillea millefolium)	F	F	П	T	Shepherd's Purse (Capsella bursa-pastoris)	Г	Γ				Kidney-leaf Buttercup (Ranunculus abortivus))				
vvnite Snakeroot (Ageratina altissima)	0	P	Η		Cutleat Loothwort (Cardamine concatenata)	┢	-	\vdash	\vdash	_	I all Buttercup (Ranunculus acris)	Η	N		\vdash	Н
Giant Ragweed (Ambrosia trifida)	r	R	H	+	Penn. Bitter-cress (Cardamine nensulvanice)	\vdash	+	\vdash	\vdash	-	Ranunculus Spart	Η	11	p	Н	\square
Field Pussytoes (Antennaria neglecta)	t.	T		+	Cardamine	\vdash	1		4	1	Sheep Sorrel (Rumex acetosella)	\square	~			Н
Artemisia	L				Blue Cohosh (Caulophyllum thalictroides)						Curly-leaf Dock (Rumex crispus)		R			
Common Burdock (Arctium minus)	₽₽	ŤΚ		_	Mouse-ear Chickweed (Cerastium fontanum)	⊢	-		\square	-	Bitter Dock (Rumex obtusifolius)					Ц
Devil's Beggar-ticks (Bidens frondosa)	⊢	+		+	Turtienead (Chelone glabra) Spotted Water-bemlock (Cicute meculate)	⊢	┢	\square		-	Bloodroot (Sanginaria canadense)	\square	_	_		\square
Spotted Knapweed (Centaurea biebersteinii)	+	\square	+	Water-hemlock (Cicuta virosa)	┢	┼─	Н	\vdash	+	Bouncing Bet (Saponaria officinalis)	Η	—	-	\vdash	\vdash
Brown Knapweed (Centaurea jacea)	Í				Enchanter's Nightshade (Circaea lutetiana)	t	t	П			Marsh Skullcap (Scutellaria galericulata)					
Chicory (Cichorium intybus)	Ľ				Carolina Spring Beauty (Claytonia caroliniana)				1		Mad Dog Skullcap (Scutellaria lateriflora)		-			
Canada Thistle (Cirsium arvesnse)	⊢	ļĸ		+	Virginia Spring Beauty (Claytonia virginica)	⊢					White Campion (Silene latifolia)					
Bull Inistie (Cirsium vulgare)	⊢	╀	\vdash	+	Virgin's-bower (Clematis virginiana)	b	0	\square	\vdash	-	Bladder Campion (Silene vulgaris)	\square	_	_		
Daisy Fleabane (Erigeron annus)	┢	+	\vdash	+	Doo-strangling Vine (Cvnanchum rossicum)	┢	P	\square		+	Bitter Nightshade (Solanum dulcamara)	\vdash	R	R		Н
Philadelphia Fleabane (Erig. philadelphicus	R	R		-	Wild Carrot (Daucus carota)	R	R	Н	\square	1	Black Nightshade (Solanum ptychanthum)		בי	-		Η
Erigeron					Deptford Pink (Dianthus armeria)						Grassleaf Stitchwort (Stellaria graminea)					
Joe-pye-weed (Eupatorium maculatum)	1	ĸ		_ 	Squirrel-corn (Dicentra canadensis)		_	Ш		4	Common Chickweed (Stellaria media)		_	_		
Boneset (Eupatonum pertoliatum)	⊢	┢			Dutchman's-breeches (Dicentra cuculiana)	⊢	0	\square		-	Early Meadow-rue (Thalictrum dioicum)			0		
Flat-top Goldenrod (Euthamia graminifolia)	┢	\vdash		+	Wild Cucumber (Echinocystis lobeta)	-	12	Н	H	-	Field Penny-cress (Thlasni arvense)		Ч	ĸ		
Orange Hawkweed (Hieracium aurantiacum)			+	Viper's Bugloss (Echium vulgare)	⊢				1	Foamflower (Tiarella cordifolia)	\vdash				\square
Field Hawkweed (Hieracium caespitosum)	Γ				Northern Willow-herb (Epilobium ciliatum)		1				Star-flower (Trientalis borealis)					
Hieracium			_		Hairy Willow-herb (Epilobium hirsutum)					_	Red Clover (Trifolium pratense)		R			
Elecampane (Inula helenium)	⊢	┢╸╢	-	+	Small-fl. Willow-herb (Epilobium parviflorum)	<u> </u>	<u> </u>		-	4	White Clover (Trifolium repens)		R.	_		
Lactuca	┢		+	+	Epilobium Worm Mustard (Ervsimum cheiranthoides)	⊢	\vdash	\vdash	-+	┥	Stinging Nettle (1 Intice digice)		E	c		
Ox-eye Daisy (Leucanthemum vulgare)	Ø	R	+	+-	Euphorbia	⊢	⊢			+	Greater Bladderwort (Utricularia vulcaris)	+	Г	r -		\square
Pineapple-weed (Matricaria discoidea)	Ê	R			Hemp Nettle (Galeopsis tetrahit)					1	Common Mullein (Verbascum thapsus)		R			
Tall White Lettuce (Prenanthes altissima)	⊢		_		Wild Madder (Galium mollugo)						Blue Vervain (Verbena hastata)					
Black-eyed Susan (Rudbeckia hirta)	⊢	\vdash	+	+	Marsh Bedstraw (Galium palustre)					-	White Vervain (Verbena urticifolia)			_		
Blue-stem Goldenrod (Solidago alussima)	┢─		+		Galium 04	⊢	0	\vdash		+	Water Speedwell (Veron: anagallis-aquatica)		\neg	\neg		
Canada Goldenrod (Solidago canadensis)	┢	\square	+		Spotted Geranium (Geranium maculatum)	⊢				+	Veronica		\neg	-	-	
Zig-zag Goldenrod (Solidago flexicaulis)					Herb-robert (Geranium robertianum)	14				1	Cow Vetch (Vicia cracca)		R			
Giant Goldenrod (Solidago gigantea)		R	_		Yellow Avens (Geum aleppicum)	K	4				Vicia					
Early Goldenrod (Solidago juncea)	⊢		+	-	White Avens (Geum canadense)	⊢	K	\square	+	4	Periwinkle (Vinca minor)		_	_		
Solidago (A)	ίA		-	-	Dame's Rocket (Hesperis matronalis)	⊢	0		+	-	Vellow Violet (Viola conspersa)	+		_	-	
Field Sow-thistle (Sonchus arvensis)	ľ,	M	+		Virg. Water-leaf (Hydrophyllum virginianum)	-					Com. Blue Violet (Viola sororia)	-	-		+	
Sonchus					Com. St. John's-wort (Hypericum perforatum)					Ť	Viola p/1		R		1	
Heart-leaf Aster (Symph. cordifolium)	L	\square	_	\square	Spotted Jewelweed (Impatiens capensis)		N	N		_						
Heath Aster (Symphyotrichum ericoides)		\vdash	+		Wood Nettle (Laportea canadensis)		F	F	+	-#	Vuphar Nariegota		_	-	4	
Calico Aster (Symphy anceolatum)	-	\vdash	+	+	Field Pennergrass (Leondrus cardiaca)		\vdash	\vdash	+	-	Clechaus harderocor		+	_	-	
New England Aster (Symph. novae-angliae)	\vdash	R	+	+	Eur. Gromwell (Lithospermum officinale)			\square	+	ľ	PRENOMA NOT ACTACED	4	+		-+	
Purple-stem Aster (Symph. puniceus)					Butter & Eggs (Linaria vulgaris)					1			1		-1	
Common Tansy (Tanacetum vulgare)				\square	Great Lobelia (Lobelia siphilitica)					_						
Common Dandelion (Taraxacum officinale)	ĸ	K	+	+	Lobelia Cut le sf Durland (Instantion)				4	4	Monocot Herbs	-			_	
Com, Goalsbeard (Tragopogon pratensis)	⊢	ĸ	+		Northern Bugleweed (Lycopus americanus)	\vdash	\square		+	-	Water-plantain (Alisma plantago-aquatica)	+	ĸ		-	-
		H	+		Fringed Loosestrife (Lysimachia ciliata)		F		+		Jack-in-the-pulpit (Arisaema triphyllum)	+	+		-	
Bidens Sp		R			Moneywort (Lysimachia nummularia)		ĊA.				Asparagus (Asparagus officinalis)	-†			1	
					Lysimachia					ľ	Wild Calla (Calla palustris)					
	⊢	\square		+	Purple Loosestrife (Lythrum salicaria)	7			+	-	Bluebead-lily (Clintonia borealis)		_	_	-	4
· · · · · · · · · · · · · · · · · · ·		\vdash	+	+	Black Medick (Medicago lupulina)	K.	F	\vdash	+	-#	Sarden Lily-of-Valley (Convallana majalis)	+	-+	+	+	-
	-	\square	+	+	White Sweet-clover (Melilotus alba)	Η	Р		+		Canada Waterweed (Elodea canadensis)	+	+		+	-
					Yellow Sweet-clover (Melilotus officinalis)	٠)	R			fi	Helleborine (Epipactis helleborine)					
		П	_	\square	Wild Mint (Mentha arvensis)				1	Ţ	Yellow Trout Lily (Erythronium americanum)					
Other Dicot Herbs	-	\square	-	+	Wild Bergamot (Monarda fistulosa)	Ц	\square		_	1	Blue-flag Iris (Iris versicolor)		RÍ		1	_
Red Baneberry (Actaea pachypoda)	\vdash	\vdash	+	+	Sman Forget-me-not (Myosotis scorpioides)	Η			+	-	Drange Day Lily (Hemerocallus fulva)	+	+	-		_
Tall Agrimony (Agrimonia grvposepala)		\square	+	+-1	Water-cress (Nasturtium officinale)		\vdash	+	+	ť	Starry Duckweed (Lemna trisulca)	+	+	-	+	
Garlic Mustard (Alliaria petiolata)	F	R			Com. Evening-primrose (Oenothera biennis)		R			h	Wild Lily-of-valley (Maianthemum canadense)		1	1		
Green Amaranth (Amaranthus retroflexus)	-	\square			Sweet-cicely (Osmorhiza berterii)					ļ	alse Solom Seal (Maianthemum racemosum) [T		T	
Hog-peanut (Amphicarpa bracteata)	-		+	+	Yellow Wood-sorrel (Oxalis stricta)		ĸ		+	-	Star False Solomon (<i>Maianthemum stellatum</i>)		_	_	_	4
Canada Anemone (Anemone canadensis)	11	4	+		English Plantain (Plantaco lanceolata)	-	\vdash	+	-	┥	Pickerel-weed (Pontederia condate)	4	+	+	+	
Ivy Hepatica (Anemone acutiloba)		۲H	+	++	Common Plantain (Plantago maior)	Н	\square	+	+	ť	Curty-leaf Pondweed (Potamodeton crisous)	+	+	+	+	
Thimbleweed (Anemone virginiana)					Rugel's Plantain (Plantago rugelii)				1	ļ	Sago Pondweed (Potamogeton pectinatus)					
Purple Angelica (Angelica atropurpurea)		Ц	Ţ		May-apple (Podophyllum peltatum)				1	1	Potamogeton					
Ingian Hemp (Apocynum cannabinum) Wild Sarsaparilla (Aratia sudiacutia)	\vdash	\square	+	-	rate smartweed (Polygonum lapathifolium)			+	+	-1'	Potamogeton	+	_	-	-	
Spikenard (Aralia racemosa)	\vdash	+	+	+	Lauy s-murno (<i>Polygonum persicana</i>)		\vdash	+	+	╬	proad-leaved Arrownead (Sagittana latifolia)	-	+	+	+	-
Wild Ginger (Asarum canadense)		\vdash	+	+	Polygonum	\square	\vdash	+	+	f	Herb. Carrion Flower (Smilax herbacea)	+	-+	+	-+	
Swamp Milkweed (Asclepias incarnate)			1		Polygonum					fi	Bristly Greenbrier (Smilax hispida)	-	+	1	+	
Common Milkweed (Asclepias syriaca)		Д	T	T	Rough Cinquefoil (Potentilla norvegica)		,	1	T	1	lodding Ladies' Tresses (Spiranthes cernua)					
Yellow Rocket (Barbarea vulgaris)	ŀ		+	+	Rough-fruited Cinquefoil (Potentilla recta)		КĮ	_	+	4	Rose Twisted-stalk (Streptopus lanceolatus)			_		
Black Mustard (Brassica niore)	Η	ГЧ	+	+	Potentilla		\vdash	+	+	-	bkunk-cabbage (Sympiocarpus foetidus)	+	+	+	+	-
Marsh-marigold (Caltha palustris)	Η	\vdash	+	+	Heal-all (Prunelle vulgaris)			+	+	╣	White Trillium (Trillium grandiflorum)	-+	+	+	+	
Creeping Bellflower (Campanula rapunculoid	es)				Shinleaf (Pyrola elliptica)					ti	arge-flowered Bellwort (Uvularia grandiflora)	+	+		+	
			1		Pilea pumila		R		1	T						
D - Dominant: represented by large numbers; generally	form	ning	>10%	ground	cover or >25% vegetation cover in any one stratum					_		_	_	_	_	
U - Uncommon (=Occasional in ELC): generally wide	spre	ad si	urda alter	n sed D ad india	nexy large numbers of individual clumps; Usually forming > duals of represented by one or more clumps of meny indivi	- 109 Juni	egro s (m·	und (ost «	vover vecia-	(Mail	fall into this calergory					
R - Rare : represented in the polygon by less than about	fve i	indivi	duals	or sma	I clumps		- 1110			***						-
Map Number:	1	CU	p?	}	1	4	Ó	Ã()				Τ	1	Ι	
Date:	2	Su	10	2-2		5						+	-+	-+	-†	-
Surveyors:	3	SU	JT.	<u>2-2</u>								+	+	+	-+	-

Page 2 of 2

Plant Species List 2012

Dicot Herbs - Asteraceae	1	2	3	4 5	Dicot Herbs	1	2	3	4	5	Dicot Herbs	1	2	3	4 5
Common Yarrow (Achillea millefolium)					Shepherd's Purse (Capsella bursa-pastoris)						Kidney-leaf Buttercup (Ranunculus abortivus)				
White Snakeroot (Ageratina altissima)	6	1			Cutleaf Toothwort (Cardamine concatenata)	-					Tall Buttercup (Ranunculus acris)		V		
Com. Ragweed (Ambrosia artemisiifolia)	ĮК	₩¥,			Toothwort (Cardamine diphylla)				\vdash	_	Hooked Buttercup (Ranunculus recurvatus)				
Giant Ragweed (Ambrosta Innida)	⊢	μ r	N		Penn. Bitter-cress (Cardamine pensylvanica)			\square	\vdash		Ranunculus Sear		U	R	
Artemisia	⊢		\vdash		Blue Cohosh (Caulophylium thelictroides)		-	Н	\vdash	┥	Curtuleat Dock (Rumex acetosetta)		26	\vdash	+
Common Burdock (Arctium minus)	a	IA	1.4		Mouse-ear Chickweed (Cerastium fontanum)		Η	Н	\vdash	┥	Bitter Dock (Rumex obtusifolius)	\vdash	ų	\vdash	
Nodding Beggar-ticks (Bidens cernua)	<u>۳</u>				Turtlehead (Chelone glabra)			\square		1	Bloodroot (Sanginaria canadense)				
Devil's Beggar-ticks (Bidens frondosa)					Spotted Water-hemlock (Cicuta maculata)		R				Black Snakeroot (Sanicula marilandica)			\square	+
Spotted Knapweed (Centaurea biebersteinii))				Water-hemlock (Cicuta virosa)						Bouncing Bet (Saponaria officinalis)				
Brown Knapweed (Centaurea jacea)					Enchanter's Nightshade (Circaea lutetiana)		κ	S			Marsh Skullcap (Scutellaria galericulata)		R		
Chicory (Cichorium intybus)	⊢				Carolina Spring Beauty (Claytonia caroliniana)			Ц	\square	4	Mad Dog Skullcap (Scutellaria lateriflora)				
Canada Thistle (Cirsium arveshse)		K			Virginia Spring Beauty (Claytonia virginica)	\vdash			\vdash	4	White Campion (Silene latifolia)		_		
Horseweed (Convae canadensis)	⊢	μх	\vdash		Field Bindweed (Convolutius anonsis)	\vdash		-		+	Bladder Campion (Silene Vulgans)			0	+
Daisy Eleabane (Erigeron annus)	┢─			+	Dog-strangling Vine (Cynapchum rossicum)			\vdash	\vdash	+	Ritter Nightshade (Solenum dulcamara)	\square	0	6	+
Philadelphia Fleabane (Erig. philadelphicus)	1	R	R		Wild Carrot (Daucus carota)	R	R	R		┥	Black Nightshade (Solanum ducamara)		4		
Erigeron					Deptford Pink (Dianthus armeria)		•			+	Grassleaf Stitchwort (Stellaria graminea)		-		
Joe-pye-weed (Eupatorium maculatum)		U	C		Squirrel-corn (Dicentra canadensis)						Common Chickweed (Stellaria media)				
Boneset (Eupatorium perfoliatum)	L	1	λ		Dutchman's-breeches (Dicentra cucullaria)						Early Meadow-rue (Thalictrum dioicum)				
Large-leaved Aster (Eurybia macrophylla)		Ц			Wild Teasel (Dipsacus fullonum)		ß			_	Tall Meadow-rue (Thalictrum pubescens)		N	RI	
Flat-top Goldenrod (Euthamia graminifolia)		Ш	-		Wild Cucumber (Echinocystis lobata)	\square	E	N		4	Field Penny-cress (Thlaspi arvense)		_		\rightarrow
Orange Hawkweed (Hieracium aurantiacum)	}	-			Viper's Bugloss (Echlum vulgare)					+	Foamflower (Tiarella cordifolia)		_		+
Heracium		Н			Hain/ Willow-herb (Epilobium birsutum)	\vdash		\square		+	Star-nower (Trientalis borealis)	-	a	\vdash	-
Elecampane (Inula helenium)		Η		+	Small-fl, Willow-herb (Epilobium parviflorum)	\square			2	-	White Clover (Trifolium recens)	+	Ы	\vdash	+
Prickly Lettuce (Lactuca serriola)		\square			Epilobium					+	Trifolium		Ч		+
Lactuca					Worm Mustard (Erysimum cheiranthoides)					t	Stinging Nettle (Urtica dioica)		F	F	
Ox-eye Daisy (Leucanthemum vulgare)		1			Euphorbia					1	Greater Bladderwort (Utricularia vulgaris)		٦	•	
Pineapple-weed (Matricaria discoidea)		ß	<u>9.</u>		Hemp Nettle (Galeopsis tetrahit)						Common Mullein (Verbescum thapsus)		R		
Tall White Lettuce (Prenanthes altissima)	1	Ц			Wild Madder (Galium mollugo)	\square		Ц		1	Blue Vervain (Verbena hastata)	I	- 1	T	
Black-eyed Susan (Rudbeckia hirta)	\vdash	Н	1	+	Marsn Bedstraw (Galium palustre)	\square	\neg	\mid			White Vervain (Verbena urticifolia)	\downarrow	_	-	+
Lan Goldenrod (Solidago alfiSSIMa)	\vdash	Н	ч	+	Gelium So	\vdash	0	├	+	-	water Speedwell (Veron. anagallis-aquatica)	\dashv	_	4	+
Canada Goldenrod (Solidago canadensis)		\vdash			Spotted Geranium (Geranium maculatum)		-			ť	Veronica	-	-	+	+
Zig-zag Goldenrod (Solidago flexicaulis)		\vdash			Herb-robert (Geranium robertianum)		-				Cow Vetch (Vicia cracca)	-+	π	+	+
Giant Goldenrod (Solidago gigantea)		u			Yellow Avens (Geum aleppicum)	u	u			1	Vicia	-1		+	+
Early Goldenrod (Solidago juncea)					White Avens (Geum canadense)		RI				Periwinkle (Vinca minor)	-		+	
Gray Goldenrod (Solidago nemoralis)					Urban Avens (Geum urbanum)						Dog Violet (Viola conspersa)	-		1	
Solidago		÷		\square	Dame's Rocket (Hesperis matronalis)					ľ	fellow Violet (Viola pubescens)				
Field Sow-thistle (Sonchus arvensis)			\rightarrow		Virg. Water-leaf (Hydrophyllum virginianum)				_	1	Com. Blue Violet (Viola sororia)			_	
Sonchus			+		Com. St. John's-wort (Hypericum perforatum)		4			+	Viola SP		Ы	\rightarrow	
Healt-leat Aster (Symph. corditolium)			+		Spotted Jewelweed (Impatiens capensis)					+	Helianthus tuberosus		24	0	
Tall White Aster (Symphyoticium encodes)		U.	-	+	Motherwort (Leopurus cerdiace)		띍	엄	+	+	Nuchar Variagata			+	
Calico Aster (Symphyotrichum lateriflorum)		Ê	u		Field Pennergrass (Leoidium campestre)		4	-	+	+	Sinchana herdero coa	Ч	a	+	+-1
New England Aster (Symph. novae-angliae)		A	ίλ I		Eur. Grornwell (Lithospermum officinale)		-1		-+-	+	EEA THAT WE'L SEO OLDES	+	9	+	+
Purple-stem Aster (Symph. puniceus)					Butter & Eggs (Linaria vulgaris)		-			+		+		+	+
Common Tansy (Tanacetum vulgare)					Great Lobelia (Lobelia siphilitica)		1			Ť		1	1	\neg	
Common Dandelion (Taraxacum officinale)	K	R I	K		Lobelia Cardinalis		5	N		I	Monocot Herbs				
Com. Goatsbeard (Tragopogon pratensis)	_	K			Cut-leaf Bugleweed (Lycopus americanus)	_	S	N		1	Nater-plantain (Alisma plantago-aquatica)		ĸ		
Coltsfoot (Tussilago farfara)			_		Northern Bugleweed (Lycopus uniflorus)	_	┢┥	-	-	4	Vild Leek (Allium tricoccum)	_		\rightarrow	
BIOCAL BA	\square	M	4	-	Finged Loosestrife (Lysimechia ciliata)				+	÷	lack-in-the-pulpit (Arisaema triphyllum)		_	+	
·····	\square		+	+	voneywort (Lysimachia numinulana)	-	ч	Ч	+	ť	Asparagus (Asparagus omonans)	-+	+	+	
			-+	+	Purple Loosestrife (Lythrum salicaria)			+	+		Ruebead-lily (Clintonia horealis)	+	+	+	-+
			+		Black Medick (Medicago lupulina)	N I	t I	-	+	ť	Garden Lilv-of-valley (Convallaria maialis)	+	+	+	+
			\neg		Alfalfa (Medicago sativa)		X1	-	+	T	(el. Lady's Slipper (Cypripedium parvifiora)	+	1	+	+
					White Sweet-clover (Melilotus alba)		RI			1	Canada Waterweed (Elodea canadensis)				
					Yellow Sweet-clover (Melilotus officinalis)		M			1	lelleborine (Epipactis helleborine)				
			_		Wild Mint (Mentha arvensis)	_		W		ľ	(ellow Trout Lily (Erythronium americanum)				
Other Dicot Herbs			+	+	Wild Bergamot (Monarda fistulosa)	-	\rightarrow		_	4	Blue-flag Iris (Iris versicolor)		Щ	RĮ	
Ped Baneberry (Actaea pachypoda)			-+	+	Small Forget-me-not (Myosotis laxa)	\dashv	+	\rightarrow	+	-19	Drange Day Lily (Hemerocallus fulva)	-	_	_	44
Tall Agrimony (Agrimonia gnyosonale)			+	+	Porget-me-not (Myosotis scorpiolaes)	+	+	+		-#	esser Duckweed (Lemna minor)	+	+	-+	
Garlic Mustard (Alliaria petiolata)	F		Rt	++	Com, Evening-primrose (Oenothera hiennis)	+	a t	+	+	f	Vild Lilv-of-valley (Maianthemum canadense)	+	+	+	+1
Green Amaranth (Amaranthus retroflexus)	1	-4	4	- -	Sweet-cicely (Osmorhiza berterii)	+	*	-	+	ti	alse Solom Seal (Maianthemum racemosum)	-1	+	++
Hog-peanut (Amphicarpa bracteata)					Yellow Wood-sorrel (Oxalis stricta)		Rt	_ 1		k	Star False Solomon (Maianthemum stellatum)	+	+	+	
Pearly Everlasting (Anaphalis margaritacea)					Wild Parsnip (Pastinaca sativa)		1			ħ	rue Solomon Seal (Polygonatum pubescens)		1	+	
Canada Anemone (Anemone canadensis)	N	W	M	\square	English Plantain (Plantago lanceolata)	T	T	T		I	Pickerel-weed (Pontederia cordata)	.1			
Ivy Hepatica (Anemone acutiloba)		\downarrow	\downarrow	+	Common Plantain (Plantago major)	_	4	_	_	4	Curly-leaf Pondweed (Potamogeton crispus)	1	1	_	\square
Inimpleweed (Anemone virginiana)	_		+	+	Rugel's Plantain (<i>Plantago rugelii</i>)		_			1	Sago Pondweed (Potamogeton pectinatus)	\downarrow		-	+
Indian Hemp (Angelica (Angelica atropurpurea)	-	+	+	+	way-apple (<i>Podophyllum peltatum</i>)	-	+	+	-	4	rotamogeton	+	-	+	+-1
Wild Sarsanarilla (Aralia nudicaulis)		+	+	+	ad/s-thumh (Polygonum pareicaria)	-	n t	+	+	+ť	rotamogeton	- k	+	+	+
Spikenard (Aralia racemosa)		+	+		/irginia Knotweed (Polynonum virginianum)	+	Ч	+	+	╬	Nue-eved-grass (Sisvrinchium montanum)	-#	Ч	+	+
Wild Ginger (Asarum canadense)		-	+	+	Polygonum	+	+	-+	+	ا ر	lerb. Carrion Flower (Smilax herbacea)	i	┥	-	+1
Swamp Milkweed (Asclepias incarnata)	1	u	W		Polygonum	-1	+	+	+	Ī	Bristly Greenbrier (Smilax hispida)	+	+	+	+
Common Milkweed (Asclepias syriaca)		B	B		Rough Cinquefoil (Potentilla norvegica)					1	lodding Ladies' Tresses (Spiranthes cernua)	+	+	+	
Yellow Rocket (Barbarea vulgaris)			Τ		Rough-fruited Cinquefoil (Potentilla recta)		77			F	Rose Twisted-stalk (Streptopus lanceolatus)		1		
False Nettle (Boehmeria cylindrica)		1	Ţ	\Box	Common Cinquefoil (Potentilla simplex)	1	T	1		1	kunk-cabbage (Symplocarpus foetidus)	T			
Black Mustard (Brassica nigra)	_		4	+	Potentilla					ļ	Purple Trillium (Trillium erectum)		1	_	
Marsh-marigold (Caltha palustris)	Ļ		+	+	Heal-all (Prunella vulgaris)		_	\rightarrow		1	Vhite Trillium (Trillium grandiflorum)	1	4		+
Creeping Delinower (Campanula rapunculoid	es)	+	+	+	Sminiear (Pyrola elliptica)	-			+	4	arge-nowered Bellwort (Uvularia grandiflora)	+	-	-	+-1
D - Dominant; represented by large numbers: generally	form	l ina '	>10%	1 ground	cover or >25% vegetation cover in any one stratum	1	Aİ	5		1		I	I	- 1	<u> </u>
F - Fairly common (=Abundant in ELC): generally wide	spre	ad n	pres	ented b	fairly large numbers of individual clumos! usually forming >:	10%	grov	und	over			-		-	
U - Uncommon (=Occasional in ELC) : present as wides	prev	ad so	atter	ed indiv	duals or represented by one or more clumps of many individu	uais	(mo	st sc)ecies	wi	fall into this catergory)	-			
R - Rare: represented in the polygon by less than about I	fve i	ndivi	duals	or sma	l clumps										
Map Number: GSHI T-L:AP	1	C	10	2	1	4	0	Δ	0			Τ	Т	Т	
Data: Aug 14, 2012	2	51	10	1-		5						+	+	+	+-1
Surveyors: RA/TDITS	,	<u> </u>	11	-2-	<u>}</u>	+						-+-	+		-+

Page 1 of 2

Plant Species List 2012

(-)

Content Content <t< th=""><th>Trees & Shrubs</th><th>Τ1</th><th>1 2</th><th>2 3</th><th>4</th><th>5</th><th>Tree & Shrubs</th><th>Tī</th><th>2</th><th>3</th><th>4 5</th><th>Graminoids</th><th>1</th><th>2</th><th></th><th>3 4</th><th>I s</th></t<>	Trees & Shrubs	Τ1	1 2	2 3	4	5	Tree & Shrubs	Tī	2	3	4 5	Graminoids	1	2		3 4	I s
Base Pri (Ables etherwell K White Date (Assert allows) Control Assert (Allows Control) K Allows Base Pri (Ables etherwell Bar Control Assert (Ables etherwell) Bar Control Bar Control <t< td=""><td>Conifers</td><td></td><td>T</td><td>T</td><td>H</td><td></td><td>Deciduous</td><td>+</td><td>-</td><td>Ť</td><td></td><td>Grasses</td><td>t</td><td>-</td><td>T</td><td>+</td><td>۲</td></t<>	Conifers		T	T	H		Deciduous	+	-	Ť		Grasses	t	-	T	+	۲
Control Decision Particle (Arginer above) A Pactor (Control above) A News Struct (Ark Schwart) File Control (Struct above) Binegett (Ark Schwart) Binegett	Balsam Fir (Abies balsamea)	TR		Τ			White Oak (Quercus alba)	1				Giant Redtop (Agrostis gigantea)		T	t	+	t
Edite Description Image: Section 2011 Particle Server (Print Journal Control) Image: Section 2011 Image: Section 2011 <thimage: 2011<="" section="" th=""> <thimage: 2011<="" section="" th=""></thimage:></thimage:>	Common Juniper (Juniperus communis)	╀	+-	\downarrow	$\left \right $		Bur Oak (Quercus macrocarpe)	R		-		Redtop (Agrostis stolonifera)					
Development Development <thdevelopment< th=""> <thdevelopment< th=""></thdevelopment<></thdevelopment<>	Eastern Red Cedar (Juniperus virginiana)	┢	+	+	$\left \cdot \right $		Red Oak (Quercus rubra)	+		┡	_	Awnless Brome (Bromus inermis)	R	Щ	┢	╞	╞
Note: Special Plane Special Plane Special	Norway Spruce (Picea abies)	F	:	+	┼┤		Common Buckthorn (Rhamnus cathartica)	┢	+	⊢	++	Blue-joint Grass (Calamagrostis canadensis)	_	⊢	╀	+	╀
Biaka Bang Piles angkang Jung Pi	White Spruce (Picea glauca)	ÏF	:	+	H		Smooth Sumac (Rhus glabra)	+			\vdash	Orchard Grass (Dactylis glomerata)	<u>A</u>	A	+	+	+
Jack Pen (Price Instance) Jack Pen (Price Insta	Black Spruce (Picea mariana)	L					Staghorn Sumac (Rhus hirta)					Poverty Oat Grass (Danthonia spicata)		1	Τ	\mathbf{t}	t
Difference Difference <thdifference< th=""> Difference Differen</thdifference<>	Jack Pine (Pinus banksiana)	╀	╀	_	\square	_	Wild Black Currant (Ribes americanum)	1	<u> </u>	u	\square	Quack Grass (Elymus repens)	R	ß		L	
Stott: Provide prime prim prime prim prima prime prima prime prime prime prime prime prime	Red Pine (Pinus resinosa)	e	+	╋	$\left \right $	_	Prickly Gooseberry (Ribes cynosbati)		⊢		\vdash	Virginia Wild Rye (Elymus virginicus)			μ	¥	⊢
Canada War (Trans Conserving) Prior Prior Marco (Trans Conserving) Conserved Conserving (Conservation) Conserved Conservation (Conservation) <	Scotch Pine (Pinus svivestris)	٢	+	┼	+	-	Red Currant (Ribes rubrum)	⊢	-	⊢	\vdash	Elymus		⊢	┢	┢	┢
Basen Minio Callar (Tode codominity) Bite A Local (Relation applicit) Bite A Local (Relation application) Bite A Local Local (Relation) Bite A Local (Rel	Canada Yew (Taxus canadensis)	1	1		\mathbf{T}		Ribes	\vdash			\square	Fowl Manna Grass (Glyceria striata)		11	10	t	┢
Batterin Herder, Grage annakenny Predsy Dear (Draw andhon) R Decklasse Hold Test (Draw Coll Care) R Marchen Mark Kong, Coll Care) Hold Test (Draw Coll Care) R Marces, Mark Mark Kong, Coll Care) Hold Test (Draw Coll Care) R Marces, Mark Mark Mark Kong, Coll Care) Hold Test (Draw Coll Care) R Start Mark Mark Mark Kong, Coll Care) Hold Test (Draw Coll Care) R R Start Mark Mark Mark Mark Mark Mark Mark Mark	Eastern White Cedar (Thuja occidentalis)	L	L				Black Locust (Robinia pseudo-acacia)					Glyceria			Ľ	1	T
Decidinaria Interface (Delay Free Resp. and Resp. (Resp. manifere) Itel Hasse (John mutching) Manifas Haspin (Res. magund) U.S.R. Cons. Bassiserr (Rubus algobiances) Person Manifas Haspin (Res. magund) U.S.R. Cons. Bassiserr (Rubus algobiances) Person Res. Magund (Res. Magund) U.S.R. Cons. Bassiserr (Rubus algobiances) Person Res. Magund (Res. X Famman) U.S.R. Cons. Bassiserr (Rubus algobiances) Velas Sciences (Person	Eastern Hemlock (Tsuga canadensis)	╞	╞	_	\square	_	Prickly Rose (Rosa acicularis)	⊢				Rice Cut Grass (Leersia oryzoides)		U			
Descheres Inc. None		┢	+	+	H	_	Smooth Rose (Rosa blanda)	⊢	0		\vdash	Tall Fescue (Lolium arundinaceum)	\square	⊢	┞	⊢	⊢
Mantide States (<i>Acc. regions</i>) L (<i>B</i>) Cons. Beakary (<i>Publics allegiberissa</i>) L = Paradia Back Magin (<i>Acc. regions</i>) Back Respont (<i>Publics allegiberissa</i>) L = Paradia Paradia Names Males (<i>Acc. regions</i>) Back Respont (<i>Publics allegiberissa</i>) L = Paradia Names Males (<i>Acc. Respont</i>) Back Respont (<i>Publics allegiberissa</i>) L = Paradia Names Males (<i>Acc. Respont</i>) Devel Respont (<i>Acc. Respont</i>) L = Paradia Names Males (<i>Acc. Respont</i>) Devel Respont (<i>Acc. Respont</i>) Foot Massacro 2 and Paradia L = Paradia Names Males (<i>Acc. X Respont</i>) If Respont (<i>Acc. X Respont</i>) If Respont (<i>Acc. X Respont</i>) L = Paradia Speaked Acte (<i>Abs. J Cons. Testers</i>) If Respont (<i>Acc. X Respont</i>) <	Deciduous	╋	╀	+	+		Rosa	+	I			Witch-grass (Panicum canillare)	\vdash	⊢	⊢	┝	┝
Bits March (Data right) Write Ree Respery (Public science) VL Local (Data (Data Park)) Description (Data Park) Description (Data Park) <thdescriptin (data="" park)<="" th=""> Descriptin (Data Park)<td>Manitoba Maple (Acer negundo)</td><td>u</td><td>R</td><td></td><td></td><td></td><td>Com. Blackberry (Rubus allegheniensis)</td><td></td><td></td><td></td><td></td><td>Panicum</td><td></td><td></td><td>┢</td><td>+</td><td>t</td></thdescriptin>	Manitoba Maple (Acer negundo)	u	R				Com. Blackberry (Rubus allegheniensis)					Panicum			┢	+	t
Nerver, Maria (Anz. Enternols) Image (Anz. Enterons) Image (Anz. Ente	Black Maple (Acer nigrum)	Г	Τ				Wild Red Raspberry (Rubus ideeus)	U		U		Reed Canary Grass (Phalaris arundinacea)	\mathcal{T}	1	Ø		Γ
Participant Provide 10, Section 11, Provide 11, Section 21, Section 11, Provide 11, Section 21, Section 11, Provide 11, Section 21, Section 11, Provide 11, Section 11, Se	Norway Maple (Acer platanoides)	┞	+-	1	┢╌┥	_	Black Raspberry (Rubus occidentalis)	⊢				Timothy (Phleum pratense)				E	Γ
Prisonanti Male Adva X Posimiento LA Patho Darg Male (Adva X Posimiento) Patho	Red Maple (Acer rubrum)	⊢	╀	╋	\vdash	_	Purple-fi. Raspberry (Rubus odoratus)	┢─	\vdash	\vdash	\vdash	Common Reed (Phragmites australis)	<u> </u>	R	Щ	1	⊢
Sign Media (Ane sectam) Plast-sectam Willow (Sale strategy) Kentucy Buggings (Page strategy) (V) Spekida Adar (Ane sectam) Plast-sectam Willow (Sale strategy) Figure Strategy) (V) (V) Spekida Adar (Ane sectam) Plast-sectam Willow (Sale strategy) (Figure Focial (States writig) (Figure Focial (Freeman's Maple (Acer X freemanii)	┢	1	+	\square	-	Rubus		\square			Canada Blue Grass (Poa compressa)	\vdash	14	⊢	⊢	⊢
Mountain target Backbar Backbar Tyratow Foodi Science purchas Image: Science writing Image: Scienc	Sugar Maple (Acer saccharum)	t	1	1	\square		Peach-leaved Willow (Salix amygdaloides)		Н	\vdash		Kentucky Bluegrass (Poa patensis)	\vdash	VI	Ь	+	⊢
Specielar Allow (Anse Iscania) Pressy Wilew (Sale decode) Green Footal (Seara wrisig) Specielar Allow (Anse Iscania) Seara and Sale F Villew Biol (Build allowing iscania) Seara and Sale F Specielar Allowing Search (Build percha) Biol (Seara and Sale) F Specielar Strict (Build percha) Seard Willow (Sear Call (Seara and Sale) F Specielar Strict (Build percha) Seard Willow (Sear Call (Seara and Sale) F Specielar Strict (Build percha) Seard Willow (Sear Call (Seara and Sale) F Specielar Strict (Build percha) F F Seard Willow (Sear Call (Seara and Sale) Specielar Strict (Build percha) F F F Strict (Seara and Sale) F F F Corron 1 stackery (Calls call seard and Sale) Green Total (Seara and Sale) Green Total (Seara and Sale) At sense Topaco (Calls and search and Sale) Green Total (Seara and Sale) F Corron 1 stackery (Calls calls and Calls	Mountain Maple (Acer spicatum)		T				Bebb's Willow (Salix bebbiana)					Yellow Foxtail (Setaria pumila)			ľ	1	t
Univery Service Image: Service of Control Service Image: Service of Control Service Service Service Service Image: Service White Brick (Darius appring) Back Wilson (Salar Agr) Service Image: Service Bane Beech (Carrius appring) Back Wilson (Salar Agr) Service Image: Service Bane Beech (Carrius appring) Back Wilson (Salar Agr) Service Image: Service Bane Beech (Carrius appring) Back Wilson (Salar Agr) Service Image: Service Chronge Barthmene (Carrius appring) Back Wilson (Salar Agr) Reduction (Salar Agr) Service Barthmene (Carrius appring) Back Wilson (Salar Agr) Reduction (Salar Agr) Back Wilson (Salar Agr) Back Wilson (Salar Agr) Barthmene (Carrius appring) Expected wilson (Salar Agr) Back Wilson (Salar Agr) Back Wilson (Salar Agr) Back Wilson (Salar Agr) Barthmene (Carrius appring) Expected wilson (Salar Agr) Back Wilson (Salar Agr) <	Speckled Alder (Alnus incana)		F	Ē	μŢ		Pussy Willow (Salix discolor)	\square	\Box			Green Foxtail (Setaria viridis)				Γ	
Description Description Description Fill Description Fill Fill Fill Fill Description Fill Fill Fill Fill Description Fill Fill Fill Fill Billing Michaely Cray configning Fill Fill Fill Fill Billing Michaely Cray configning Fill Fill Fill Fill Billing Michaely Cray configning Billing Michaely Cray configning Fill Fill Fill Billing Michaely Cray configning Billing Michaely Cray configning Fill Fill Fill Corrons Hisbaery Craits configning Billing Billing Cray Craits configning Fill	Downy Serviceberry (Amelanchier arborea)	┞	+	+			Missouri Willow (Salix eriocephala)	\vdash	\square	E			Ц		L	Ē	Ľ
White Bank Bises Winder Laboration Bises Winder Laboration Bises Winder Laboration Bises Winder State Applied Bises Winder State Applied Bises Winder Carpon accolinency Bises Winder State Applied Bises Winder State Applied Bises Winder State Applied Carpon accolinency Bises Winder State Applied Carpon accolinency Bises Winder State Applied Carpon accolinency Bises Winder State Applied Carpon accolinency Bises Winder State Applied Carpon accolinency Bises Winder State Applied Carpon accolinency Bises Winder State Applied Carpon accolinency Bises Winder State Applied Carpon accolinency Expected Carpon accolinency Bises Winder State Applied Carpon Applied C	Serviceberry (Amelanchier Sanguinea) Yellow Birch (Betule elleghenionsis)	⊢	+-	+	\vdash	-	Sanudar Willow (Salix 0xigua)	+	\vdash	-	⊢-		Н		┢	┢	⊢
European Eich (Beinhe penche) Bater (Unite Service Anthony) Bater (Construction cardining) Bater (Construction carding) Bater (Construction cardining) Bate	White Birch (Betula papyrifera)	+	+	t	\square		Black Willow (Salix ricina)	╉┤	Η	Η	+		\vdash		⊢	\vdash	⊢
Bite Beech Campine and minine) State Name	European Birch (Betula pendula)	+	1	1			Slender Willow (Salix petiolaris)		Η	Η			Η	-	⊢	+	┢
Bittemster Entry Flynd Cask Willow (Sain X-ruban) K K Carrbing Bittersweit (Celestrux scandward) Bit	Blue Beech (Carpinus caroliniana)	L	T				Salix						Н		t	t	
Shagahi Hickoy (Cargo conta) IBlack-berrid Elder (Sambusca naro) IBlack-berrid Elder (Sambusca naro) ID Corron Hackberry (Catigo colonitelis) Buffaberry (Shagahard contactions) ID ID Sedan Corron Hackberry (Catigo colonitelis) ID Endoberrid Elder (Sambusca naro) ID Sedan Silv Doposod (Cornus anonan) ID E Corron Hackberry (Catigo colonitelis) ID Silv Doposod (Cornus anonan) E E Corron Hackberry (Toxicolonitelis) ID Grav doposod (Cornus anonan) E E Corron Hackberry (Toxicolonitelis) ID ID Rander Doposod (Cornus anonan) E E Corron Hackberry (Toxicolonitelis) ID I	Bittemut hickory (Carya cordiformis	F	Γ		\square		Hybrid Crack Willow (Salix X rubens)	R	3								Γ
Carbong Waterweek (Zwaters Bachamy) (Past-Bartel Eder (Sambucas maconose) (K. Sambucas maconose) (K. Sambucas maconose) (K. Sambucas maconose) (K. Sambucas maconose) (Carbona sambu) (Sambucas maconose) (Carbona sambus) (Sambucas maconose) (Carbona sambucas maconose) (Carbona sambus maconose) (Ca	Shagbark Hickory (Carya ovata)	_	1				Black-berried Elder (Sambucus nigra)										
Control Display and an analysis Display and analysis Display and analysis Analysis Display analysis Display analysis Display analysis Display analysis Sily Doposod Corrus anonability III Anaron Massic www.ell (Garnas analysis) IIII (Garnas analysis) IIII (Garnas analysis) Sily Doposod Corrus anonability IIII (Garnas analysis) IIIII (Garnas analysis) IIIII (Garnas analysis) IIIIII (Garnas analysis) Revide and Doposod (Corrus anonability) IIIIIII (Garnas analysis) IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Climbing Bittersweet (Celastrus scandens)	┢	+	+	+ +	_	Red-berried Elder (Sambucus racemosa)	\square	К	_					⊢	\vdash	L_
Ail-Bard Dogwood (Cornus alternitivs) R. Narrow Meedow-sweet (Sprane alba) Gradel Seige (Carex alternitivs) Bundberry (Cornus canadamis) Corners in Science (Carex anternitivs) Gradel Seige (Carex alternitivs) Bundberry (Cornus canadamis) Christing Posicion (Carex anternitivs) Gradel Seige (Carex alternitivs) Bundberry (Cornus canadamis) Christing Posicion (Carex anternitivs) Gradel Seige (Carex alternitivs) Bundberry (Cornus canadamis) Christing Posicion (Carex anternitivs) Hall Seige (Carex alternitivs) Brundbeared Dogwood (Cornus anternitivs) Christing Posicion radicamis) Hole Seige (Carex alternitivs) Brundbeared Dogwood (Cornus anternitivs) Stevans Territivs Hall Seige (Carex alternitivs) Anternitivs Hall Seige (Carex alternitivs) Hall Seige (Carex alternitivs) Anternitivs Hal	Buttonbush (Central anthus occidentalis)	┢	10	la	$\left \right $	-	Burraloberry (Snepherdia canadensis)	\vdash				Sedges			⊢	–	⊢
Sity Depresof (Corrus anademsis) Sity Depresof (Corrus anademsis) E E Corrono Line (Syrings vigaris) Site Corrus anademsis) Citering Posson-ivy (Taxoodendon radians) Site Corrus anademsis Citering Posson-ivy (Taxoodendon radians) Site Posson-ivy (Taxoodendon radians) Site Posson-ivy (Taxoodendon radians) Site Posson-ivy (Taxoodendon radians) Site Posson-ivy (Taxoodendon radians) Corres Depreson (Corrus anademsis) Corres Depres	Altleaved Dogwood (Cornus alternifolia)	⊢	ĬŘ	41	$\left \right $		Narrow Meadow-sweet (Spiraea alba)	H				Golden-fruited Sedge (Carex aurea)	\vdash		┝	⊢	┝
Bunchberry (Corrus canaelansis) Pelson-hy (Toskodendron rytkergi) K1 K1 Intervention) Clares de la construit d	Silky Dogwood (Cornus amomum)		F	F			Common Lilac (Syringa vulgaris)	H				Graceful Sedge (Carex gracillima)				\vdash	⊢
Gray dopwool (Corrus neurossa) Christing Poison-ivy (Toxocolendron malicans) B. B. Biedering Subject (Carux International) B. Red-desite Dopwool (Corrus sarcina) Silverin Em (Umus articla) Hube Social (Carux International) B. Red-desite Dopwool (Corrus sarcina) Silverin Em (Umus articla) Hube Social (Carux International) B. Red-desite Dopwool (Corrus sarcina) Silverin Em (Umus articla) Hube Social (Carux International) Hube Social (Carux International) Beaked Hazal (Carlus corrula) Low Bueberry (Vacchum argustibilim) Hube Social (Carux International) Hube Social (Carux International) Beaked Hazal (Carlus corrula) Low Bueberry (Vacchum argustibilim) Fox Social (Carux International) Hube Social (Carux International) Beak Honegoueskin (Dervills Incoren) Riverban (Carux (Muumun International) Carux Hube Social (Carux International)	Bunchberry (Cornus canadensis)		Γ	Γ			Poison-ivy (Toxicodendron rydbergii)	R	R			Inland Sedge (Carex interior)					1
Mound-Barrels Depresed White Exin (Limus pumis) If If Links barris Sedge (Carrus lacids) Machaele Depresed (Carrus services) Bispers (Emi (Limus pumis)) If Links barris Sedge (Carrus lacids) If Links barris Sedge (Carrus lacids) American Issue (Carrus services) Bispers (Emi (Limus pumis)) If Links barris Sedge (Carrus lacids) If Links barris Sedge (Carrus lacids) English Hawhom (Carlussus carrus and the Margheset Mexican and the Margheset Mexican Mexican and the Margheset Mexican Mexic	Gray dogwood (Cornus racemosa)	⊢	╞	<u> </u>	\square		Climbing Poison-ivy (Toxicodendron radicans)	<u>R</u>	ß,			Bladder Sedge (Carex intumescens)					
Production Loginolos (Loginis antesian) P Statistian for (Lumia nutra) Promos Name Statistian for Containant statistian Statistian for (Lumia nutra) Promos Name Promos Name Containant for Containant statistian Statistian for (Lumia nutra) Promos Name Promos Name Containant for Containant statistian Promos Name Promos Name Promos Name Containant for Containant statistian Promos Name Promos Name Promos Name Containant for Containant statistian Promos Name Promos Name Promos Name Containant for Containant statistian Promos Name Promos Name Promos Name Containant for Containant statistian Promos Name	Round-leaved Dogwood (Cornus rugosa)	⊢	┢		\vdash		White Elm (Ulmus americana)		R			Lake-bank Sedge (Carex lacustris)			└_		
Database Development (Construction) Development (Cons	American Hazel (Condus emericane)	⊢	₽	Γ.	\vdash	+	Sibenan Eim (Ulmus pumia)	\vdash			-	Hop Sedge (Carex lupulina)	\square	_	-	\square	⊢
Cockspur Thom (Crategus crusspall) Insepte-test Warmum confidum) Fox Sedge (Carax vubricible) U Explish Hawthom (Crategus punctais) R Namyberry (Vacuum lentego) Carax restriction NA Cratesgus Downy Annowemy (Vacuum lentego) Carax restriction NA Cratesgus Downy Annowemy (Vacuum lentego) Carax restriction NA Cratesgus Downy Annowemy (Vacuum lentego) Carax restriction NA Bash Honegusch (Darvilla knickern) Reverbank Response (Vacuum lentego) Carax NA Bush Honegusch (Darvilla knickern) Reverbank Response Carax NA Runs Bawherry-bush (Excornance angustificite) Ann. Prickly-ash (Carthox/um anericinum) Carax Carax Run Stawherry-bush (Excornance angustificite) Balan Mayberry (Maxmillike Response) Carax Carax Gessey Loostham (Frazgus andrificite) D Reather Mayberry (Maxmillike Restriction angustificite) Carax Carax Beak Maint (Logians angustificite) D Reather Restriction angustificite bushificite) Carax Carax Beatern (Splue angustificite) D Reather Restriction angustificite bus	Beaked Hazel (Corvius cornuta)	┢	+	-	\square		Low Blueberry (Vaccinium anoustifolium)	\vdash				Awl-fruited Sedge (Carex pensylvanica)	+	_		H	⊢
English Hawthom (Crategues monograne) Hobblebush (Viburum Instancides) Cares (b) (b) (i) With the construction of the construle of the construction of the construction of the construction of	Cockspur Thom (Crataegus crus-galli)	t	$^{+}$	\square			Maple-leaf Viburnum (Viburnum acerifolium)					Fox Sedge (Carex vulpinoidea)		O	⊢		1
Large-fruited Thom (Crategus punctate) K Nannyberry (Viburum linetgo) Career Top Care Top	English Hawthorn (Crataegus monogyna)						Hobblebush (Viburnum lantanoides)					Carex pelanii		h			
Creategus Caleborg Creategus Downy Anorwood (Vin Sinesquanum) Bush Honeysuckle (Diarville Innoere) Riverbank Grape (Vitis riparia) Russian Olive (Eleasgrus umbolites) Am. Frickley, ask (Zantopkum americanum) Russian Olive (Eleasgrus umbolites) TILA ATER Russian Olive (Eleasgrus umbolites) TILA ATER Russian Olive (Eleasgrus umbolites) Russian Olive (Eleasgrus umbolites) Reak Ab (Fraxitas americelas) Russian Olive (Eleastanumanolive) </td <td>Large-fruited Thorn (Crataegus punctata)</td> <td>⊢</td> <td>ĮΚ</td> <td></td> <td>\square</td> <td></td> <td>Nannyberry (Viburnum lentago)</td> <td></td> <td></td> <td></td> <td></td> <td>Carex rostrata</td> <td></td> <td>N</td> <td></td> <td></td> <td></td>	Large-fruited Thorn (Crataegus punctata)	⊢	ĮΚ		\square		Nannyberry (Viburnum lentago)					Carex rostrata		N			
Category Construction Construction Construction Construction Result homesuchts Construction Construction Construction Construction Russian Construction Construction Construction Construction Russian Construction Construction Construction Construction Rundition Construction Construction Construction Construction Rundition State State Construction Construction Construction Rundition State State Construction Construction <td>Crataegus</td> <td>⊢</td> <td>+</td> <td>⊢</td> <td>\vdash</td> <td>-</td> <td>Guelder-Rose (Viburnum opulus)</td> <td>\square</td> <td></td> <td></td> <td></td> <td>Carex Inching</td> <td></td> <td>U</td> <td></td> <td>\square</td> <td></td>	Crataegus	⊢	+	⊢	\vdash	-	Guelder-Rose (Viburnum opulus)	\square				Carex Inching		U		\square	
Disset Classe Carex Autum Olive (Eleagenus unballisa) TIL A N E R Carex Autum Olive (Eleagenus unballisa) TIL A N E R Carex Ann Strawberry-bush (Exorymus abouted) Bulaco Act (C f. f. R) Carex American Beech (Fagus grandfolia) Bulaco Act (C f. f. R) Carex Gossy Ducktion (Frangula altung) Fans & Allies Carex Carex Back An (Frazulus arritofane) Lady Fern (Athyrium file-ferrina) Carex Carex Winte Ash (Frazulus arritofane) Bulder Badafer Fenr (C)stpatris buthfera) Redroot Spike-rush (Eleocharis arythropoda) Winte Ash (Frazulus grandfolia) Spin. Wood Fern (Dyopteris carthusana) Eleocharis Eleocharis Batternu (Lugians ritora) R R R Marginal Wood Fern (Dyopteris rathusana) Eleocharis Batternu (Lugians ritora) Orstor Fern (Matteuccis struthisprini) Dark-green Bulush (Sch purgens) Eleocharis Spicebush (Lindera benzoir) Orstor Fern (Altrifue Cost struthisprini) Dark-green Bulush (Sch purgens) Eleocharis Spicebush (Lindera benzoir) Orstor Fern (Altrifue Cost struthisprini) Dark-green Bulush (Sch purgens) Eleocharis Battartin (Linguar grandfolia	Crataegus Bush Honevsuckle (Diepvilla Ionicera)	⊢	+	⊢	\vdash	-	Downy Arrow-wood (Vib. rannesquianum) Riverbank Grape (Vitis rineria)		1.8		-	Carex grave		V	-	\square	\vdash
Autum Olive (Eleasgnus umbellets) TIL ATÉR R Carex American Beech (Fagus grandfolle) Sulary Roise (CF) R Carex Games Anderson (Fangua lanus) Farns & Alles Carex White Ash (Frazinus americano) Lady Fern (Athyninn file-fernina) Carex Black Ash (Frazinus americano) Lady Fern (Athyninn file-fernina) Carex Black Ash (Frazinus genrsykwinica) D Ratioenake Fern (Botynchium viginienum) Cyperus Witch-txael (Hammanis viginiano) Bubet Bladder Fern (Cystoptaris carthusania) Efeocharis Redroot Spike-rush (Eleocharis arytiropodia) Witch-txael (Hammanis viginiano) Corested Wood Fern (Dryoptaris carthusania) Efeocharis Efeocharis Battemul (Jugians signes) Corested Wood Fern (Dryoptaris carthusania) Efeocharis Efeocharis Battemul (Jugians signes) Corested Wood Fern (Dryoptaris carthusania) Efeocharis Efeocharis Battemul (Jugians signes) Corested Wood Fern (Dryoptaris carthusania) Efeocharis Efeocharis Battemul (Jugians signes) Corested Wood Fern (Dryoptaris carthusania) Efeocharis Sch. team Bulrush (Sch. teamenontan) Bojcabush (Lindera benzoin) Corister anandonsei) Efeocharis	Russian Olive (Elaeagnus angustifolia)	⊢	+	┢			Am. Prickly-ash (Zanthoxvlum americanum)	H	V I			Carex		_		\vdash	\vdash
Run. Strawberry-bush (Euroymus obovels) BLACM Ack (Cf.) R Carex. Glossy Buckthom (Frague annalos) Ferns & Allee Carex. Black Ash (Frazinus andranon) Lady Fern (Altyrium fillo-formine) Carex. Black Ash (Frazinus andranon) Lady Fern (Altyrium fillo-formine) Carex. Black Ash (Frazinus andranon) Lady Fern (Altyrium fillo-formine) Carex. Witch-based (Hammellis Vightane) Bulbet Bladder Fern (Cystoptaris butblifers) Perres & Allee Carex. Witch-based (Hammellis Vightane) Bulbet Bladder Fern (Cystoptaris cristila) Perres & Allee Carex. Black Manu (Luglans digran) R (R Marginal Wood Fern (Dystoptaris cristila) Perres & Allee Elsopharis Bask Wahu (Luglans digran) R (R Marginal Wood Fern (Dystoptaris anthioptaris) Softstam Bulush (Sch. burgans) Freme equare Bulush (Sch. purgans) Correon Phrite (Lyustrum vulgare) Dystoptaris Contex anadenisis) Ganamon Fern (Carnunda estruthioptaris) Bask Kalu (Londera anadenisis) Ganamon Fern (Carnunda estruthioptaris) Bask Kalu (Londera anadenisis) Ganamon Fern (Carnunda estruthioptaris) Bask Kalu (Krie gale) Mord-Fern (Dystopharinen) Free Ganamon Fern (Carnunda estruthioptaris) Bask Gale (Migright Gale Gale (Migright Hale)) Free Gale (Migright	Autumn Olive (Elaeagnus umbellata)		\uparrow	ţ		1	TILAMER	H	Rİ			Carex			\vdash	\square	
American Beech (Fegus grandfiole) Image: Care x Glossy Buckhom (Franzule anardicans) Ferns & Allies Black Ab (Fraxinus americans) Image: Lady Fern (Atriptum IIIs/efformine) Care x Black Ab (Fraxinus americans) Image: Lady Fern (Atriptum IIIs/efformine) Care x Winte Abs (Fraxinus americans) Image: Lady Fern (Atriptum IIIIs/efformine) Care x Wintehnzel (Hauramelis vigininen) Bulce Bladder Fern (Cystoptieth Sublifyers) Redrock Spike-rush (Eloocheris extrusions) Black Walnut (Lugiens cheree) Fern (Broycelisis carthusians) Eleocharis Black Walnut (Lugiens cheree) Fern (Dropoteris carthusians) Three-square Bulrush (Sch. Durgens) Black Walnut (Lugiens cheree) Careax Soft-Fern (Mateuccia struthopteris) Dark organe balanski (Scheenoplectus acutus) Dropoteris Speabush (Innore caradensis) Sensitive Fern (Dropoteris carthusians) Bark representations (Scheenoplectus acutus) Fy Horeysuckle (Lonicera diolca) Cinnamon Fern (Osmunda canamame) Bark representations) Genesenabilitis, (Scheenoplectus acutus) Fy Horeysuckle (Lonicera tatarica) K.R. R. Roy (Parula tataria Nonsysuckle (Lonicera tatarica) K.R. Roy (Parula tataria Nonsysuckle (Lonicera tatarica) K.R. Roy (Parula tataria Nonsysuckle (Lonicera tatarica) K.R.	Run. Strawberry-bush (Euonymus obovata)						Billion Base (cf.)		R			Carex					
Glossy Buckhorn (Prargue anuly) Ferns & Allies Carex Black Ash (Fraxinus americana) Lady Fern (Athyrium file/Fernina) Carex Black Ash (Fraxinus ging) Lady Fern (Athyrium file/Fernina) Carex Black Ash (Fraxinus ging) Black Ash (Fraxinus ging) Carex Witeh-bazal (Hamamelis vignilana) Bubte Bladder Fern (Cystoplaris bublifiera) Redroot Spike-rush (Eleocharis erythropode) Witeh-bazal (kurammelis vignilana) Bubte Bladder Fern (Cystoplaris bublifiera) Redroot Spike-rush (Eleocharis erythropode) Butter ut (Juglans charea) R R Marginal Wood Fern (Dryopteris cristela) Back Walnut, (Luglarum vulgare) Dryopteris Schesten Bufuns (Sch. Buerneemontan) Spicebush (Linders barrazin) Destrich Fern (Matsouccia struthiopteris) Dark-green Bulrush (Sch. Buerneemontan) Spicebush (Linders barrazin) Districh Fern (Matsouccia struthiopteris) Dark-green Bulrush (Sch. Buerneemontan) Glaucous Honeysuckle (Lonicare af totica) Cinnamon Fern (Osmunda cinnamonea) Wite Muberry (Marus allea) Hard states White Muberry (Marus allea) R R Northeras Fern (Osmunda cinnamonea) Harow-leaved Catali (Typha arguestivai) Harow-leaved Catali (Typha arguestivai) White Mubery (Marus allea) R <	American Beech (Fagus grandifolia)	⊢	1	L		_		\square		_	\square	Carex					
Black Abi (Travinus nigra) Lady Fern (Athyrium Bix-Anima) Carlox Green Abi (Travinus nigra) P Rattesnake Fern (Bottychlum vignianum) Cyperus Winteh-tazel (Travinus pennsylvanica) P Rattesnake Fern (Bottychlum vignianum) Cyperus Winteh-tazel (Travinus pennsylvanica) B P Read cost P Winteh-tazel (Travinus pennsylvanica) Eleocharis Eleocharis P Black Wahn (Lyglens nigra) Carlox Eleocharis Eleocharis Black Wahn (Lyglens nigra) Carlox Eleocharis Eleocharis Spicebush (Lindera benzoin) D Optication ferm (Matteuccia struthoptens) Dark-green Bulnush (Scirpus atrovinens) Fly Honeysuckle (Lonicare anadansis) Sensitive Fern (Onzodas sensitibilis) Wool-grass (Scirpus cyperinus) Glaucous Honeysuckle (Lonicare anadansis) Eleocharis Eleocharis Glaucous Honeysuckle (Lonicare anadansis) Eleocharis Eleocharis Glaucous Honeysuckle (Lonicare anadansis) Eleocharis Soft-stass materianus Glaucous Honeysuckle (Lonicare anadansis) Eleocharis Soft-stass Glaucous Honeysuckle (Lonicare anadansis) Eleocharis Soft-stass	White Ash (Fravinus americana)	⊢	<u> </u>	┝	\vdash	┥	Forme & Allion	\square		-	$-\!\!+\!\!$	Carex	-		_	\square	\vdash
Green Ash (Frazinus parins/vanica) D Ratteenake Fam (Botrychium virginianum) Cyperus Witch-hazel (Hammanian (Lingian cheres) Bulber Bladder Fam (Cycoptaris actifusianum) Radtoot Spike-rush (Eleocharis arythropode) Witch-hazel (Jugians cheres) Eleocharis Radtoot Spike-rush (Eleocharis arythropode) Butternut (Lugians cheres) Created Wood Fam (Cycoptaris arthusiana) Eleocharis Butternut (Lugians cheres) Droptaris Soft-Asm Burush (Sch. tuppens) Bart Wahut (Lingians cheres) Doroptaris Soft-Asm Burush (Sch. tuppens) Borbabsk (Indrae benzon) Ostrich Fam (Matteuccia struthoptaris) Dark-green Burush (Sch. tuppens) Fly Honeysuckle (Lonicara nandensis) Sansitive Fam (Onzdea senzibilis) Bartistive Fam (Onzdea senzibilis) Bartant Honeysuckle (Lonicara tatrica) R R Royal Fam (Osmunda chaytoninae) Morrow's Honeysuckle (Lonicara tatrica) R R Royal Fam (Osmunda chaytoninae) Morrow's Honeysuckle (Lonicara tatrica) R R Royal Fam (Theilypteris palustris) Dotter Graminoids Morrow's Honeysuckle (Lonicara tatrica) R R R R Royal Fam (Dsmunda chaytoninae) Interrupted Fam (Dsmunda chaytoninae) Interview (Morcu alba) Mars Fam (Theilypteris palustris) Broad Bur-read	Black Ash (Fraxinus anarcana)	⊢	\vdash			-	Lady Fem (Athyrium filix-femina)	\square		-	+	Carex			-	\vdash	\vdash
Witsd-basel (Hamamelis virginiana) Bulbet Bladder Farn (Örstptleris bulbfora) Redroot Spike-rush (Eleocharis arythropoda) Winterberry (Ilex verticiala) Spin. Wood Farn (Dryopteris carstusiana) Eleocharis Eleocharis Back Walnut (Jugians cinerea) R R R Marginal Wood Fern (Dryopteris cristula) Hard-stem Bulush (Sch. burgens) Black Walnut (Jugians cinerea) R R R Marginal Wood Fern (Dryopteris marginalis) Three-square Bulush (Sch. burgens) Spicebush (Lindera benzoin) Ostrich Fern (Matteuccis struthiopteris) Dark-green Bulush (Sch. burgens) Image: Scherus Bulush (Sch. burgens) Glaucous Honeysuckle (Lonicara canadensis) Sensitive Fern (Orocles assochilis) Wool-grees (Scirpus ciperinus) Image: Scherus Bulush (Scherus Burgens) Glaucous Honeysuckle (Lonicara tetarica) A R Royal Fern (Osmunda cignalinano) Image: Scherus Bulush (Scherus Bulush	Green Ash (Fraxinus pennsylvanica)	F	D			1	Rattlesnake Fern (Botrvchium virginianum)	H		-1	+	Cyperus	\vdash	-	-	Η	\vdash
Winterbery (lizz verticialat) Spin. Wood Fem (Dryopteris carthusiene) Eleocharis Butternut (Juglans cinerea) Crested Wood Fem (Dryopteris carthusiene) Hard-stem Bulrush (Schoenoplectus acutus) Black Wainut (Juglans cinerea) Crested Wood Fem (Dryopteris carthusiene) Black Wainut (Juglans cinerea) Black Wainut (Juglans cinerea) Crested Wood Fem (Dryopteris marginalis) Three-square Bulrush (Sch. purgens) Common Prive (Ligustum vulgare) Dryopteris Soft-stem Bulrush (Sch. purgens) Image: Soft-stem Bulrush (Sch. purgens) Spinturs (Lindera banzoin) Ostrich Fem (Matteuccia struthiopteris) Dark-green Bulrush (Sch. purgens) Image: Soft-stem Bulrush (Sch. purgens) Blacous Honeysuckle (Lonicera teircia) Cinnamon Fem (Osmunda cinamonee) Wool-grass (Scirpus cyperinus) Image: Soft-stem Reventeen (Parchum acustichaides) Morrow's Honeysuckle (Lonicera teircia) R R R Royal Fem (Osmunda cinamonee) Image: Soft-stem Reventeen (Parchum acustichaides) Image: Soft-stem Reventeen (Parchum acustichaides) White Mulberry (Marus albe) Eastem Bracken-fem (Parchum acustichaides) Image: Soft-stem Reven-fem (Parchum acustichaides) Image: Soft-stem Reven-fem (Parchum acustichaides) Innebark (Prycoscarpus opulita) Field Horsetail (Equisetum arvense) R R Royal Fem (Christichas Fem (Parchum acustichas) Image: Soft-stem Reven-fem (Parc	Witch-hazel (Hamamelis virginiana)						Bulbet Bladder Fern (Cystopteris bulbifera)			-		Redroot Spike-rush (Eleocharis erythropoda)	4			\square	
Back Wainut (Jugians cinerea) I Crested Wood Fem (Dryopteris marginalis) I Hard-stem Bulrush (Schoenopiedus acutus) I Back Wainut (Jugians cinerea) R (R (Marginal Wood Fem (Dryopteris marginalis) I Three-square Bulrush (Sch. pungens) I Common Privet (Lgustrum vulgare) Dyopteris Botto Hant (Unders benzcin) Dotto: Fem (Matteuccie struthiopteris) IDark green Bulrush (Sch. tabernaemontani) Spicebush (Linders benzcin) D Strich Fem (Interrupted es ensibilis) Wood-grass (Scirpus cyperirus) I Glaucous Honeysuckle (Lonicera dincia) Ennamon Fem (Osmunda cinaemonea) Wood-grass (Scirpus cyperirus) I Glaucous Honeysuckle (Lonicera morowi) Interrupted Fem (Dsmunda cigyoniana) I I Tartarian Honeysuckle (Lonicera titatica) R R Royal Fem (Osmunda cigyoniana) I Common Apple (Malus pumila) R R Christmas Fem (Polyberis palustris) I I Sweet Gale (Myrice gale) Marsh Fem (Thelyberis palustris) Intervale de Castall (Typha angustrika) I I Ninebark (Physocarpus opulificius) Field Horsetail (Equisatum arvense) R Narrow-leaved Castall (Typha tagustrika) I Batsam Popiar (Populus baisarifere) Scouring-rush (Equisatum arvense) R Nare	Winterberry (llex verticilata)				I	1	Spin. Wood Fern (Dryopteris carthusiana)					Eleocharis					
convex.rearrus.rugral fx 1 \ L Imaginal Wood Pern (LPyopters marginalis) Three-square Bulrush (Sch. pungens) Spicebush (Lindera benzain) Dyopteris Soft-stem Bulrush (Sch. taberneemontan) Spicebush (Lindera benzain) Dottich Fem (Mattuccia struthiopteris) Dark-green Bulrush (Sch. taberneemontan) Fly Honeysuckle (Lonicera caradensis) Sensitive Fem (Oncolea sensibilis) Wood-grass (Scrpus cyperinus) Glaucous Honeysuckle (Lonicera tatarica) R & R Royal Fem (Osmunda cinnamonea) Imaginal Wood Grass (Scrpus cyperinus) Tarafara Honeysuckle (Lonicera tatarica) R & R Royal Fem (Osmunda regalis) Imaginal Wood Grass (Scrpus cyperinus) Common Apple (Malus pumila) R & R Christmas Fem (Osmunda regalis) Imaginal Wood Grass (Scrpus cyperinus) Common Apple (Malus pumila) R & R Christmas Fem (Polystichum acrostichoides) Imaginal Wood Grass (Sparganium eurycapum) Uncket-creeper (Parthenodssus inserte) M & Marsh Fem (Thelypteris palustris) Broad Bur-reed (Sparganium eurycapum) Nicket-creeper (Parthenodssus inserte) W R Narrow-leaved Cattail (Typha angustiole) Imaginal Wood Grass (Sparganium eurycapum) Nicket-creeper (Parthenodssus inserte) W R Narrow-leaved Cattail (Typha angustiole) Imaginal Wood Grass (Sparganium eurycapum)	Butternut (Jugians cinerea)	p	h-	0	\square	4	Crested Wood Fern (Dryopteris cristata)	\square	_	\square	\square	Hard-stern Bulrush (Schoenoplectus acutus)	1	_		ЦĪ	П
Spicebush (Inders berzoin) Constraint (Inders berzoin) Solt Starm Buillush (Schue atowiens) Ry Honeysuckle (Lonicera canadensis) Sensitive Ferm (Oncode sensitibilis) Wool-grass (Scipus cyperinus) Morrow's Honeysuckle (Lonicera morrowii) Interrupted Ferm (Matteuccia struthiopteris) Wool-grass (Scipus cyperinus) Morrow's Honeysuckle (Lonicera morrowii) Interrupted Ferm (Osmunde cinamornee) Interrupted Ferm (Osmunde cinamornee) Morrow's Honeysuckle (Lonicera totarica) R R Royal Ferm (Osmunde cinamornee) Interrupted Ferm (Osmunde cinamornee) Morrow's Honeysuckle (Lonicera totarica) R R Royal Ferm (Osmunde cinamornee) Interrupted Ferm (Osmunde cinamornee) Morrow's Honeysuckle (Lonicera totarica) R R Royal Ferm (Osmunde cinamornee) Interrupted Ferm (Osmunde cinamornee) Morrow's Honeysuckle (Lonicera totarica) R R Royal Ferm (Osmunde cinamornee) Interrupted Ferm (Osmunde cinamornee) Morrow's Honeysuckle (Lonicera totarica) R R Royal Ferm (Detrupted Ferm (Osmunde cinamornee) Interrupted Ferm (Osmunde cinamornee) Morrow's Honeysuckle (Lonicera totarica) R R Royal Ferm (Detrupted Ferm (Detrupted Ferm (Detrupted Ferm (Detrupted Ferm (Detrupted Ferm (Detrupted Ferm (Detrupted Ferm (Detrupted Ferm (Detrupted Ferm (Detrupted Ferm (Detrupted Ferm (Detrupted Ferm (Detrupted Ferm (Detrupted Ferm (Detrupted Ferm (Detrupted Ferm (D	Common Privet (Ligustrum vulgere)	r -	112	μŅ	\vdash	+	marginal wood rem (<i>Dryopteris marginalis</i>)	⊢∔	-	-		Inree-square Bulrush (Sch. pungens)	\parallel		-	Н	Н
Fly Honeysuckle (Lonicera canadensis) Sensitive Fern (Onoclea sensibilis) Wong-grass (Scipus cyperinus) Glaucous Honeysuckle (Lonicera dioica) Cinnamon Fern (Osmunda cinnamonnea) Wong-grass (Scipus cyperinus) Morrow's Honeysuckle (Lonicera dioica) R K Royal Fern (Osmunda cinnamonnea) Wong-grass (Scipus cyperinus) Tartarian Honeysuckle (Lonicera diatrica) R K Royal Fern (Osmunda claytoniana) Wong-grass (Scipus cyperinus) Tartarian Honeysuckle (Lonicera tatarica) R K Royal Fern (Osmunda claytoniana) Wong-grass (Scipus cyperinus) Sweet Gale (Myrice gale) Eastern (Polystichum acrositchoides) White Mulaern (Morus elba) Eastern (Perifulum aquilinum) Sweet Gale (Myrice gale) Marsh Fern (Thelypteris palustris) Other Graminoida Ironwood (Ostry virginiana) Sociring-rush (Equisetum arvense) Broad-leaved Cattail (Typha angustificia) Balsam Popie (Populus seismrifere) Sociring-rush (Equisetum vergetum) Articulated Rush (Juncus effusus) Eastern Cottonwood (Populus grandidenteta) Equisetum Soft Rush (Juncus effusus) Iarge-tooth Aspen (Populus seismrifere) Ground-grass (Lycopodium lucidulum) Path Rush (Juncus effusus) Sweet Cherry (Prunus servina) Ground-gine (Lycopodium obscurum) Juncus	Spicebush (Lindera benzoin)	\vdash	+-	\vdash	+	+	Ostrich Fern (Matteuccia struthionteris)	┝╌╢	-	-	+	Dark-green Bulrush (Sch. tabernaemontani)		\neg	-	Н	H
Glaucous Honeysuckle (Lonicera dioica) Cinnamon Fern (Osmunda cinnamonea) Interrupted Fern (Osmunda cinnamonea) Morrov's Honeysuckle (Lonicera tatarica) Interrupted Fern (Osmunda regelis) Interrupted Fern (Osmunda regelis) Tartarian Honeysuckle (Lonicera tatarica) I.R. Royal Fern (Osmunda regelis) Interrupted Fern (Osmunda regelis) Common Apple (Malus pumila) R.R. R. Christmas Fern (Polystichum acostichoides) Interrupted Fern (Osmunda regelis) White Mulbery (Morus alba) Eastern Bracken-fern (Playfoldum aquilinum) Interrupted Fern (Osmunda regelis) Ironwood (Ostrya virginiana) Interrupted Fern (Osmunda regelis) Interrupted Fern (Osmunda regelis) Innebark (Physocarpus opulifolus) Ifield Horsetail (Equisetum arvense) Broad-leaved Cattail (Typha argustificia) Innebark (Physocarpus opulifolus) Ifield Horsetail (Equisetum hyernele) Broad-leaved Cattail (Typha argustificia) Balsam Poplar (Populus balsamifere) Scouring-rush (Equisetum hyernele) Broad-leaved Cattail (Typha K glauce) Eastern Cotonwood (Populus delatatata) I.Equisetum intervente and tatator) Articulated Rush (Juncus effusus) Termbling Aspen (Populus delatatata) I.Equisetum Soft Rush (Juncus effusus) I.Equisetum Sweet Cherry (Prunus avium) Shining Clubmoss (Lycopodium tadulum) Juncus	Fly Honeysuckle (Lonicera canadensis)	—				1	Sensitive Fern (Onoclea sensibilis)		+			Wool-grass (Scirpus cyperinus)		-	-	\vdash	Η
Morrow's Honeysuckle (Lonicera morrowii) Interrupted Fem (Osmunda regalis) Interrupted Fem (Osmunda regalis) Tartarian Honeysuckle (Lonicera matarica) A. R. R. Royal Fem (Osmunda regalis) Interrupted Fem (Osmunda regalis) Common Apple (Malus pumita) A. R. R. Christmas Fem (Polystichum acrostichoides) Interrupted Fem (Osmunda regalis) Sweet Gale (Myrice gale) Imterrupted Fem (Osmunda regalis) Imterrupted Fem (Osmunda regalis) Imterrupted Fem (Osmunda regalis) Sweet Gale (Myrice gale) Imterrupted Fem (Osmunda regalis) Imterrupted Fem (Per/dum aquilinum) Imterrupted Fem (Per/dum aquilinum) Sweet Gale (Myrice gale) Imterrupted Fem (Thelypteris palustris) Imterrupted Fem (Per/dum aquilinum) Imterrupted Fem (Per/dum aquilinum) Sweet Gale (Myrice gale) Imterrupted Fem (Thelypteris palustris) Imterrupted Fem (Per/dum aquilinum) Imterrupted Fem (Per/dum aquisficile) Broad-Bayead Cattail (Typha argustificile) Imterrupted Fem (Per/dum aquisficile) Imterrupted Fem (Per/dum aquisficile) Imterrupted Fem (Per/dum aquisficile) Balsam Poplar (Populus balsamifora) Scouning-rush (Equisetum arvense) R Broad-Beaved Cattail (Typha argustificile) Imterrupted Fem (Per/dum aquisficile) Imterrupted Fem (Per/dum aquisficile) Imterrupted Fem (Per/dum aquisficile) Imterrupted Fem (Per/dum aquisficile)	Glaucous Honeysuckle (Lonicera dioica)						Cinnamon Fern (Osmunda cinnamomea)									Η	Η
Laranan Honeysuckie (Lonicera tatarica) K.K.N. Royal Ferri (Osrnunda regalis) Image: Common Apple (Malus pumila) K.R.R. Christmas Ferri (Polystichum acvisichoides) Image: Common Apple (Malus pumila) K.R.R. Christmas Ferri (Polystichum acvisichoides) Image: Common Apple (Malus pumila) Image: Common Apple (Malus pum	Morrow's Honeysuckle (Lonicera morrowii)	<u> </u>				1	Interrupted Fern (Osmunda claytoniana)	П	1								
Consistent ryppie (marks putritier) Christmas hem (Popules characholdes) Image: Consistent ryppie (marks putritier) Sweet Gale (Myrica gale) Marsh Fem (Thelypteris palustris) Other Graminolds Image: Consistent ryppie (marks putritier) Sweet Gale (Myrica gale) Marsh Fem (Thelypteris palustris) Broad Bur-reed (Sparganium eurycarpum) Image: Consistent ryphie (marks palustris) Image: Consistent ryphie (marks palustris) </td <td>Tartarian Honeysuckle (Lonicera tatarica)</td> <td>Ķ</td> <td>IK-</td> <td>Ŕ</td> <td></td> <td>-</td> <td>Royal Fern (Osmunda regalis)</td> <td>\vdash</td> <td>-</td> <td>\downarrow</td> <td>4</td> <td></td> <td>1</td> <td></td> <td></td> <td>Ц</td> <td>Ц</td>	Tartarian Honeysuckle (Lonicera tatarica)	Ķ	IK-	Ŕ		-	Royal Fern (Osmunda regalis)	\vdash	-	\downarrow	4		1			Ц	Ц
Induction (Inductional) Leastern (Inductional) Other Graminoids Ironwood (Ostrya virginiana) Marsh Ferm (Thelyotteris palustris) Broad Bur-reed (Sparganium eurycarpum) Intervent (Parthenocissus inserta) W R Narrow-leaved Cattall (Typha angustifolia) Ninebark (Physocarpus opulifolius) Field Horsetail (Equisetum arvense) R Broad-leaved Cattall (Typha angustifolia) Balsam Poplar (Populus balsamifera) Scouring-rush (Equisetum nvense) R Broad-leaved Cattall (Typha X glauca) Large-tooth Aspen (Populus deltoides) K Variegated Horsetail (Equisetum variegatum) Articulated Rush (Juncus articulatus) Large-tooth Aspen (Populus deltoides) Ground-cedar(Lycopodium variegatum) Articulated Rush (Juncus articulatus) Sweet Cherry (Prunus avium) Shining Clubmoss (Lycopodium lucidulum) Juncus Pin Cherry (Prunus evium) Shining Clubmoss (Lycopodium lucidulum) Juncus Pin Cherry (Prunus evium) Ground-cedar(Lycopodium obscurum) Juncus Pin Cherry (Prunus evitoria) Ground-cedar(Lycopodium obscurum) Juncus Prunus Set R F-Althy common (rAbundant In ELC): generality widesgreed represented by faity large numbers of individual clumps; usually forming >10% ground over 0: Dominent?*geneented in the polygon by less tha	White Mulherry (Morus elhe)	μ γ	μr.	μ ζ		+	Consumas rem (Polysticnum acrostichoides)	\vdash	-+	+	+		-		-	\vdash	Н
Ironwood (Ostrya virginiana) Ironwood (Ostrya virginiana) Ironwood (Ostrya virginiana) Thicket-creeper (Parthenocissus inserta) W K Ironwood (Cetrya virginiana) Ninebark (Physocarpus opuilifolius) Field Horsetail (Equisetum arvense) R Broad-leaved Cattail (Typha angustifolia) Balsam Poplar (Populus balsamifere) Scouring-rush (Equisetum nyernele) R Broad-leaved Cattail (Typha Aglauca) Large-tooth Aspen (Populus grandidentata) Equisetum variegatum) Articulated Rush (Juncus articulatus) Ironwood (Cetry (Prunus avium) Sweet Cherry (Prunus avium) Shining Clubmoss (Lycopodium lucidulum) Juncus Juncus Black Cherry (Prunus serotina) Ground-pine (Lycopodium obscurum) Juncus Ironwood Black Cherry (Prunus virginiana) Ground-pine (Lycopodium lucidulum) Juncus Ironwood Prunus Stri R Ironwood virginiana) Ironwood (Costra Virginiana) Ironwood Virginiana) Prunus Stri R Ironwood (Costra Virginiana) Ironwood (Costra Virginiana) Ironwood (Costra Virginiana) Ironwood (Costra Virginiana) Prunus Stri R Ironwood (Costra Virginiana) Ironwood (Costra Virginiana) Ironwood (Costra Virginiana) Prunus Stri R	Sweet Gale (Myrica gale)		\vdash		+	+	Marsh Fern (Thelypteris nalustris)	\vdash	+	+	+	Other Graminoide	+	\neg	-	Η	Η
Thicket-creeper (Parthenocissus inserta) W R Narrow-leaved Cattail (Typha angustifolia) Ninebark (Physocarpus opulifolius) Field Horsetail (Equisetum arvense) Broad-leaved Cattail (Typha angustifolia) Balsam Poplar (Populus balsamifera) Scouring-rush (Equisetum hyernela) Broad-leaved Cattail (Typha angustifolia) Balsam Poplar (Populus balsamifera) Scouring-rush (Equisetum hyernela) Broad-leaved Cattail (Typha X glauca) Large-tooth Aspen (Populus grandidentata) Equisetum Soft Rush (Juncus articulatus) R Large-tooth Aspen (Populus termuloides) Ground-cedar(Lycopodium digitatum) Path Rush (Juncus effusus) R Sweet Cherry (Prunus avium) Shining Clubmoss (Lycopodium lucidulur) Juncus Juncus Black Cherry (Prunus serotina) Ground-pine (Lycopodium obscurum) Juncus Vancus Black Cherry (Prunus serotina) R Typha Secondary (Populus termina) Vancus Choke Cherry (Prunus viginiana) R R Typha Secondary (Populus termina) Vancus Prunus Seconda R R R Typha Secondary (Populus termina) Vancus Black Cherry (Prunus serotina) R R R R R D - Dominant*represented	Ironwood (Ostrya virginiana)		t			Ť			+	+		Broad Bur-reed (Sparganium eurvcarpum)	+	-	-	\vdash	Η
Ninebark (Physocarpus opulifolius) Field Horsetail (Equisatum arvense) Broad-leaved Cattail (Typha latifolia) Balsam Poplar (Populus balsamffere) Scouring-rush (Equisatum hyernale) Broad-leaved Cattail (Typha X glauca) Large-tooth Aspen (Populus grandidentata) Equisatum Soft Rush (Juncus articulatus) Field Horsetail (Equisatum arvense) Sweet Cherry (Prunus articulated Rush (Juncus articulatus) Equisatum Soft Rush (Juncus articulatus) Field Horsetail (Equisatum arvense) Sweet Cherry (Prunus articulated Rush (Juncus articulatus) Equisatum Soft Rush (Juncus articulatus) Field Horsetail (Equisatum) Sweet Cherry (Prunus avium) Shining Clubmoss (Lycopodium lucidulum) Juncus Juncus Black Cherry (Prunus serotina) Ground-pine (Lycopodium obscurum) Juncus Juncus Black Cherry (Prunus virginiana) Ground-pine (Lycopodium obscurum) Juncus Juncus Prunus Se R Dominent*represented by large numbers; generally forming >10% ground over or >25% vegetation cover in any one stratum Feldy common (eAbundant In ELC): generally widespreed represented by fairly large numbers of individual clumps; usually forming >10% ground cover U CAO Dominent*represented in the cD; generally widespreed scattered individuals or represented by one or more clumps of many indiniduals (most species will fell into this catergory) </td <td>Thicket-creeper (Parthenocissus inserta)</td> <td></td> <td>u</td> <td>R</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Narrow-leaved Cattail (Typha angustifolia)</td> <td></td> <td></td> <td></td> <td></td> <td>Π</td>	Thicket-creeper (Parthenocissus inserta)		u	R								Narrow-leaved Cattail (Typha angustifolia)					Π
Delisarii ropuris (ropurus Daisarmaria) Scounng-rush (Eguisetum hyemele) Broad-leaved Cattaii (Typha X glauca) Eastem Cottonwood (Populus deltoides) Variegated Horsetaii (Equisetum variegatum) Articulated Rush (Juncus articulatus) Large-tooth Aspen (Populus grandidentata) Equisetum Soft Rush (Juncus articulatus) Image: Constraint (Lycopodium digitatum) Path Rush (Juncus functionatus) Image: Constraint (Lycopodium digitatum) Image: Constraint (Lycopo	Ninebark (Physocarpus opulifolius)	\vdash	1_	ГÌ			Field Horsetail (Equisetum arvense)	Ц	₿Į	1	\square	Broad-leaved Cattail (Typha latifolia)	_			Ц	
Large-took record re	Daisam Popiar (Populus balsamitera)		0	Н	-	-	Scouring-rush (Equisetum hyemale)	\vdash	+	+	+	Broad-leaved Cattail (Typha X glauca)	+	_		Ц	Ц
Termbling Aspen (Populus termulaides) Equation Joint Cush (Juncus Industry) Sweet Cherry (Prunus avium) Shining Clubmoss (Lycopodium digitatum) Path Rush (Juncus tenuis) Sweet Cherry (Prunus pensylvanica) Ground-edar(Lycopodium lucidulum) Juncus Pin Cherry (Prunus pensylvanica) Ground-pine (Lycopodium obscurum) Juncus Black Cherry (Prunus verginiane) UNA Choke Cherry (Prunus virginiane) N Do Dominent?represented by large numbers; generally informacy to the ground over or >25% vegetation cover in any one stratum F - Fairly common (*Abundant In ELC): generally widespreed represented by fairly large numbers of individual clumps; usually forming >10% ground cover U - Uncommon (*Abundant In ELC): generally widespreed scattered individuals or represented by one or more clumps of many individuals (most species will fail into this catergory) R - Rare: represented in the polygon by less than about two individuals or mail clumps Map Number: (2 L) I A C 1 Data: 2 Data: 2 Study Data - 2 6	Large-tooth Aspen (Populus grandidenteta)	Η	ΙV	Н	+	+	vanegateo norsetan (<i>≿quisetum vanegatum)</i> Eouisetum	\vdash	-	+	+ 1	Anticulated RUSIN (JUNCUS Articulatus)	-	p		Н	\vdash
Sweet Cherry (Prunus avium) Shining Clubmoss (Lycopodium luciduum) Juncus Pin Cherry (Prunus pensylvanica) Ground-pine (Lycopodium obscurum) Juncus Black Cherry (Prunus serotina) Image: Second	Trembling Aspen (Populus tremuloides)			Η	+	ť	Ground-cedar(Lycopodium diaitatum)	\vdash	-+	+	+	Path Rush (Juncus tenuis)	+	Ц	-	Н	Η
Pin Cherry (Prunus pensylvanica) Ground-pine (Lycopodium obscurum) Juncus Black Cherry (Prunus serotine) Tyches Se Choke Cherry (Prunus virginiane) Tyches Se D - Dominent Programmel Tyches Se D - Dominent Programmel Tyches Se Wash Choke Cherry (Prunus virginiane) Tyches D - Dominent Programmel K Tyches D - Dominent Programmel Medbundent In ELC): generally widespreed represented by fairly large numbers of individuals or represented by one or more clumps of many individuals (most species will fell into this catergory) R - Rare: represented in View Set the about for individuals or small clumps Map Number: (Sth T-LiAC 1 2 Stud Q - 2 6 Surveyore: TP/RA / 7 S 3	Sweet Cherry (Prunus avium)		Γ				Shining Clubmoss (Lycopodium lucidulum)		1			Juncus	+	-		H	Η
Black Cherry (Prunus serotina) Image: Choke Cherry (Prunus virginiana) Choke Cherry (Prunus virginiana) Image: Choke Cherry (Prunus virginiana) Drunus Si- Image: Choke Cherry (Prunus virginiana) D - Dominent*represented by large numbers, generally forming >10% ground cover or >25% vegetation cover in any one stratum F - Fairly common (=Docessional in ELC): generally widespread represented by fairly large numbers of individual clumps; usually forming >10% ground cover U - Uncommon (=Occessional in ELC): gressent as widespread scattered individuals or represented by one or more clumps of many individuals (most species will fail into this catergory) R - Rare: represented in View individuals or an about five individu	Pin Cherry (Prunus pensylvanica)						Ground-pine (Lycopodium obscurum)					Juncus					
Crocke Cherry (<i>Prunus virginiana</i>) Prunus SA- Reverse represented by large numbers; generally forming >10% ground cover or >25% vegetation cover in any one stratum F - Fafry common (=Abundant In ELC): generally widespreed represented by fairly large numbers of individual clumps; usually forming >10% ground cover U - Uncommon (=Occeational in ELC): generally widespreed scattered individuals or represented by one or more clumps of many individuals (most species will fail into this catergory) R - Rare: represented in the polygon by less than about twe individuals or small clumps Map Number: (SCH) T - LiAC. Map Number: (SCH) T - LiAC. Surveyors: SP/RA / T S SLUT 2 - 2	Black Cherry (Prunus serotina)					T		Г		1		Typha Sp		U	A		
In International Content of the polygon by less than about two individuals or meric schemes in any one stratum P - Painty common (*Abundant In ELC): generally widespread represented by fairy large numbers of individual clumps; usually forming >10% ground cover U - Uncommon (*Abundant In ELC): generally widespread scattered individuals or represented by one or more clumps of many individuals (most species will fail into this catergory) R - Rare: represented in the polygon by less than about two individuals or small clumps Mee Number: CS to T - LiAC. 1	Choke Cherry (Prunus virginiana)	\vdash	0		-			$\mid \downarrow$	_		+	<u> </u>	1	1		\square	
F-Falty common (*Abundant In ELC): generally widespread represented by faity large numbers of individual clumps; usually forming >10% ground cover U - Uncommon (*Occasional In ELC): generally widespread scattered individuals or increased and the polygon by less then about two individuals or email clumps R - Rare: represented in the polygon by less then about two individuals or email clumps Map Number: GSH T-LIAC 1 Q - Q - Q 5 Data: 2 SLIDQ - Q Surveyors: SP/RA / TS 3 SLIT Q - Q	D - Dominent represented by iame numbers: generally	for	mine	>10	1 Karr	und	cover or >25% vegetation cover in any one stratum		_	1							_
U - Uncommon (=Occessional in ELC): present as widespread scattered individuals or represented by one or more clumps of many individuals (most species will fell into this cetergory) R - Rare: represented in the polygon by less than about five individuals or small clumps Map Number: GSH T-LIAC 1 CAP3 4 CAO Data: 2 SU02-2 5 Surveyors: JP/RA/TS 3 SUT 2-2	F - Fairly common (=Abundant in ELC): generally wide	Ispre	aad i	nepre	sente	d by	/ fairly large numbers of individual clumps; usually formina >	>10%	igro	und	cover			-	-		-
R - Rare: represented in the polygon by less than about two individuals or small chumps Map Number: GSH T-LIAC 1 CAP3 0 data: 2 SUD2-2 Surveyors: JP/RA/TS	U - Uncommon (=Occasional in ELC) : present as wide	spre	ad s	catte	red in	divi	duals or represented by one or more clumps of many individ	duals	(то	st st	oecies w	ill fell into this catergory)	_			_	
Map Number: GSH T-LIAC 1 CAP3 4 CAO Data: 2 SU02-2 5 5 5 Surveyors: JP/RA/TS 3 SUT2-2 5 5 5	R - Rare: represented in the polygon by less than about	íve i	indiv	idua	s or s	ma	11 clumps	_		_							
Data: 2 SU02-2 6 Burwyon: JP/RA/75 3 SUT2-2	Map Number: GSH T-LIAC	1					CUP3	4		_[CAO	T				
Burryson: JP/RA/75 1 SUT2-2	Date:	2					SU02-2	5	ľ	T			T	Τ			
	Burveyors: JP/RA/TS	3					SLIT2-2						Τ				



C2. Amphibian Wetland Breeding Habitat Evaluation of Significance Surveys



Vernal Pool/Pond Habitat Description and Feature Identification Form



Study Area (circle one	e): Bluewater	Goshen	Jericho
Pre-determined Station	#: AWOEOS	Feature #1: 60	GSH 2394/2717
UTM	S:		
Date (yyyy-mm-de	d): <u>2013 - 04 - 17</u>	• 	
Field Staff (full name	e): Ton Shormen	+ JESS Piette	
Weather Condition	18: 59 1159F	(1 5	
	IS C N/L ILM	In JUANY	
	a: 8:00 G. ~	Time Finished: 9	lo an.
Water Present (V/	NI)	Vernal Pool or P	Pond 2
Max water Depth (r	n)	Water Quality (
Length(r	n)	Wi	dth(m)
% open water (emerger	nt)	% floating plant cov	ver of open water
Potential to hold water	until July? (circle one)	YES	NO
Human Influences affectiv	ng area (dykes, agricultu	re etc.):	-
	S men (a) nooi aginounu		<u>, , , , , , , , , , , , , , , , , , , </u>
Describe area 100m babi	nd you (field march ata):		
Describe area Tourn Denn	na you (neia, maish elc).		
	·····		
Submergent Plants (Speci	es & % cover **)		
1	,,,	13	
2			
		<u> </u>	
Emergent Plants (Species	& % cover)		
1		3	
2		4	
Floating Plants (Species a	nd % cover)		
1		3	
2			
2		4	
Fringing Shrubs (Species	& ½/cover)		
1	/	3	
2 /		4	
Trees (Species & % cover)			
1		3	
2			
Exposed mud/sand/rock			
Logs (size, quantity, location	on)		
Amphibians/egg masses o	bserved (Type, quantity, lo	ocation)	······
Comments See	Victures 111-122	- Site Flooden	> Could hot
Ac	cepa Pond		

* Feature # refers to assigned AWO/ AWE EOS ID. This # will be used on call sheet & salamander forms

** Of total percent cover (surface and canopy), select top 4 and estimate percent of their cover.

if no water present then no amphiblan or salamander sheet completed

Pools created by tractor/ATV etc. ruts that are not naturalized are not considered vernal pool habitat

Vernal Pool/Pond Habitat Description and Feature Identification Form

AECOM



Salamander Area Search Survey Form

A_COM

Study Area (circle one)	:	Bluewater	(0	Boshenノ		Jericho
Pre-determined Station #	AWO EC	25	F	eature # 1	:609 6	42394/2717
UTMs:	~				~	
Date(yyyy-mm-dd)	: 2013-0	xe-17				
Field Staff (full name)	Tom 56	orney	+ Jess	Pietle	2	
Weather Conditions	Jec. N	Egrath	SIANY			
Time Started	8:00 Q.	~.	Time Finishe	d: 9:10	> a ~~~	
Water Present Y/N)		Vernal pool	depth (m)		2
Vernal Pool width (m)		Vernal Pool le	ength (m)	/	/
		-		/	/	
Vegetation Comments	•					
(Dominant, % cover etc)					
·						
O Amphibiana Obcara]	•••		
	ea		1			
Amphibian Species	Life Stage ²	Number ³	Search T	ype ⁴	Size ⁵	Comments/GPS
		_				
an a watan basu babuna babuna bata babu babu bata babu babu						
Photo # Lo	ocation/or Sub	ject	_∕Photo #	and the	Location/	or Subject
		/				
	to have ODO	`		/		
mmonte (ov: ora maccos		/	/			
omments (ex: e <u>gg masses</u>	to have GFS					
omments (ex: e <u>gg masses</u>	to have GFS					
omments (ex: egg masses 						
omments (ex: egg masses						

² Adult or larvae or egg masses

³ Number of individuals (adults or larvae) or egg masses

⁴ Overturned logs, D-ring dipnet, observation

⁵ Size of individual (adult or larvae) or egg masses (cm)

Amphibian Night Time Call Survey Form

 \bigcirc



Study Ar	rea (circle one): Bluewater (Goshen) Jericho
Pre-determ	nined Station #: 609_FJH2394 *Feature #: 609 FJH2394
	UTMs: n/a
Wate	r Present (Y/N)
* Feature # refe	rs to the vernal pool ID given on the habitat description form
Dat	te (yyyy-mm-dd): $10(3-04-1+)$ Visit #(1-3):
Field S	staff (full names): Jon hotter tim Sharw
	Time Started:
Beaufort Wir	nd Scale (0-6):
Background	
Dackground	(None for drizzle evicin)
Precipitation	(None, log, unzzie, or rain)
Species NONE	IN OUT Direction Facing
GRIR	
GRFR	
NLFR	
PIFR	
SPPE	
WOFR	100m 100m
Code 1 - not s	imultaneous, number of individuals can be accurately counted
Code 2 - some	e call simultaneous, but number of individulas can be reliable estimated
Code 3 - full c	horus, call continuous, numbers of indiviudals cannot be reliably estimated
Beaufort	0: 0-2 km/hr - calm 4: 20-30 km/hr -moderate breeze -small branch moves
Wind Scale	1: 3-5 km/hr - light air movement 5 : 31-38 km/hr - fresh breeze - moderate branch moves
	2: 6-11km/hr - slight breeze - can feel on face 6: 39-49 km/hr - strong breeze - large branch moves
	3: 12-19 km/hr- gentle breeze - leaves move on twigs
Background	0 - no appriciable effect 3 - serious -continuous traffic nearby (6-10 cars)
Noise Scale	1 - slight - distant traffic (1 car) 4- profound -continous traffic passing
	2 - moderate -distant traffic (2-5 cars)
Species	AMTO - American ToadGRTR - Gray TreefrogSPPE - Spring Peeper
Codes	BULL- Bullfrog GRFR - Green Frog WOFR - Wood Frog
	CHFR - Chorus Frog NLFR - N.Leopard Frog
	MIFR - Mink Frog PIFR - Pickeral Frog
General Co	mments: Could get find good, under water
	· ·



Salamander Area Search Survey Form



	-				
Study Area (circle one	e):	Bluewater	Goshen		Jericho
Pre-determined Station	#: (009 GSH2	394/2717	Feature #	1: 609 FS	H2394/2717
UTMs	s: 4570ba	479429	29		
Date(yyyy-mm-dd	1): <u>7013-05</u>	-15			
Field Staff (full name): Tom shin	Mary + Jeron	a Kette		
Weather Condition	S: 16°C. 11/1A	dy	Finana Filmbala ale al as M	Definition of the	
	d: 10:10am		ime Finished: 10	40am	
Water Present V/			Vernel neel depth (m) >1m	
Vernal Pool width (r	n (H) - s n		/ernal Pool length (m	$1 \leq 0$	
	IN NO SUM	v	remain oonengun (m	1 AIM	
Vegetation Comment (Dominant, % cover et Amphibians Obser	s: <u>aquiultin</u> c)	e, Asauble	river		
Vegetation Comment (Dominant, % cover et Amphibians Obser Amphibian Species	s: <u>aquiultivy</u> c) ved Life Stage ²	e, Asaube Number ³	Search Type ⁴	Size ⁵	Comments/GPS
Vegetation Comment (Dominant, % cover et Amphibians Obser Amphibian Species	s: <u>aquiultivy</u> c) ved Life Stage ²	e , Asaube	Search Type ⁴	Size ⁵	Comments/GPS
Vegetation Comment (Dominant, % cover et Amphibians Obser Amphibian Species	s: <u>aquiniting</u> c) ved Life Stage ²	e, Asaube	Search Type ⁴	Size ⁵	Comments/GPS
Vegetation Comment (Dominant, % cover et Amphibians Obser Amphibian Species	s: <u>aquiniltar</u> c) ved Life Stage ²	e, Asaube	Search Type ⁴	Size ⁵	Comments/GPS
Vegetation Comment (Dominant, % cover et Amphibians Obser Amphibian Species	s: <u>aqualtar</u> c) ved Life Stage ²	e, Asaube	Search Type ⁴	Size ⁵	Comments/GPS
Vegetation Comment (Dominant, % cover et Amphibians Obser Amphibian Species	s: <u>aquiultiv</u> c) Ved Life Stage ²	e , Asaube	Search Type ⁴	Size ⁵	Comments/GPS
Vegetation Comment (Dominant, % cover et Amphibians Obser Amphibian Species	s: <u>aquiultivy</u> c) Ved Life Stage ²	e , Asaube	Search Type ⁴	Size ⁵	Comments/GPS
Vegetation Comment (Dominant, % cover et Amphibians Obser Amphibian Species	s: <u>aquinilting</u> c) Ved Life Stage ²	e , Asaube	Search Type 4	Size ⁵	Comments/GPS
Vegetation Comment (Dominant, % cover et Amphibians Obser Amphibian Species	s: <u>aquin(ltiry</u> c)	e , Asaube	Search Type 4	Size ⁵	Comments/GPS
Vegetation Comment (Dominant, % cover et Amphibians Obser Amphibian Species	s: <u>aquinilting</u> c) Ved Life Stage ²	e , Asaube	Search Type 4	Size ⁵	Comments/GPS
Vegetation Comment (Dominant, % cover et Amphibians Obser Amphibian Species	s: <u>aquinilitary</u> c) Ved 	e , Asaube	Search Type 4	Size ⁵	Comments/GPS

Photo #	Location/or Subject	Photo #	Location/or Subject
100-101	and		
102-103	thick shrabs		

Comments (ex: egg masses to have GPS)



¹ Feature # refers to the vernal pool ID given on the habitat description form

² Adult or larvae or egg masses

³ Number of individuals (adults or larvae) or egg masses

⁴ Overturned logs, D-ring dipnet, observation

⁵ Size of individual (adult or larvae) or egg masses (cm)

Amphibian Night Time Call Survey Form

 \bigcirc

()



90 D.C.				
Study Are	ea (circle one):	Bluewater	Goshen	Jericho
Pre-determ	ined Station #:	609_GSH 2.394	*Feature #: 609-	-GSH2394
	UTMs:	Soo-Round #1 Notes		·····
Water	Present (Y/N)	Yes		
* Feature # refer	s to the vernal poo	I /D given on the habitat descripti	on form	
Det		7012-05-11	\/ioit #/1_2\	
	e (yyyy-mm-dd):	2013-05-16		
Field S	taπ (full names):	Tom Showay +	JUSTIA MUARC	
	Time Started:	10:5 1P:m.	Time Finished:	∂0 F .~~
Beaufort Win	d Scale (0-6):	Z	Cloud Cover (%)	: <u> </u>
Background I	Noise Scale (0-	4):	Temperature Celcius	s
Precipitation	(None, fog, driz	zle,or rain) No kg		
Species	IN OUT			Direction Facing
NONE				
АМТО				
BULL				SADET
CHFR				
MIFR				
GRTR				
GRER				
		/		
		/		\
				\
WOFR				1
		100		100-
				TUUM
Code 1 - not s	imultaneous, nur	nber of individuals can be acc	curately counted	
Code 2 - some	e call simultaneo	us, but number of individulas	can be reliable estimated	
Code 3 - full cl	horus, call contin	uous, numbers of indiviudals	cannot be reliably estimat	ed
Beaufort	0: 0-2 km/hr - ca	lm	4: 20-30 km/hr -moderate	breeze -small branch moves
Wind Scale	1: 3-5 km/hr - lia	nt air movement	5 : 31-38 km/hr - fresh bree	ze - moderate branch moves
	2: 6-11km/hr - sl	oht breeze - can feel on face	6: 39-49 km/hr - strong bre	eze - large branch moves
	3: 12-19 km/hr- g	jentle breeze - leaves move on tv	vigs	
		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	
Background	0 - no appriciable	effect	3 - serious -continuous trafi	fic nearby (6-10 cars)
Noise Scale	1 - slight - distant	traffic (1 car)	4- profound -continous traff	ic passing
	2 - moderate -dis	ant traffic (2-5 cars)		
Species	AMTO - Americ	an Toad GRTR - Grav	Treefrog	SPPE - Spring Peeper
Codee	RIII - Bullfrog	CREP_Groo	n Frog	WOER - Wood Frog
	CHER - Chorus		nard Frog	HOIN- NOUTING
	MIFR - Mink Fr		al Frog	
	1411 FZ - 1401 UZ 1 10	-9 THIX-FICKE		
Conorol Co	mmonto:			
General Col	minents.	No prop calling	I'm durg Von)
		· · · · · · · · · · · · · · · · · · ·		······································
	<u></u>			

Amphibian Night Time Call Survey Form





General Comments:



Appendix D

Vascular Plant Species List

BOTANICAL NAME		COMMON NAME	Coefficient of Conservatistm	Wetness Index	Weediness Index	Provincial Status	OMNR Status COSEWIC Status	Global Status	Local Status Lambton County	Local Status Huron County	Natural Area 609							
			am et al	am et al	am et al	master		master	je 2004	am 1993	сι	JP3	sw	D2-2	sw	T2-2	0.	40
			dbiO	oldh	oldh	New		New	Tied	Oldhi	19-Jun-13	14-Aug-13	19-Jun-13	14-Aug-13	19-Jun-13	14-Aug-13	19-Jun-13	14-Aug-13
PTERIDOPHYTES		FERNS & ALLIES																
Equisetaceae		Horsetail Family																
Equisetum	arvense	Field Horsetail	0	0		S5		G5					R	R				
Pinaceae		Pine Family																
Abies	balsamea	Balsam Fir	5	-3		S5		G5			R	R						
Picea	abies	Norway Spruce		5	-1	SE3		G?			F	F						
Picea	glauca	White Spruce				S5		G5			F	F						
Pinus	strobus	Eastern White Pine	4	3		S5		G5	L3	Х	F	F						
DICOTYLED		DICOTS																
Aceraceae		Maple Family																
Acer X	negundo	Manitoba Maple	0	-2		S5		G5	С		U	U	R	R				
Acer X	freemanii	Freeman's Maple				SNR		GNA		L4			U	U				
Anacardiaceae		Sumac or Cashew Family																
Toxicodendron	radicans ssp. negundo	Climbing Poison-ivy	5	-1		S5		G5T		х	R	R	R	R				
Toxicodendron	rydbergil	Ground Poison-ivy	0	0		S5		G5T			R	R	R	R				
Apiaceae		Carrot or Parsley Family																
Cicuta	maculata	Spotted Water-hemlock	6	-5		S5		G5						R				
Daucus	carota	Wild Carrot		5	-2	SE5		G?		I	R	R	R	R		R		
Sium	suave	Hemlock Water-parsnip	6	-5		S5		G5								R		
Asclepiadaceae																		
Asclepias	incarnata	Swamp Milkweed	6	-5		S5		G5						U		U		
Asclepias	syriaca	Common Milkweed	0	5		S5		G5						R		R		
Asteraceae		Composite or Aster Family																
Ambrosia	artemisiifolia	Common Ragweed	0	3		S5		G5			R	R	R	R				
Ambrosia	trifida	Giant Ragweed	0	-1		S5		G5					R	F		U		
Arctium	minus	Common Burdock		5	-2	SE5		G?T?		I	R	R	R	U		U		
Bidens	species	Bidens species											R	U		U		
Symphyotrichum	lanceolatum	Tall White Aster	3	-3		S5		G5T?		х				U				
Symphyotrichum	lateriflorum	Calico Aster	3	-2		S5		G5T5		х				F		U		
Symphyotrichum	novae-angliae	New England Aster	2	-3		S5		G5	С				R	U		U		
Cirsium	arvense	Canada Thistle		3	1	SNA		GNR					R	R				
Cirsium	vulgare	Bull Thistle		4	-1	SE5		G5		I				R				
Erigeron	philadelphicus ssp. philadelpl	Philadelphia Fleabane	1	-3	1	S5		G5T?		Х	R		R	R		R		
Eupatorium	maculatum	Joe-pye-weed			1	S5		G5					R	U		U		
Eupatorium	perfoliatum	Perfoliate Thoroughwort/Bon	2	-4		S5		G5		Х						U		
Helianthus	tuberosus	Jerusalem Artichoke		0		S5		G5						0		0		

BOTANICAL NAME		COMMON NAME	AWAN NOWWO: Coefficient of Conservatistim Wetness Index Wetness Index Provincial Status OMNR Status OMNR Status COSEWIC Status COSEWIC Status Local Status Lambton County Local Status Lunon County				Natural Area 609											
			ham et al	nam et al	nam et al	wmaster		wmaster	dje 2004	iam 1993	CL	JP3	sw	D2-2	sw	T2-2	0.	AO
			PIO	PIO	PIO	Ne		Ř	Tie	Oldr	19-Jun-13	14-Aug-13	19-Jun-13	14-Aug-13	19-Jun-13	14-Aug-13	19-Jun-13	14-Aug-13
Leucanthemum	vulgare	Ox-Eye Daisy		5		SNA		GNR			R		R					
Matricaria	descoidea	Pineapple-weed				SNA		G5						R				
Solidago	altissima	Tall Goldenrod	1	3		S5				Х						U		
Solidago	gigantea	Giant Goldenrod	4	-3		S5		G5		х			R	U				
Solidago	species	Goldenrod species									U		U					
Taraxacum	officinale	Common Dandelion		3	-2	SE5		G5		1	R	R	R	R		R		
Tragopogon	pratensis ssp. pratensis	Common Goatsbeard		5		SNA		GNR					R	R				
Balsaminaceae		Touch-me-not Family																
Impatiens	capensis	Spotted Jewelweed	4	-3		S5		G5		х			U		U			
Brassicaceae		Mustard Family																
Alliaria	petiolata	Garlic Mustard		0	-3	SE5		G5		I	F	F	R	R		R		
Hesperis	matronalis	Dame's Rocket		5	-3	SE5		G4G5		I			R					
Campanulaceae																		
Lobelia	cardinalis	Cardinal Flower	7	-5		S5		G5						U		U		
Caprifoliaceae		Honevsuckle Family																
Lonicera	tatarica	Tartarian Honevsuckle		3	-3	SE5		G?		1	R	R	R	R		R		
Sambucus	racemosa var. racemosa	Red-berried Elderberry	5	2		S5		G5T4T5	L3	x			R	R				
Convolvulaceae			-	-														
Convolvulus	anvensis	Field Bindweed		5		SNA		GNR			R		R					
Cornaceae		Dogwood Family				014/1		GINIC					I.					
Cornus	alternifolia	Alternate-leaved Dogwood	6	5		S 5		G5		x				R				
Comus	amomum sen, obliqua	Silky Dogwood	5	-4		S5		G5T2		×			U	F		F		
Comus	racomoso	Grev dogwood	2	-4		55		G52		~			U					
Comus	naceritosa	Bed asier Degwood	2	-2		55		G51		×			U	-		F		
Contas	Sencea	Red-osier Dogwood	2	-3		35		05		^			0			F		
Bonthorium	sadaidas	Ditch stangerop	4	5		SE.		C5						P				
Cucurbitaceae	sedoldes	Dich-stonecrop	4	-5		35		65						R.				
Echinocustis	lobata	Wild Mack augumbar	2	2		SE.		C5					P					
Dinggagagag	lobala	Teesel Femily	5	-2		35		65					ĸ	- F		0		
Dipsacaceae	full-mum and automatic			-		055		0070					P	P				
Echaecee	runonum ssp. sylvestris	Page Femily		5	-1	SED		Grir					ĸ	ĸ				
Modioago	lupulino			4		CNIA		CNID			P	P	Р	P				
Madiaago					-	SINA	$\left \right $				ĸ	ĸ	ĸ	R D				
wedicago	sauva ssp. Sativa				-	SNA	\vdash	GINKTINR					к	к				
IVIEIIIOTUS	aibà	white Sweet Clover			-	SNA	\vdash	G5						R				
Melilotus	otticinalis	Yellow Sweet Clover		-	-	SNA		GNR					R	R				
l ritolium	pratense	Red Clover		2	-2	SE5		G?					R	R				

BOTANICAL NAME		COMMON NAME	Nax Nax Nax Nax Nax Nax Nax Nax					Natural .	ural Area 609									
			am et al	am et al	am et al	vmaster		vmaster	dje 2004	am 1993	CL	JP3	sw	D2-2	sw	T2-2	0.	AO
			Oldh	OldF	Oldr	Nev		Nev	Tiec	Oldh	19-Jun-13	14-Aug-13	19-Jun-13	14-Aug-13	19-Jun-13	14-Aug-13	19-Jun-13	14-Aug-13
Trifolium	repens	White Clover		2		SNA		GNR					R	R				
Vicia	cracca					SNA		GNR					R	U				
Fagaceae		Beech Family																
Quercus	macrocarpa	Bur Oak	5	1		S5		G5		х	R	R						
Grossulariaceae		Currant Family																
Ribes	americanum	Wild Black Currant	4	-3		S5		G5		х						U		
Juglandaceae		Walnut Family																
Juglans	nigra	Black Walnut	5	3		S4		G5		х	R	R	R	R		R		
Lamiaceae		Mint Family																
Glechoma	hederacea	Ground Ivy		3		SNA		GNR			U	U						
Leonurus	cardiaca	Common Mother-wort		5		SNA		GNR						F		F		
Lycopus	americanus	Cut-leaved Bungleweed	4	-5		S5		G5		х				U		U		
Mentha	arvensis	Wild Mint	3	-3		S5		G5								U		
Scutellaria	galericulata	Hooded Skullcap	6	-5		S5		G5						R				
Lvthraceae																		
Lythrum	salicaria	Purple Loosestrife		-5	-3	SE5		G5	IC	1				R				
Nymphaeaceae																		
Nuphar	variegata	Yellow Pond-lilv				S5		G5T5									х	U
Oleaceae		Olive Family																-
Fraxinus	pennsvlvanica	Green Ash	3	-3		S5		G5	С		D		D	D				
Onagraceae	ponnoyivania	Evening-primrose Family	-															
Circaea	lutetiana	Enchanter's Nightshade	3	3		S5		G5T5		х				U		U		
Oenothera	biennis	Common Evening-primrose	0	3		S5		G5					R	R		-		
Oxalidaceae		Wood Sorrel Family	-	-														
Oxalis	stricta	Yellow Wood-sorrel	0	3		S5		G5		х			R	R				
Polygonaceae		Smartweed Family	-	-														
Polvaonum	persicaria	Ladv's-thumb												R				
Rumex	Crispus	Curly-leaf Dock		-1	-2	SE5		G?	IC	1			R	U				
Primulaceae		Primrose Family												-				
Lysimachia	ciliata	Fringed Loosestrife	6	-3		S5		G5					F	F				
Lysimachia	nummularia	Moneywort	-	-4	-3	SE5		G?		1			U	F		U		
Ranunculaceae		Buttercup Family		Ĺ	Ť													
Anemone	canadensis	Canada Anemone	3	-3		S5		G5			U	U	U	U		U		
Ranunculus	acris	Tall Buttercup		-2	\uparrow	SNA		G5			Ť	Ŭ	U	U U		Ŭ		
Ranunculus	septentrionalis	Swamp Buttercup		Ê	\vdash	0.17	++						U U	F	R	R		
Thalictrum	nubescens	Tale Meadow-rue	5	-2	1	S 5		G5		1			U U	u .	R	R		
			-	<u> </u>			1		1	1		L						

BOTANICAL NAME		COMMON NAME	American conservatistm Coefficient of Conservatistm Vetress Index Veediness Index Provincial Status OMNR Status Cose Status Local Status Lambton County Local Status Huron County						Natural Area 609									
			am et al	nam et al	nam et al	vmaster		vmaster	dje 2004	am 1993	СІ	JP3	sw	D2-2	sw	T2-2	0/	40
			Oldh	oldr	oldr	Nev		Nev	Tiec	Oldh	19-Jun-13	14-Aug-13	19-Jun-13	14-Aug-13	19-Jun-13	14-Aug-13	19-Jun-13	14-Aug-13
Rosaceae		Rose Family																
Crataegus	punctata	Large-fruited Thorn	4	5		S5		G5						R				
Geum	aleppicum	Yellow Avens	2	-1		S5		G5	L2	Х	U	U	U	U				
Geum	canadense	White Avens	3	0		S5		G5		Х			R	R				
Malus	pumila	Common Apple		5	-1	SE5		G5		Ι	R	R	R	R		R		
Potentilla	recta	Rough-fruited Cinquefoil		5	-2	SE5		G?	1	Ι			R	R				
Prunus	species	Cherry Species											R	R				
Rosa	multiflora	Multiflora Rose		3		SNA		GNR					R	R				
Rosa	palustris	Swamp Rose	7	-5		S5		G5					R	R				
Rubus	idaeus	Wild Red Raspberry				SE1		G5T5			U	U				U		
Rubiaceae		Madder Family																
Cephalanthus	occidentalis	Common Buttonbush	7	-5		S5		G5						U		R		
Galium	species	Galium species											R	R				
Salicaceae		Willow Family																
Populus	deltoides ssp. deltoides	Eastern Cottonwood	4	-1		SU		G5T?		Х			R	R				
Salix	eriocephala	Missouri Willow	4	-3		S5		G5							F	F		
Salix	exigua	Sandbar Willow	3	-5		S5		G5							F	F		
Salix X	rubens	Hybrid Crack Willow		-4	-3	SE4		HYB			R	R	U	U				
Scrophulariaceae		Figwort Family																
Verbascum	thapsus	Common Mullein		5	-2	SE5		G?		Ι			R	R				
Solanaceae		Nightshade Family																
Solanum	dulcamara	Bitter Nightshade		0	-2	SE5		G?		I			R	R	R	R		
Tiliaceae		Linden Family																
Tilia	americana	American Basswood	4	3		S5		G5		х			R	R				
Ulmaceae		Elm Family																
Ulmus	americana	White Elm	3	-2		S5		G5?		х			R	R				
Ulmus	rubra	Slippery Elm	6	0		S5		G5					R	R				
Urticaceae																		
Boehmeria	cylindrica	False Nettle	4	-5		S5		G5					R					
Laportea	canadensis	Wood Nettle											F	U	F	U		
Pilea	pumila	Canada Clearweed	5	-3		S5		G5					R	U	U	U		
Urtica	dioica	Stinging Nettle		-1		SNA		G5T5					F	F	F	F		
Violaceae		Violet Family																
Viola	species	Violet Species											R	R				
Vitaceae		Grape Family																
Parthenocissus	vitacea	Thicket-creeper	6	1		S4?		G5					U	U	R	R		

BOTANICAL NAME		COMMON NAME	Coefficient of Conservatistm	Wetness Index	Weediness Index	Provincial Status	OMNR Status COSEWIC Status	Global Status	Local Status Lambton County	Local Status Huron County	Natural				I Area 609						
			n et al	n et al	n et al	laster		laster	2004	n 1993	CL	JP3	SW	02-2	sw	Г2-2	04	40			
			Oldhar	Oldhar	Oldhar	Newn		Newm	Tiedje	Oldham	19-Jun-13	14-Aug-13	19-Jun-13	14-Aug-13	19-Jun-13	14-Aug-13	19-Jun-13	14-Aug-13			
Vitis	riparia	Riverbank Grape	0	-2		S5		G5		х			U	U							
MONOCOTYLEDONS		MONOCOTS																			
Alismataceae																					
Alisma	plantago-aquatica	Water-plantain											R	R							
Sagittaria	latifolia	Broadleaf Arrowhead	4	-5		S5		G5						R							
Cyperaceae		Sedge Family																			
Carex	bebii	Bebb's Sedge	3	-5		S5		G5					U	U							
Carex	grayi	Asa Gray Sedge	8	-4		S4		G4						U							
Carex	lupulina	Hop Sedge	6	-5		S5		G5		Х			U	U							
Carex	rostrata	Beaked Sedge				54?		G5					U	U							
Iridaceae																					
Iris	versicolor	Blue-flag Iris	5	-5		S5		G5					R	R		R					
Juncaceae		Rush Family																			
Juncus	effusus	Soft Rush				S5		G5						R							
Poaceae		Grass Family																			
Bromus	inermis ssp. inermis	Awnless Brome		5	-3 \$	SE5		G4G5T?		Ι	R	R	R	R							
Dactylis	glomerata	Orchard Grass		3	-1 \$	SE5		G?		Ι	R	R	R	R							
Elymus	repens	Quack Grass		3	5	SNA		GNR			R	R	R	R							
Elymus	virginicus	Virginia Wild Rye				S5		G5T5								U					
Glyceria	striata	Fowl Mana Grass	3	-5		S5		G5		Х			U	U	R	R					
Leersia	oryzoides	Rice Cut Grass	3	-5		S5		G5						U							
Phalaris	arundinacea	Reed Canary Grass	0	-4		S5		G5		Х	R	R			D	D					
Phragmites	australis	Common Reed	0	-4		S5		G5					R	R	R	R					
Poa	paulustris	Fowl Meadow Grass	5	-4		S5		G5					U	U							
Typhaceae		Cattail Family																			
Typha	species	Cattail species											U	U	R	R					

FLORISTIC SUMMARY & ASSESSMENT

Species Diversity		
Total Species:	86	
Native Species:	66 7	77%
Exotic Species	20 2	23%
S1-S3 Species	0	
S4 Species	2	
S5 Species	68	

EXPLANATION OF TERMINOLOGY

Botanical and Common Name: From Integrated Taxonomic Information System (IT IS). 2012. Co-efficient of Conservatism: This value, ranging from 0 (low) to 10 (high), is based on a species tolerance of disturbance and fidelity to a specific habitat integrity.

Wetness Index: This value, ranging from -5 (obligate wetland) to 5 (upland) provides the probability of a species occurring in wetland or upland habitats.

Weediness Index: This value, ranging from -1 (low) to -3 (high) quantifies the potential invasiveness of non-native plants. In combination with the percentage of non-native plants, it can be used as an indicator of disturbance.

Provincial Status: Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. These ranks are not legal designations. S4 and S5 species are generally uncommon to common in the province. Species ranked S1-S3 are considered to be rare in Ontario. Local Status:

VU: native and very uncommon

X: native and not rare or very uncommon

C: native and common

R: native and rare

I: introduced and persisting outside of cultivation.

Ir: introduced and rare

Ih: introduced and known only from historic records

Ivu: introduced and very uncommon

Iu: introduced and uncommon

Ic: introduced and common

Annotations: Provides comments on general distribution and abundance on the subject lands. Definitions of terminology and abbreviations used as follows.

Abundance

Dominant: represented by large numbers; generally forming >10% ground cover or >25% vegetation in any one stratum

Fairly common: generally widespread; represented by fairly large numbers of individual clumps; usually forming >10% ground cover

Uncommon: present as widespread scattered individuals or represented by one or more clumps of many individuals

Rare: represented in the polygon by less than about five individuals or small clumps

DETAILED EXPLANATION OF TERMS

Floral Quality Index and Coefficient of Conservatism Values

Vegetation species and community sensitivity was assessed through the application of coefficient of conservatism values (CC), assigned to each native species in southern Ontario (Oldham, et. al, 1995). The value of CC, ranging from 0 (low) to 10 (high), is based on a species tolerance of disturbance and fidelity to specific habitat integrity. The occurrence of species with a CC of 9 or 10 can be good indicators of undisturbed conditions such as mature forests, fens or bogs.

General habitat values associated with the CC values are:

0-3: species found in a wide variety of communities, including disturbed sites

4-6: species associated with a specific community, but tolerate moderate disturbance

7-8: species associated with a community in an advanced successional stage, tolerant of minor disturbances

9-10: species with a high degree of fidelity to a narrow range of synecological parameters

The floristic quality of an area is reflected in the mean value of CC. For example, an old field or grazed woodlot would tend have a low mean CC; these habitats are dominated by opportunistic species that occur in a wide range of site conditions and are tolerant of disturbance. A bog, prairie or intact forest would have a higher value, reflecting the specific habitat requirements of many of the species and a generally undisturbed condition. The following provides an example of interpretation of CC values: mean CC value / % spp CC >8 / Condition of the Landscape

5 / 27 / intact

3.5 / 19 / slightly degraded

1.3 / 2 / severely degraded

The FQI accounts for the species diversity of the area by equating the number of native species with the mean CC value. The FQI is generally used for comparing natural areas. The CC value and FQI of the study area were calculated for the entire study area.

Weediness Index

The sensitivity of natural areas can be assessed through application of the Weediness Index. The Weediness Index quantifies the potential invasiveness of non-native plants, and, in combination with the percentage of non-native plants can be used as an indicator of disturbance. Values (ranging from 1- to -3) have been assigned to most non-native species based on the potential impact each species can have in natural areas:

-1: little or no impact on natural areas (most non-native plants are in this category)

- -2: occasional impacts on natural areas, generally infrequent or localized
- -3: major potential impacts on natural areas

Wetness Index

All plants in southern Ontario have been assigned a wetland category, based on the designations developed for use by the United States Fish & Wildlife Service. Plants are designated into the following categories:

OBL (Obligate Wetland): occurs almost always in wetlands under natural conditions (estimated >99%

probability)

FACW (Facultative Wetland): usually occurs in wetlands, but occasionally found in non-wetlands (estimated 67-99% probability)

FAC (Facultative): equally likely to occur in wetlands or non-wetlands (estimated 34-66% probability) FACU (Facultative Upland): occasionally occurs in wetlands, but usually occurs in non-wetlands (estimated 1-33% probability)

UPL (Upland): occurs almost never in wetlands under natural conditions (estimated <1% probability)

Further refinement of the Facultative categories are denoted by a "+" or "-" to express exaggerated tendencies for those species. The "+" denotes a greater estimated probability occurring in wetlands than species in the general indicator category, but a lesser probability than species occurring in the next higher category. The "-" denotes a lesser estimated probability of occurring in wetlands than species in the general indicator category, but a greater probability than species occurring in the next lower general category.

Each wetland category has been assigned a numerical value to facilitate the quantification of the wetness index. The wetland categories and their corresponding values are as follows:

OBL : -5 FACW+: -4 FACW: -3 FACW-: -2 FAC+: -1 FAC: 0 FAC-: 1 FACU+: 2 FACU+: 2 FACU-: 4 UPL: 5

Provincial Status

Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. These rankings are based on the total number of extant Ontario populations and the degree to which they are potentially or actively threatened with destruction. The ranks are: S1: Critically Imperiled—Critically imperiled 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

S2: Imperiled—Imperiled 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

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

S4: Apparently Secure—Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5:Secure—Common, widespread, and abundant in the nation or state/province 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

SNR Unranked—Nation or state/province conservation status not yet assessed

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

SNA Not Applicable —A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

SU: Unrankable—Currently unrankable due to lack of information or due to substantially conflicting information about status or trends

Rank ranges, e.g. S2S3, indicate that the rank is either S2 or S3, but that current information is insufficient to differentiate.

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).

REFERENCES

Nomenclature based on:

Integrated Taxonomic Information System (IT IS). 2012: (http://www.itis.gov)

Co-efficient of Conservatism, Wetness & Weediness:

Oldham, M.J., W.D. Bakowsky and D.A. Sutherland. 1995. Floristic quality assessment for southern Ontario. OMNR, Natural Heritage Information Centre, Peterborough. 68 pp.

Provincial (Ontario) Status:

Natural Heritage Information Centre (NHIC). 2000. Provincial status of plants, wildlife and vegetation communities database. http://www.mnr.gov.on.ca/MNR/nhic/nhic.html. OMNR, Peterborough.

Local Status:

Oldham, M.J. 1993. Distribution and Status of the Vascular Plants of Southwestern Ontario. OMNR