

Toronto and Region
Conservation
Authority

The Meadoway:
Vegetation, Bird and Butterfly Monitoring
Update Report
2016, 2018, 2019

Prepared by Environmental Monitoring and Data Management
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1 Introduction

The Meadoway project involves the revitalization of a 16-km linear hydro corridor, formerly known as the Gatineau Hydro Corridor (Figures 1 and 2). The goals of the revitalization are to create and maintain meadow habitat and to create an active east-west link between downtown Toronto and the Rouge National Urban Park becoming one of the largest greenspaces in Canada (Sharma 2018).

Restoration and maintenance activities have included seeding portions of the corridor with flora species native to meadows, mowing and invasive species management. Restoration began in 2012 with the section between McCowan Road and Lawrence Avenue East being prepared and seeded. Several other sections were seeded between 2013 and 2016; however, some sections remained un-restored as highly manicured turfgrass such as the west end of The Meadoway between Eglinton Avenue East and Kennedy Road. These turfgrass areas started undergoing restoration (spraying, tilling, seeding cover crops) in the summer of 2019. Mowing and herbicide application has occurred intermittently in different sections although became a more prominent focus in 2018.

Monitoring activities began in 2016 to document changes in species composition related to the vegetation, breeding birds and butterfly presence. The monitoring has also occurred in 2018 and 2019. This report is an update to the 2018 monitoring report with a focus on seeding success, species composition and abundance along with a comparison of turfgrass plots to restored plots. The effectiveness of invasive species management is also assessed in this report and can be used to guide future management decisions.



Figure 1. The Meadoway

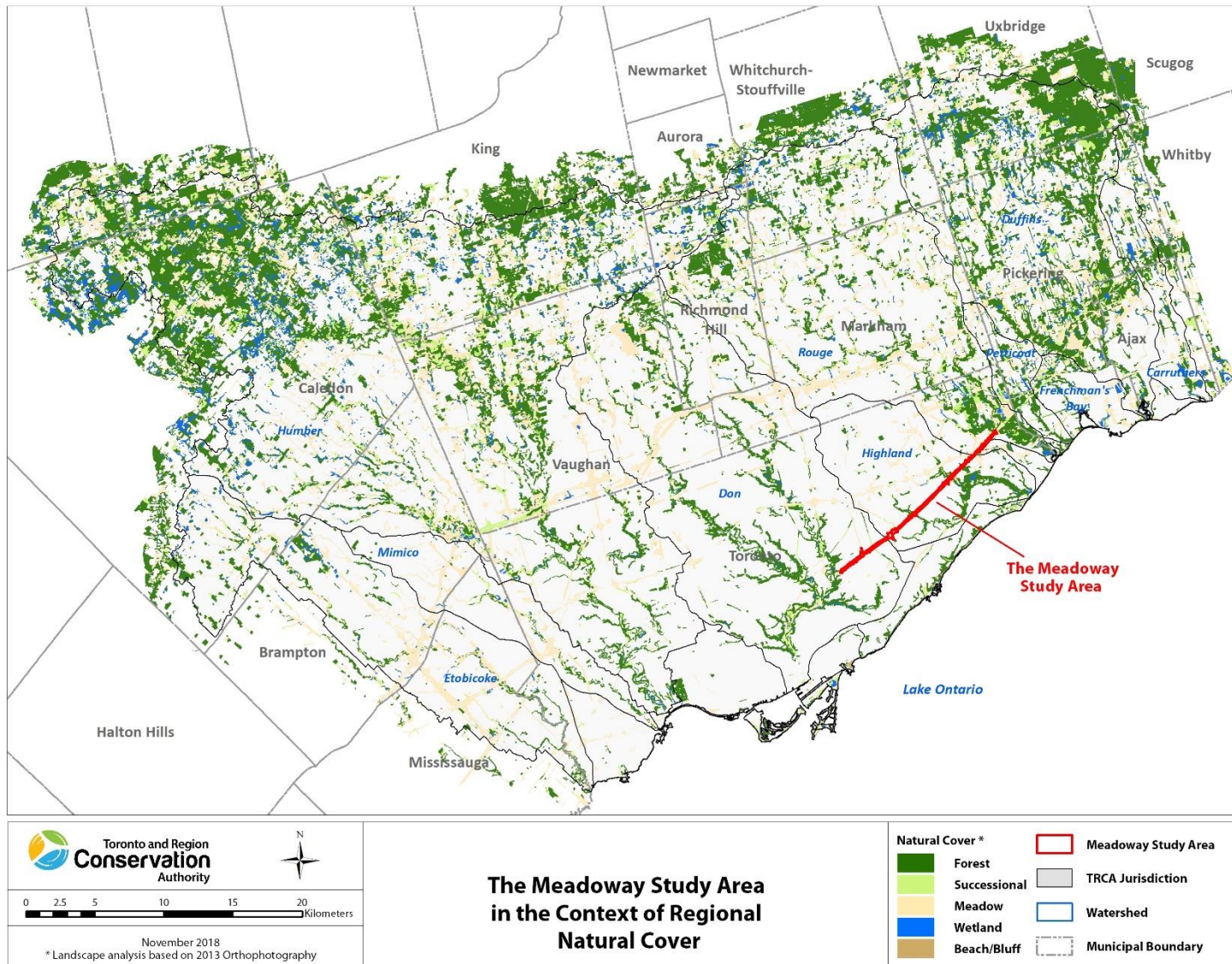


Figure 2. Geographic location of The Meadoway related to the Toronto and Region Conservation Authority (TRCA) jurisdiction

2 Methodology

2.1 Vegetation plots

The methodology for monitoring meadow ecosystems used by the Toronto and Region Conservation Authority (TRCA) is based on the Ecological Monitoring and Assessment Network (EMAN) endorsed terrestrial vegetation biodiversity monitoring protocols identified by Roberts-Pichette and Gillespie (1999). As the EMAN protocol was originally intended for forest communities, adaptations to the protocol were made making it specific to meadow ecosystems (Figure 3).



Figure 3. Vegetation plot set-up at The Meadoway

Each meadow plot consisted of one 20 x 20 m (400 m²) main plot, five 2 x 2 m (4 m²) shrub and sapling regeneration sub-plots and five 1 x 1 m (1 m²) ground cover vegetation sub-plots (nested within the larger regeneration sub-plots). Shrub and sapling regeneration sub-plots were monitored once during the growing season (September). Sites were visited approximately the same time each year coinciding with the second ground vegetation visit. All shrubs and seedlings that were <10 cm diameter-at-breast-height and ≥16 cm in height were considered in regeneration sub-plots. Only live plants were recorded in regeneration sub-plots. The boundaries of the 2 x 2 m sub-plots were identified and delineated. All qualifying plant species originating within the sub-plot were identified. Individuals within each species were then measured with a metre stick and recorded into the appropriate height class located on the data sheet. Height measurements were taken from the ground to the upper most living portion of the plant. For plants that leaned, the vertical distance from the ground to the highest part of the plant was recorded as the height. The percent cover that each species provides was estimated.

All herbaceous plants, regardless of size, as well as shrub, tree and woody vines <16 cm in height were considered in ground vegetation sub-plots. Ground vegetation sub-plot monitoring was conducted twice during the growing season to capture early and late growing meadow/prairie species. The first visit was in early June and the second in late summer (September). Sites were visited approximately the same time each year. Each plant species originating within or hanging over into the 1 x 1 m sub-plot was identified. A 1 x 1 m grid square consisting of smaller 10 x 10 cm grids was positioned over corner “A” of the sub-plot and shifted to the other three corners. The number of 10 x 10 cm squares that each species occupies was summed to determine their total percentage of cover within the sub-plot. It was also noted if a species was solitary. The cover of dead vegetation (thatch) was also measured in the ground vegetation plots.

Species lists were created for the plot as a whole using data combined from the 20 x 20, all 2 x 2s and all 1x 1s. For a detailed description of vegetation monitoring methodology please see the Bob Hunter Meadow Management Monitoring Protocol (TRCA 2016).

Vegetation data were interpreted using TRCA’s local rank (L-rank) system for flora (TRCA 2017). The L-rank system is a species scoring and ranking system developed at TRCA to provide guidance for natural heritage protection and management within the jurisdiction. The L-rank system uses simple ranks to convey individual species’ ecological needs and sensitivities rather than just “rarity” in order to portray such complexities on a simple ordinal scale. Flora are scored using four criteria: local occurrence, population trend, habitat dependence and sensitivity to development impacts. For example, species ranked L1 would have: a limited local occurrence, declining population trends, habitat specialist preferences and a sensitivity to development. Species ranked L5 would have: a widespread local occurrence, increasing population trends, habitat generalist preferences and a tolerance to development. These are extreme examples and species can be ranked L1, L2, L3, L4 or L5 based on the scores associated with this combination of ecological needs and population status assessments. In addition, flora species can be categorized as follows: L1-L3 species are of regional conservation concern, L4 species are of conservation concern in urban areas, L5 species are not of conservation concern at this time, L* species are native to southern Ontario but with no known natural records in TRCA jurisdiction, LX species have been extirpated from the TRCA jurisdiction (but have been planted since extirpation), L+ species are introduced species not native to the TRCA jurisdiction, L+? species are probably introduced.

2.2 Bird stations

Meadow bird monitoring followed an adapted Ontario Forest Bird Monitoring Protocol (Figure 4). This protocol is also used for meadow bird surveys conducted through TRCA’s Terrestrial Long-term Monitoring Program (TRCA 2011). Meadow birds were monitored twice during the field season with the first visit occurring between May 15th and May 30th, and the second visit between May 30th and June 15th, with at least 10 days between visits. Counts were conducted between 05:00 and 10:00 hours and at approximately the same time of day on subsequent visits from year to year. Counts were only conducted in good weather conditions (no rain, light winds). All birds seen or heard within a 100 m radius circle and during a 10-minute time period were recorded. In the 2018 report, all bird species were included in the analysis; however, this report only contains species assumed to be breeding at the site.

Bird data were also interpreted using TRCA’s local rank (L-rank) system for fauna. Fauna L-ranks are based on scores for six criteria including local occurrence, population trends, habitat dependence, area sensitivity, patch isolation sensitivity and sensitivity to development. For example, species ranked L1 would have: a limited local occurrence, declining population trends, habitat specialist and area sensitive requirements, restricted mobility and a sensitivity to development. Species ranked L5 would have: a widespread local occurrence, increasing population trends,

habitat generalist and non-area sensitive requirements, no sensitivity to patch isolation and a tolerance to development. Again, these are extreme examples and species can be ranked L1, L2, L3, L4 or L5 based on the scores associated with this combination of ecological needs and population status assessments.



Figure 4. Biologist conducting bird monitoring

2.3 Butterfly transects

Butterflies were surveyed in 2016, 2018 and 2019 by slowly walking a specified path through the meadow and identifying/counting butterfly species observed (Figure 5). In 2016 and 2018, five sections were surveyed with transects situated on the paved trail that runs the length of the corridor. In 2019 two new sections (at the west end of the corridor) were added and the transects were moved slightly to run beneath the northmost hydro wires for the entire length of the corridor. In 2019, Hydro One established a works yard in a portion of section 7 making comparisons across the three years difficult. Start and end times were recorded and were generally consistent among years. Butterflies were identified to species where possible or to genus if species-level identification was not possible. Four visits were made each year to capture variation in adult emergence dates among species and migratory species. Surveys were conducted between 09:00 and 16:00 and only in good weather conditions ($>20^{\circ}\text{C}$, no rain, light winds).



Figure 5. Common ringlet (*Coenonympha tullia*)

3 Results

Twenty-four vegetation plots were set-up between 2016 and 2019 (Table 1, Figure 6). Vegetation plots A-O were set-up in 2016 and monitored in 2016, 2018 and 2019. Plots P-U were set-up in 2018 and were monitored in 2018 and 2019. Plots Q and R were moved in 2019 (by request of Hydro One) and re-named V and W (respectively). The new location of these plots still represents the general conditions within that section; however, changes in plant species composition at these stations were not compared between years. Bird monitoring was completed in 2016, 2018 and 2019 in study area sections 4 and 7, and only in 2018 and 2019 in study area sections 1 and 2. Butterfly monitoring was completed in study area sections 4 and 7 in 2016, 2018 and 2019, and was expanded to sections 1 and 2 in 2019.

Table 1. Vegetation plot characteristics, seed mix and bird/butterfly survey locations and years surveyed

Location	Seed mix	Vegetation plot letter	Vegetation plot years	Bird station #	Bird survey years	Butterfly survey years
Section 1.1	n/a	X	2019	-	-	-
Section 1.2	Turfgrass	P	2018/2019	-	-	-
Section 1.3	Turfgrass	Q, V	Q 2018, V 2019	-	-	-
Section 1.4	Turfgrass	R, W	R 2018, W 2019	6	2018/2019	2019
Section 2	Turfgrass	S, T, U	2018/2019	7	2018/2019	2019
Section 4.1	Mix 2	G, H, I	2016/2018/2019	1	2016/2018/2019	2016/2018/2019
Section 4.2	Mix 1	A, B, C	2016/2018/2019	2	2016/2018/2019	2016/2018/2019
Section 4.3	Mix 1	D, E, F	2016/2018/2019	3	2016/2018/2019	2016/2018/2019
Section 4.4	Mix 2	J, K, L	2016/2018/2019	4	2016/2018/2019	2016/2018/2019
Section 7	Mix 1	M, N, O	2016/2018/2019	5	2016/2018/2019	2016/2018/2019

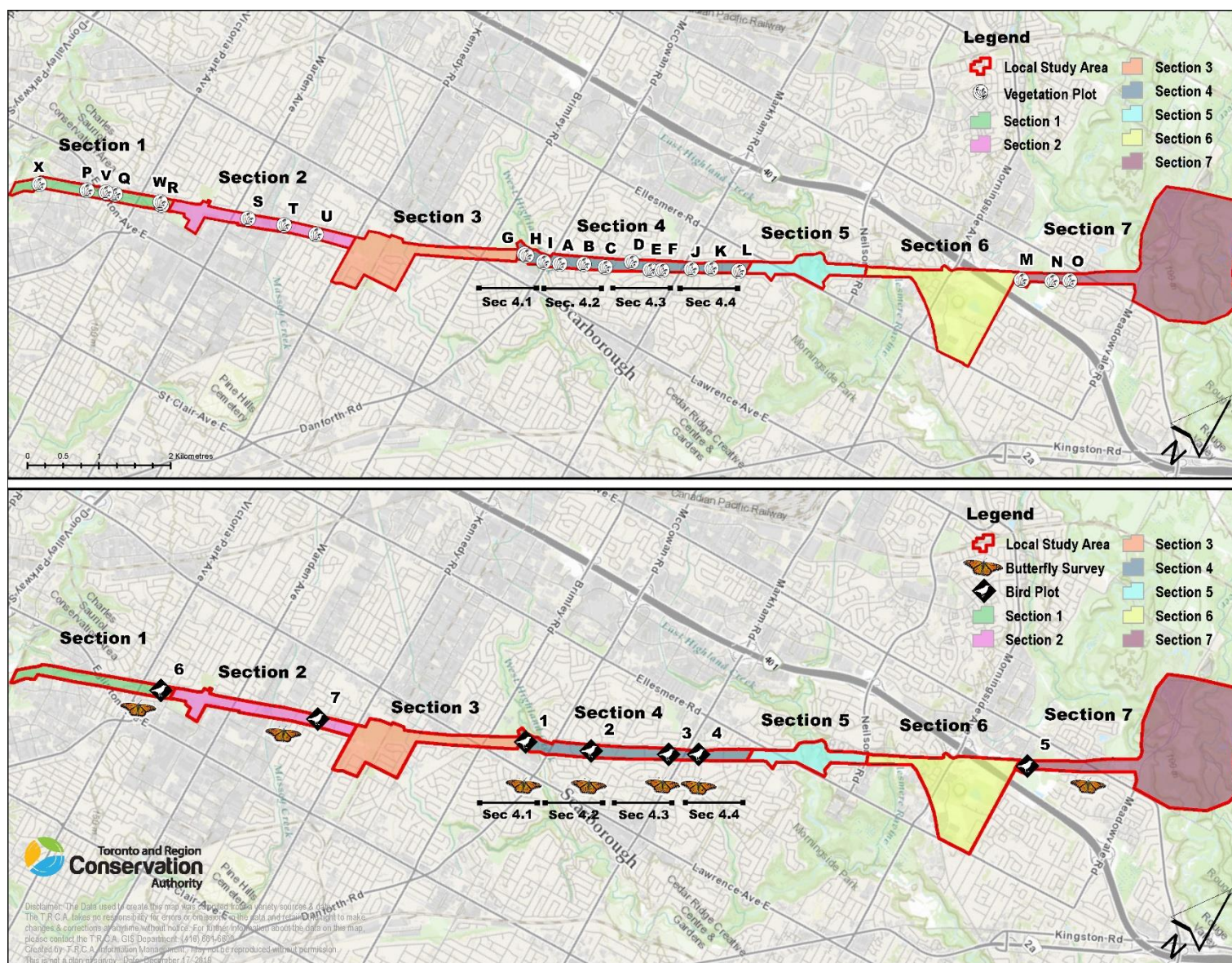


Figure 6. Vegetation plot, bird and butterfly survey locations at The Meadoway in 2016, 2018 and 2019

3.1 Vegetation plots

Flora results describe species occurrence related to the type of seed mix planted (identified as seed mix 1 and seed mix 2, Table 2), year surveyed, location in The Meadoway and between seeded plots and turfgrass plots (unrestored at time of sampling in 2019). As such, the results section has been split into sub-sections which assist in synthesizing these descriptions. An additional section has been added to this 2019 report update related to examining the effectiveness of invasive species management of creeping thistle (*Cirsium arvense*) and dog-strangling vine (*Cynanchum rossicum*) using the vegetation plot data.

Table 2. Flora species specified in seed mix 1 and 2

Species name	Common name	L-rank	Seed mix 1	Seed mix 2
<i>Lobelia cardinalis</i>	cardinal flower	L1	x	x
<i>Schizachyrium scoparium</i>	little bluestem	L2	x	x
<i>Sorghastrum nutans</i>	Indian grass	L2	x	x
<i>Heliopsis helianthoides</i>	ox-eye	L2	x	x
<i>Andropogon gerardii</i>	big bluestem	L3	x	x
<i>Panicum virgatum</i>	switch grass	L3	x	x
<i>Gentiana andrewsii</i>	bottle gentian	L3	x	x
	round-headed bush-			
<i>Lespedeza capitata</i>	clover	L3	x	x
<i>Lobelia siphilitica</i>	great blue lobelia	L3	x	x
<i>Penstemon digitalis</i>	foxglove beard-tongue	L3	x	x
<i>Penstemon hirsutus</i>	hairy beard-tongue	L3	x	x
<i>Pycnanthemum virginianum</i>	Virginia mountain-mint	L3	x	
<i>Elymus canadensis</i>	Canada wild rye	L4	x	x
<i>Rudbeckia hirta</i>	black-eyed Susan	L4	x	x
<i>Elymus virginicus</i> var.				
<i>virginicus</i>	Virginia wild rye	L5	x	
<i>Desmodium canadense</i>	showy tick-trefoil	L5	x	x
<i>Monarda fistulosa</i>	wild bergamot	L5	x	x
	common evening-			
<i>Oenothera biennis</i>	primrose	L5	x	x
<i>Silphium perfoliatum</i>	cup-plant	L5	x	x
<i>Verbena hastata</i>	blue vervain	L5	x	
<i>Asclepias sullivantii</i>	smooth milkweed	LX	x	x
<i>Asclepias tuberosa</i>	butterfly milkweed	LX	x	x
<i>Helianthus giganteus</i>	tall sunflower	LX	x	x
<i>Solidago rigida</i> ssp. <i>rigida</i>	stiff goldenrod	LX	x	
<i>Allium cernuum</i>	nodding wild onion	L*	x	x
<i>Coreopsis lanceolata</i>	lance-leaved coreopsis	L*	x	x
<i>Coreopsis tripteris</i>	tall tickseed	L*	x	x
<i>Echinacea pallida</i>	pale purple coneflower	L*	x	x
<i>Ratibida pinnata</i>	grey-headed coneflower	L*	x	x
<i>Vernonia missurica</i>	Missouri ironweed	L*	x	
<i>Veronicastrum virginicum</i>	Culver's root	L*	x	

3.1.1 Vegetation plots A-F – seed mix list 1

Plots A-F contained a total of 158 species including 64 (40%) native species, 90 (57%) species not native to southern Ontario and 4 species that were previously deemed to have been extirpated from the Toronto Region (Appendix 1, Figure 7). The area where vegetation plots A-F were established was seeded with species in seed mix 1. These plots contained 24 of the 31 species (77%) specified in seed mix 1 (Figure 7, Table 3).

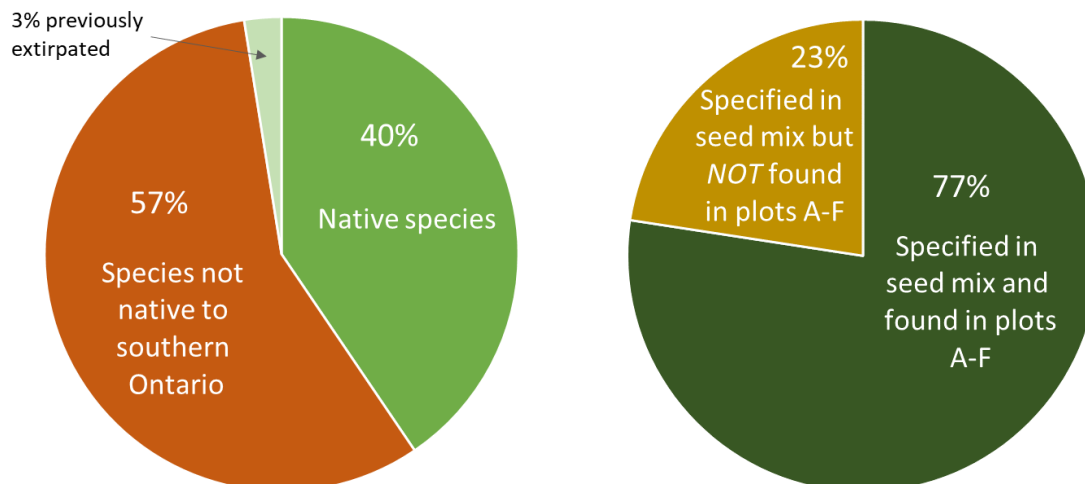


Figure 7. Flora species composition in plots A-F

There was variation in when different species from the seed mix were found in the plots (Table 3). In addition to this temporal variation, seven species found were also identified by botanists as seeded, although were not shown on the seed mix list: wild senna (*Senna hebecarpa*), tall ironweed (*Vernonia gigantea*), Riddell's goldenrod (*Solidago riddellii*), smaller evening-primrose (*Oenothera parviflora*), large-flowered tickseed (*Coreopsis grandiflora*), swamp rose-mallow (*Hibiscus moscheutos*) and swamp milkweed (*Asclepias incarnata* ssp. *incarnata*) (Figure 8). It was clear that these were species introduced into the seed mix because they are prairie plants that are not native to the TRCA jurisdiction but are associated with other prairie plants that were specified in the seed mix. They are highly conservative species that are unlikely to volunteer into a disturbed hydro corridor as adventive introductions. In general, their native range extends into parts of southwestern Ontario.

Fifteen species occurred at a high frequency, being found in all plots (A-F) each year, including cup-plant (*Silphium perfoliatum*; Figure 8), while 30 species were rare, being found in only 1 plot over all years. Species frequently observed or rarely observed included a mix of native species and non-native species. One non-native, invasive species, that was found in all plots (A-F) in all years was dog-strangling vine. Although widespread, this species is being actively managed in The Meadoway due to its ability to form dense colonies smothering other vegetation (DiTommaso et al. 2005).

Table 3. Seeded species and those occurring in vegetation monitoring plots A-F

Scientific name	Common name	L-Rank	2016	2018	2019
<i>Lobelia cardinalis</i>	cardinal flower	L1			
<i>Schizachyrium scoparium</i>	little bluestem	L2		x	
<i>Sorghastrum nutans</i>	Indian grass	L2	x	x	x
<i>Heliopsis helianthoides</i>	ox-eye	L2	x	x	x
<i>Gentiana andrewsii</i>	bottle gentian	L2			
<i>Penstemon digitalis</i>	foxglove beard-tongue	L3			x
<i>Lobelia siphilitica</i>	great blue lobelia	L3		x	x
<i>Lespedeza capitata</i>	round-headed bush-clover	L3	x	x	x
<i>Panicum virgatum</i>	switch grass	L3	x	x	x
<i>Andropogon gerardii</i>	big bluestem	L3	x	x	x
<i>Pycnanthemum virginianum</i>	Virginia mountain-mint	L3	x	x	x
<i>Penstemon hirsutus</i>	hairy beard-tongue	L3			
<i>Elymus canadensis</i>	Canada wild rye	L4	x		x
<i>Rudbeckia hirta</i>	black-eyed Susan	L4	x	x	x
<i>Verbena hastata</i>	blue vervain	L5		x	
<i>Oenothera biennis</i>	common evening-primrose	L5	x	x	x
<i>Desmodium canadense</i>	showy tick-trefoil	L5	x	x	x
<i>Monarda fistulosa</i>	wild bergamot	L5	x	x	x
<i>Silphium perfoliatum</i>	cup-plant	L5	x	x	x
<i>Elymus virginicus</i> var. <i>virginicus</i>	Virginia wild rye	L5			
<i>Asclepias sullivantii</i>	smooth milkweed	LX	x	x	x
<i>Asclepias tuberosa</i>	butterfly milkweed	LX	x	x	x
<i>Solidago rigida</i> ssp. <i>rigida</i>	stiff goldenrod	LX	x	x	x
<i>Helianthus giganteus</i>	tall sunflower	LX	x	x	x
<i>Vernonia missurica</i>	Missouri ironweed	L*		x	x
<i>Coreopsis lanceolata</i>	lance-leaved coreopsis	L*	x		x
<i>Coreopsis tripteris</i>	tall tickseed	L*	x	x	x
<i>Ratibida pinnata</i>	grey-headed coneflower	L*	x	x	x
<i>Veronicastrum virginicum</i>	Culver's root	L*			
<i>Allium cernuum</i>	nodding wild onion	L*			
<i>Echinacea pallida</i>	pale purple coneflower	L*			



Figure 8. Swamp milkweed (*Asclepias incarnata* ssp. *incarnata*) (left) and cup-plant (*Silphium perfoliatum*) (right)

3.1.2 Vegetation plots M and N – seed mix list 1

In the 2018 report, vegetation plots M, N and O were summarized together due to their close proximity and similar management. In this 2019 update report, plots M and N were summarized together while plot O was summarized independently. This separation was due to the variability in success of the seed mix noted in the 2018 report, variability in soil substrate (more sand in M and N) and due to variable ongoing management in this section of The Meadoway.

Plots M and N contained a total of 166 species including 71 (43%) native species, 94 (57%) species not native to southern Ontario and 1 species that was previously deemed to have been extirpated from the Toronto Region (Appendix 1, Figure 10). The area where vegetation plots M and N were established was seeded with species in seed mix 1. These plots contained 15 of the 31 species (48%) specified in seed mix 1 (Figure 10, Table 4). Plots M and N are very unique for The Meadoway containing 5 species of native *Carex* spp. (sedges) and 6 species of native aster which are naturally occurring and have limited occurrence in The Meadoway. Plot N was particularly unique containing several uncommon species such as sky-blue aster (*Symphyotrichum oolentangiense*) and hairy aster (*Symphyotrichum pilosum* var. *pilosum*). Other naturally occurring noteworthy species in plot N include plantain-leaved pussytoes (*Antennaria parlinii* ssp. *fallax*), blue-eyed grass (*Sisyrinchium montanum*; Figure 11), poverty oat grass (*Danthonia spicata*) and downy serviceberry (*Amelanchier arborea*), red cedar (*Juniperus virginiana*) and grey goldenrod (*Solidago nemoralis* ssp. *nemoralis*). These species are either uncommon or locally ranked as sensitive species in urban areas.

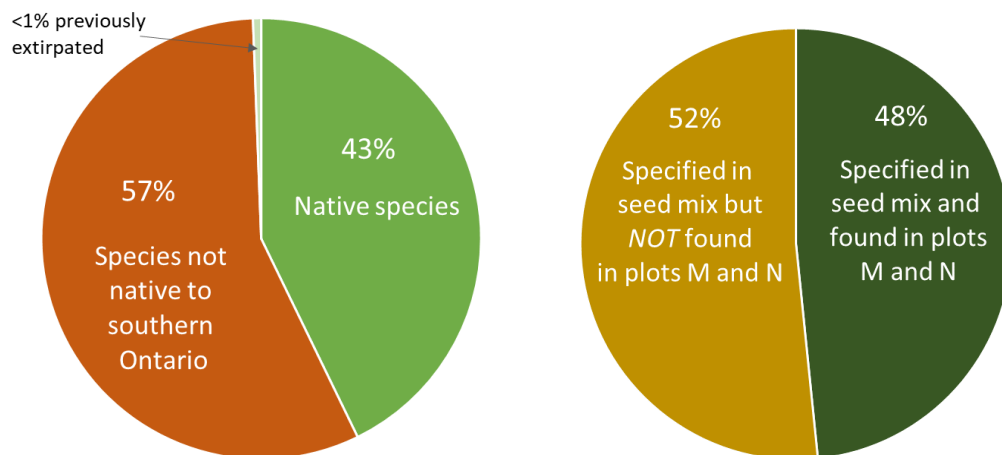


Figure 10. Flora species composition in plots M and N

Of the 15 seeded species that germinated at the site, only wild bergamot (*Monarda fistulosa*) was found in all 3 years (2016, 2018, 2019; Figure 11). Wild bergamot may be also be a naturally occurring species at this site due to its early appearance in 2016. All other seeded species that occurred in the plots were only found in 2018 and/or 2019. Large-flowered tickseed was not specified in the seed mix list but was in the plots and was identified by botanists as being sourced from the seed mix.

Table 4. Seeded species and those occurring in vegetation monitoring plots M and N

Scientific name	Common name	L-Rank	2016	2018	2019
<i>Lobelia cardinalis</i>	cardinal flower	L1			
<i>Schizachyrium scoparium</i>	little bluestem	L2		x	x
<i>Sorghastrum nutans</i>	Indian grass	L2		x	x
<i>Heliopsis helianthoides</i>	ox-eye	L2		x	x
<i>Gentiana andrewsii</i>	bottle gentian	L2			
<i>Penstemon digitalis</i>	foxglove beard-tongue	L3			
<i>Lobelia siphilitica</i>	great blue lobelia	L3			
<i>Lespedeza capitata</i>	round-headed bush-clover	L3			
<i>Panicum virgatum</i>	switch grass	L3		x	x
<i>Andropogon gerardii</i>	big bluestem	L3		x	x
<i>Pycnanthemum virginianum</i>	Virginia mountain-mint	L3			
<i>Penstemon hirsutus</i>	hairy beard-tongue	L3			x
<i>Elymus canadensis</i>	Canada wild rye	L4			
<i>Rudbeckia hirta</i>	black-eyed Susan	L4		x	x
<i>Verbena hastata</i>	blue vervain	L5			
<i>Oenothera biennis</i>	common evening-primrose	L5		x	x
<i>Desmodium canadense</i>	showy tick-trefoil	L5			
<i>Monarda fistulosa</i>	wild bergamot	L5	x	x	x
<i>Silphium perfoliatum</i>	cup-plant	L5			
<i>Elymus virginicus</i> var. <i>virginicus</i>	Virginia wild rye	L5		x	x
<i>Asclepias sullivantii</i>	smooth milkweed	LX			
<i>Asclepias tuberosa</i>	butterfly milkweed	LX			
<i>Solidago rigida</i> ssp. <i>rigida</i>	stiff goldenrod	LX			
<i>Helianthus giganteus</i>	tall sunflower	LX		x	x
<i>Vernonia missurica</i>	Missouri ironweed	L*			x
<i>Coreopsis lanceolata</i>	lance-leaved coreopsis	L*			x
<i>Coreopsis tripteris</i>	tall tickseed	L*			
<i>Ratibida pinnata</i>	grey-headed coneflower	L*		x	x
<i>Veronicastrum virginicum</i>	Culver's root	L*			
<i>Allium cernuum</i>	nodding wild onion	L*			
<i>Echinacea pallida</i>	pale purple coneflower	L*			x



Figure 11. Blue-eyed grass (*Sisyrinchium montanum*) (left) and wild bergamot (*Monarda fistulosa*) (right)

3.1.3 Vegetation plot O – seed mix list 1

Plot O contained a total of 84 species including 28 (33%) native species, 55 (66%) species not native to southern Ontario and 1 species that was previously deemed to have been extirpated from the Toronto Region (Appendix 1, Figure 12). The area where vegetation plot O was established was seeded with species in seed mix 1 but was largely unsuccessful in 2016/2018. Plot O contained 12 of the 31 species (39%) specified in seed mix 1 (Figure 12, Table 5).

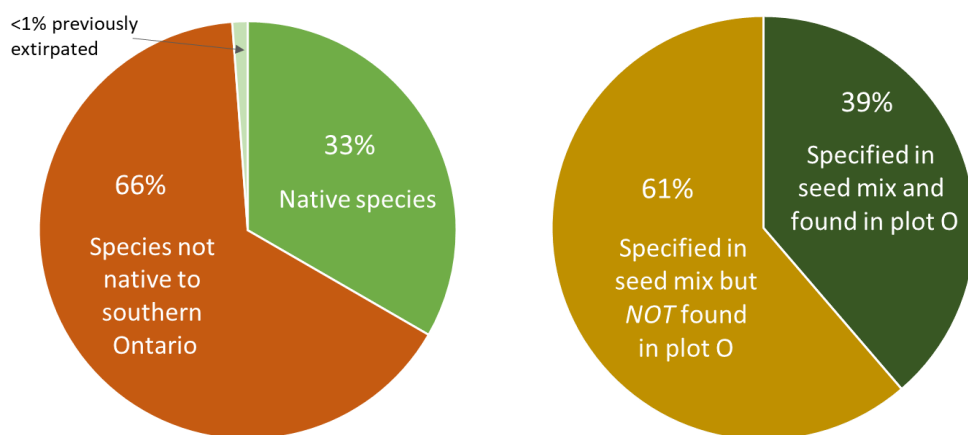


Figure 12. Flora species composition in plot O

Of the 12 species seeded at this site, none were found in 2016, 11 were found in 2018 and 6 were found in 2019. Only six seeded species were found in both 2018 and 2019: lance-leaved coreopsis (*Coreopsis lanceolata*), ox-eye (*Heliopsis helianthoides*), black-eyed Susan (*Rudbeckia hirta*), common evening primrose (*Oenothera biennis*) and tall sunflower (*Helianthus giganteus*). Showy tick-trefoil (*Desmodium canadense*) was seeded in the seed mix but not found until 2019.

Table 5. Seeded species and those occurring in vegetation monitoring plot O

Scientific name	Common name	L-Rank	2016	2018	2019
<i>Lobelia cardinalis</i>	cardinal flower	L1			
<i>Schizachyrium scoparium</i>	little bluestem	L2			
<i>Sorghastrum nutans</i>	Indian grass	L2		x	
<i>Heliopsis helianthoides</i>	ox-eye	L2		x	x
<i>Gentiana andrewsii</i>	bottle gentian	L2			
<i>Penstemon digitalis</i>	foxglove beard-tongue	L3			
<i>Lobelia siphilitica</i>	great blue lobelia	L3			
<i>Lespedeza capitata</i>	round-headed bush-clover	L3			
<i>Panicum virgatum</i>	switch grass	L3		x	
<i>Andropogon gerardii</i>	big bluestem	L3		x	
<i>Pycnanthemum virginianum</i>	Virginia mountain-mint	L3			
<i>Penstemon hirsutus</i>	hairy beard-tongue	L3			
<i>Elymus canadensis</i>	Canada wild rye	L4			
<i>Rudbeckia hirta</i>	black-eyed Susan	L4		x	x
<i>Verbena hastata</i>	blue vervain	L5			
<i>Oenothera biennis</i>	common evening-primrose	L5		x	x
<i>Desmodium canadense</i>	showy tick-trefoil	L5			x
<i>Monarda fistulosa</i>	wild bergamot	L5		x	
<i>Silphium perfoliatum</i>	cup-plant	L5			
<i>Elymus virginicus</i> var. <i>virginicus</i>	Virginia wild rye	L5		x	
<i>Asclepias sullivantii</i>	smooth milkweed	LX			
<i>Asclepias tuberosa</i>	butterfly milkweed	LX			
<i>Solidago rigida</i> ssp. <i>rigida</i>	stiff goldenrod	LX			
<i>Helianthus giganteus</i>	tall sunflower	LX		x	x
<i>Vernonia missurica</i>	Missouri ironweed	L*			
<i>Coreopsis lanceolata</i>	lance-leaved coreopsis	L*		x	x
<i>Coreopsis tripteris</i>	tall tickseed	L*			
<i>Ratibida pinnata</i>	grey-headed coneflower	L*		x	
<i>Veronicastrum virginicum</i>	Culver's root	L*			
<i>Allium cernuum</i>	nodding wild onion	L*			
<i>Echinacea pallida</i>	pale purple coneflower	L*			

3.1.4 Vegetation plots G-L – seed mix list 2

Plots G-L contained a total of 162 species including 60 (37%) native species, 101 (62%) species not native to southern Ontario and 1 species that was previously deemed to have been extirpated from the Toronto Region (Appendix 1, Figure 13). The area where vegetation plots G-L were established was seeded with species in seed mix 2 (Table 2). These plots together contained 14 of the 25 species (56%) specified in seed mix 2 (Figure 13, Table 6). There were also 3 species found in the plots that botanists knew were seeded but were not specified in seed mix 2: orange

coneflower (*Rudbeckia fulgida*), wild senna and large-flowered tickseed. Oats were found only in plot K in 2019 and were likely a product of cover crop seeding at the site.

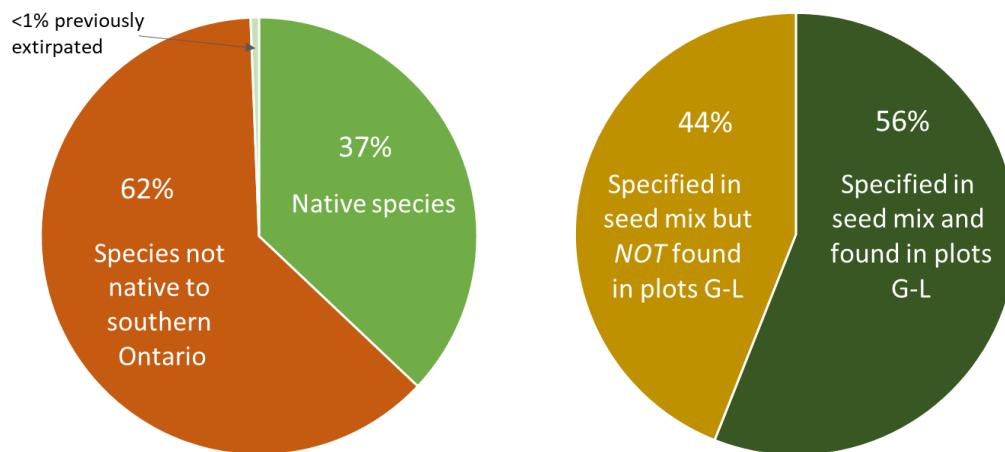


Figure 13. Flora species composition in plots G-L

Two species that were seeded were not found in 2016 but were observed in 2018 and 2019 only in plot L: Canada wild rye and cup-plant. Alternatively, two species that were seeded were found in 2016 and not in 2018 or 2019: tall tickseed (*Coreopsis tripteris*) and lance-leaved coreopsis. Virginia mountain-mint (*Pycnanthemum virginianum*) was a seeded species but not specified in seed mix 2 and was only found in plot H in 2019.

Thirteen species occurred at a high frequency, being found in all plots (G-L) each year, including Indian grass (*Sorghastrum nutans*), a perennial grass species seeded into the site and representative of tallgrass prairies of southern Ontario (Figure 14; Packard and Mutel 1997). There were 33 species that were only found in 1 plot over all 3 years including 13 native species and 20 non-native species. Hairy aster was a notable species found in plot I in 2019. This species may have been seeded or may have colonized the site naturally. Based on TRCA's scoring and ranking, this species is rare, has a declining population trend, is sensitive to development and is highly dependent on specific habitat types.



Figure 14. Indian grass (*Sorghastrum nutans*)

Table 6. Seeded species and those occurring in vegetation monitoring plots G-L

Scientific name	Common name	L-Rank	2016	2018	2019
<i>Lobelia cardinalis</i>	cardinal flower	L1			
<i>Schizachyrium scoparium</i>	little bluestem	L2	x	x	x
<i>Sorghastrum nutans</i>	Indian grass	L2	x	x	x
<i>Heliopsis helianthoides</i>	ox-eye	L2	x	x	x
<i>Gentiana andrewsii</i>	bottle gentian	L2			
<i>Penstemon digitalis</i>	foxglove beard-tongue	L3			
<i>Lobelia siphilitica</i>	great blue lobelia	L3			
<i>Lespedeza capitata</i>	round-headed bush-clover	L3			
<i>Panicum virgatum</i>	switch grass	L3	x	x	x
<i>Andropogon gerardii</i>	big bluestem	L3	x	x	x
<i>Penstemon hirsutus</i>	hairy beard-tongue	L3			
<i>Elymus canadensis</i>	Canada wild rye	L4		x	x
<i>Rudbeckia hirta</i>	black-eyed Susan	L4	x	x	x
<i>Oenothera biennis</i>	common evening-primrose	L5	x	x	x
<i>Desmodium canadense</i>	showy tick-trefoil	L5	x	x	x
<i>Monarda fistulosa</i>	wild bergamot	L5	x	x	x
<i>Silphium perfoliatum</i>	cup-plant	L5		x	x
<i>Asclepias sullivantii</i>	smooth milkweed	LX			
<i>Asclepias tuberosa</i>	butterfly milkweed	LX			
<i>Helianthus giganteus</i>	tall sunflower	LX	x	x	x
<i>Coreopsis lanceolata</i>	lance-leaved coreopsis	L*	x		
<i>Coreopsis tripteris</i>	tall tickseed	L*	x		
<i>Ratibida pinnata</i>	grey-headed coneflower	L*			
<i>Allium cernuum</i>	nodding wild onion	L*			
<i>Echinacea pallida</i>	pale purple coneflower	L*			

3.1.5 All vegetation plots combined

Overall, the vegetation plots contained 265 species including 113 (42%) native species, 148 (56%) species not native to southern Ontario and 4 species that were previously deemed to have been extirpated from the Toronto Region (Appendix 1, Figure 15). Of the 31 species seeded, 27 (87%) were found in the vegetation plots (Figure 15, Table 7). There were also eight species found in the plots that botanists knew were seeded but were not specified in the seed mix list: tall ironweed, Riddell's goldenrod, wild senna, swamp milkweed, large-flowered tickseed, orange coneflower, swamp rose-mallow and smaller evening-primrose. Oats were also found seeded in plot K in 2019 (likely planted as a cover crop). As of 2019, The Meadoway supports 33 species of regional conservation concern (ranked L1-L3) and urban (ranked L4) with 18 of these species introduced through restoration plantings at the site and 15 naturally occurring. Of these species, four planted species are considered to be locally extirpated (ranked LX) from the jurisdiction as no known natural records have been found with the TRCA jurisdiction since the 1920s: smooth milkweed (*Asclepias sullivantii*), butterfly milkweed (*Asclepias tuberosa*), stiff goldenrod (*Solidago rigida ssp. rigida*) and tall sunflower.

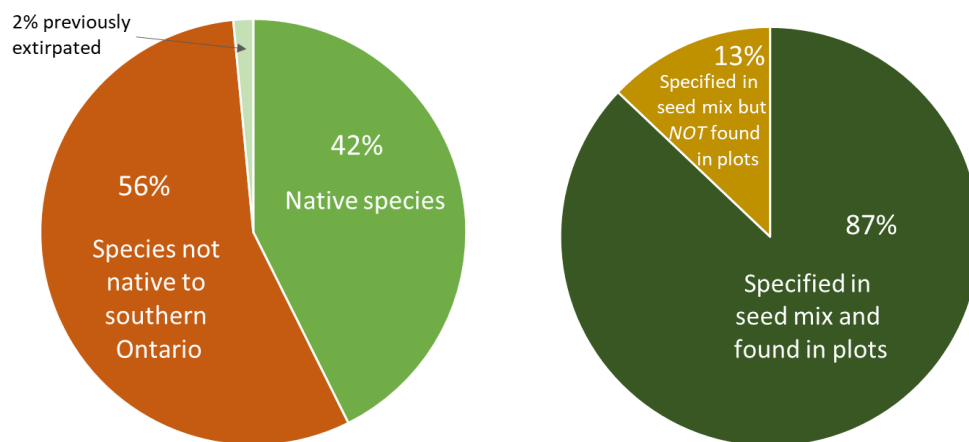


Figure 15. Flora species composition in all plots

Table 7. Seeded species and those occurring in vegetation monitoring plots

Scientific name	Common name	L-Rank	2016	2018	2019
<i>Lobelia cardinalis</i>	cardinal flower	L1			
<i>Schizachyrium scoparium</i>	little bluestem	L2	x	x	x
<i>Sorghastrum nutans</i>	Indian grass	L2	x	x	x
<i>Heliopsis helianthoides</i>	ox-eye	L2	x	x	x
<i>Gentiana andrewsii</i>	bottle gentian	L2			
<i>Penstemon digitalis</i>	foxglove beard-tongue	L3			x
<i>Lobelia siphilitica</i>	great blue lobelia	L3		x	x
<i>Lespedeza capitata</i>	round-headed bush-clover	L3	x	x	x
<i>Panicum virgatum</i>	switch grass	L3	x	x	x
<i>Andropogon gerardii</i>	big bluestem	L3	x	x	x
<i>Pycnanthemum virginianum</i>	Virginia mountain-mint	L3	x	x	x
<i>Penstemon hirsutus</i>	hairy beard-tongue	L3			x
<i>Elymus canadensis</i>	Canada wild rye	L4	x	x	x
<i>Rudbeckia hirta</i>	black-eyed Susan	L4	x	x	x
<i>Verbena hastata</i>	blue vervain	L5		x	
<i>Oenothera biennis</i>	common evening-primrose	L5	x	x	x
<i>Desmodium canadense</i>	showy tick-trefoil	L5	x	x	x
<i>Monarda fistulosa</i>	wild bergamot	L5	x	x	x
<i>Silphium perfoliatum</i>	cup-plant	L5	x	x	x
<i>Elymus virginicus</i> var. <i>virginicus</i>	Virginia wild rye	L5	x	x	x
<i>Asclepias sullivantii</i>	smooth milkweed	LX	x	x	x
<i>Asclepias tuberosa</i>	butterfly milkweed	LX	x	x	x
<i>Solidago rigida</i> ssp. <i>rigida</i>	stiff goldenrod	LX	x	x	x
<i>Helianthus giganteus</i>	tall sunflower	LX	x	x	x
<i>Vernonia missurica</i>	Missouri ironweed	L*		x	x
<i>Coreopsis lanceolata</i>	lance-leaved coreopsis	L*	x	x	x
<i>Coreopsis tripteris</i>	tall tickseed	L*	x	x	x
<i>Ratibida pinnata</i>	grey-headed coneflower	L*	x	x	x
<i>Veronicastrum virginicum</i>	Culver's root	L*			
<i>Allium cernuum</i>	nodding wild onion	L*			
<i>Echinacea pallida</i>	pale purple coneflower	L*			x

3.1.6 Vegetation plots P-W – not planted; turfgrass

Plots P-W contained a total of 78 species including 28 (36%) native species and 50 (64%) species not native to southern Ontario (Appendix 1, Figure 16). These plots were in section 1 and 2 of The Meadoway that have been maintained as turfgrass consisting of primarily meadow fescue (*Schedonorus pratensis*), red fescue (*Festuca rubra* ssp. *rubra*) and Kentucky blue grass (*Poa pratensis* ssp. *pratensis*), all of which are non-native species (Figure 17). These sections of The Meadoway were sprayed, tilled and had a cover crop applied in the summer of 2019 but only after spring vegetation sampling occurred. Summer vegetation sampling was not feasible due to the ongoing

management activities. As such, the data for these plots still represent pre-management conditions and the results of 2019 management will be apparent when the plot data are collected in 2020. Common wild strawberry (*Fragaria virginiana* ssp. *virginiana*) was the most frequently encountered native species in the plots followed by tall goldenrod (*Solidago altissima*), riverbank grape (*Vitis riparia*), choke cherry (*Prunus virginiana* var. *virginiana*) and heal-all (*Prunella vulgaris* ssp. *lanceolata*).

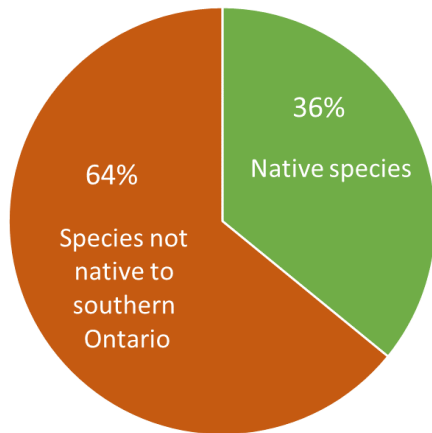


Figure 16. Flora species composition in plots P-W



Figure 17. Photo at plot U (a turfgrass plot; September 2018)

3.1.7 Vegetation plot X – unrestored, exotic forb meadow

Plot X was added in 2019 at the request of the restoration team. This plot was only visited by the terrestrial monitoring team in the spring due to active management (spraying, plowing, planting oats) occurring when visited again in the summer. During the spring visit, this plot contained a total of 30 species including 10 (33%) native species and 20 (67%) species not native to southern Ontario (Figure 18). All sub-plots were dominated by non-native species. Sub-plots 1 and 2 were dominated by meadow fescue, sub-plot 3 was dominated by Kentucky blue grass and sub-plots 4 and 5 were dominated by dog-strangling vine.

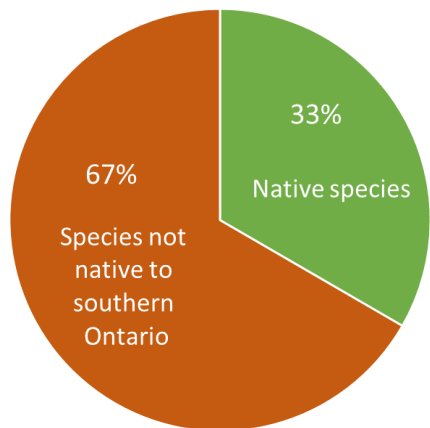


Figure 18. Flora species composition in plot X

3.1.8 Invasive species management

Significant efforts have been made since 2018 to map and control invasive species such as creeping thistle and dog-strangling vine. Biologists conducting vegetation plot sampling made note of the incredible success of invasive species management at The Meadoway including wicking of dog-strangling vine and mowing of creeping thistle. This analysis examined changes in maximum absolute cover of dog-strangling vine and creeping thistle within each subplot only at plots A to O (sections 4 and 7 of The Meadoway) because they were monitored each year (2016, 2018, 2019) and were targeted for invasive species management.

There was an increase in the number of subplots with dog-strangling vine between 2016 and 2018 (30 to 50 subplots). Due to this increase in occurrence, comparisons in the percent cover of dog-strangling vine were only done between 2018 and 2019. This also aligns better with the active management of invasive species that began more formally in 2018. Dog-strangling vine percent cover decreased at 19 of 50 subplots (38%) between 2018 and 2019 while it remained the same at 20 subplots (40%) and increased at 11 subplots (22%). Dog-strangling vine was completely eradicated from 9 subplots by 2019; however, was observed for the first time in 5 subplots in 2019.

Between 2016 and 2018 there was an increase in the number of subplots with creeping thistle (24 subplots in 2016 to 49 subplots in 2018). Due to this increase in occurrence, comparisons in the percent cover of creeping thistle were only done between 2018 and 2019. Creeping thistle percent cover decreased at 30 of 49 subplots (61%) between 2018 and 2019 while it remained the same at 7 subplots (14%) and increased at 12 subplots (25%). Creeping thistle was completely eradicated from 11 subplots; however, it was observed for the first time in 4 subplots in 2019.

3.2 Bird surveys

Twenty-two bird species were detected during 2016, 2018 and 2019 surveys (Appendix 2). These included one species of conservation concern in the Toronto Region (ranked L3): eastern meadowlark (*Sturnella magna*; Figure

19). Eastern meadowlark is a meadow-dependent species that nests on the ground in grassland habitats and is a species of conservation concern also due to declining population trends and sensitivity to disturbance. Eastern meadowlark is also listed as threatened in the province of Ontario under the Endangered Species Act (Endangered Species Act 2007). There were two other meadow-dependent species detected during surveys including savannah sparrow (*Passerculus sandwichensis*) and eastern kingbird (*Tyrannus tyrannus*). Red-winged blackbirds (*Agelaius phoeniceus*) and song sparrows (*Melospiza melodia*) were the most frequently occurring and most abundant species detected during surveys.



Figure 19. Eastern meadowlark (*Sturnella magna*)

There was variation in species composition and abundance among stations. Fewer bird species and individuals were detected in the turfgrass sites compared to all other sites (Table 8); however, similar numbers of sensitive species and meadow-dependent species were detected at the turfgrass sites and the restored sites. There was some variation in species richness (number of species) and abundance among the restored sites although differences were minimal and variable among years.

Table 8. Summary of bird survey results at stations 1-7 at The Meadoway

Station #	# species			abundance			# L1-L3 species			# L1-L4 species			Meadow-dependent # species			Meadow low-level nester (# species)		
	2016	2018	2019	2016	2018	2019	2016	2018	2019	2016	2018	2019	2016	2018	2019	2016	2018	2019
1	7	9	10	10	19	21	0	1	0	0	2	3	0	1	0	0	1	0
2	6	8	10	18	17	19	0	1	0	0	1	2	0	1	1	0	1	0
3	9	6	8	24	12	15	1	0	0	1	0	0	1	0	0	1	0	0
4	6	4	4	13	16	11	0	0	0	1	1	0	1	1	0	1	0	0
5	7	6	5	17	12	11	0	0	0	0	2	0	0	1	0	0	0	0
6*	na	2	3	na	2	4	na	0	0	na	1	1	na	1	1	na	1	1
7*	na	3	3	na	4	4	na	1	0	na	2	1	na	2	1	na	2	1

*Turfgrass sites

3.3 Butterfly surveys

Thirty-five butterfly species were observed during 2016, 2018 and 2019 surveys (Figure 20, Appendix 3). Of these 35 species, the giant swallowtail (*Papilio cresphontes*), Delaware skipper (*Anatrytone logan*), silver-spotted skipper (*Epargyreus clarus*) and wild indigo duskywing (*Erynnis baptisiae*) are ranked at the provincial level as S4 species. Species with an S4 rank are not rare species, but are uncommon, and there is some cause for long-term concern due to population declines or other factors (Nature Serve 2018). Monarch butterflies (*Danaus plexippus*) were also found using The Meadoway in very high numbers. For example, 280 monarchs were counted using section 4.3 (between Bellamy Road North and Markham Road) in 2019. Butterfly species richness and abundance appeared to be lower in the turfgrass sites compared to the restored areas (Figures 21-24).


Figure 20. Eastern Tailed Blue (*Cupido comyntas*) and Peck's Skipper (*Polites peckius*)

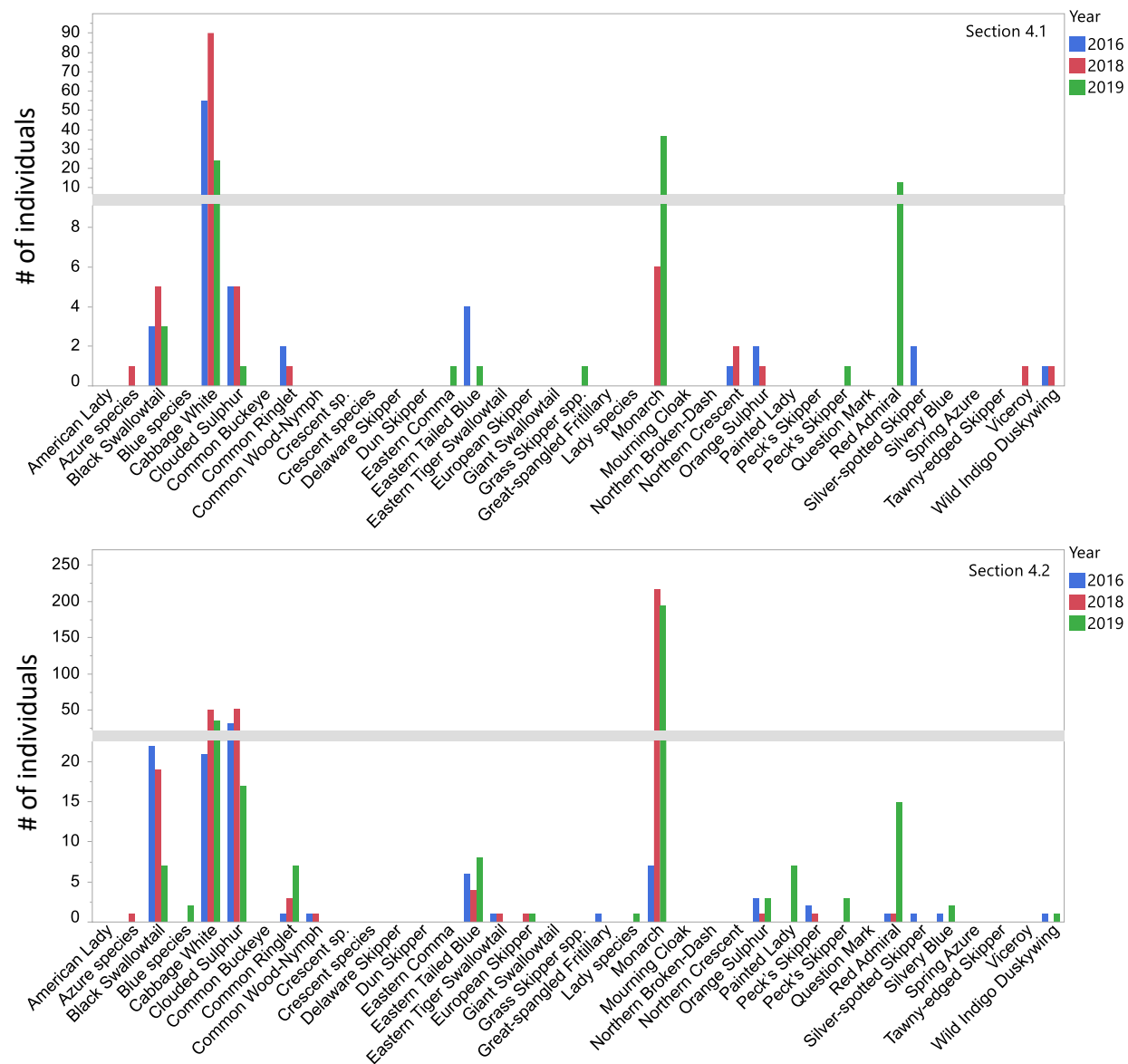


Figure 21. Total butterfly abundance per year at The Meadoway in section 4.1 (top) and section 4.2 (bottom). Note that there is a scale-break to facilitate viewing less abundant species at the same time as more abundant species.

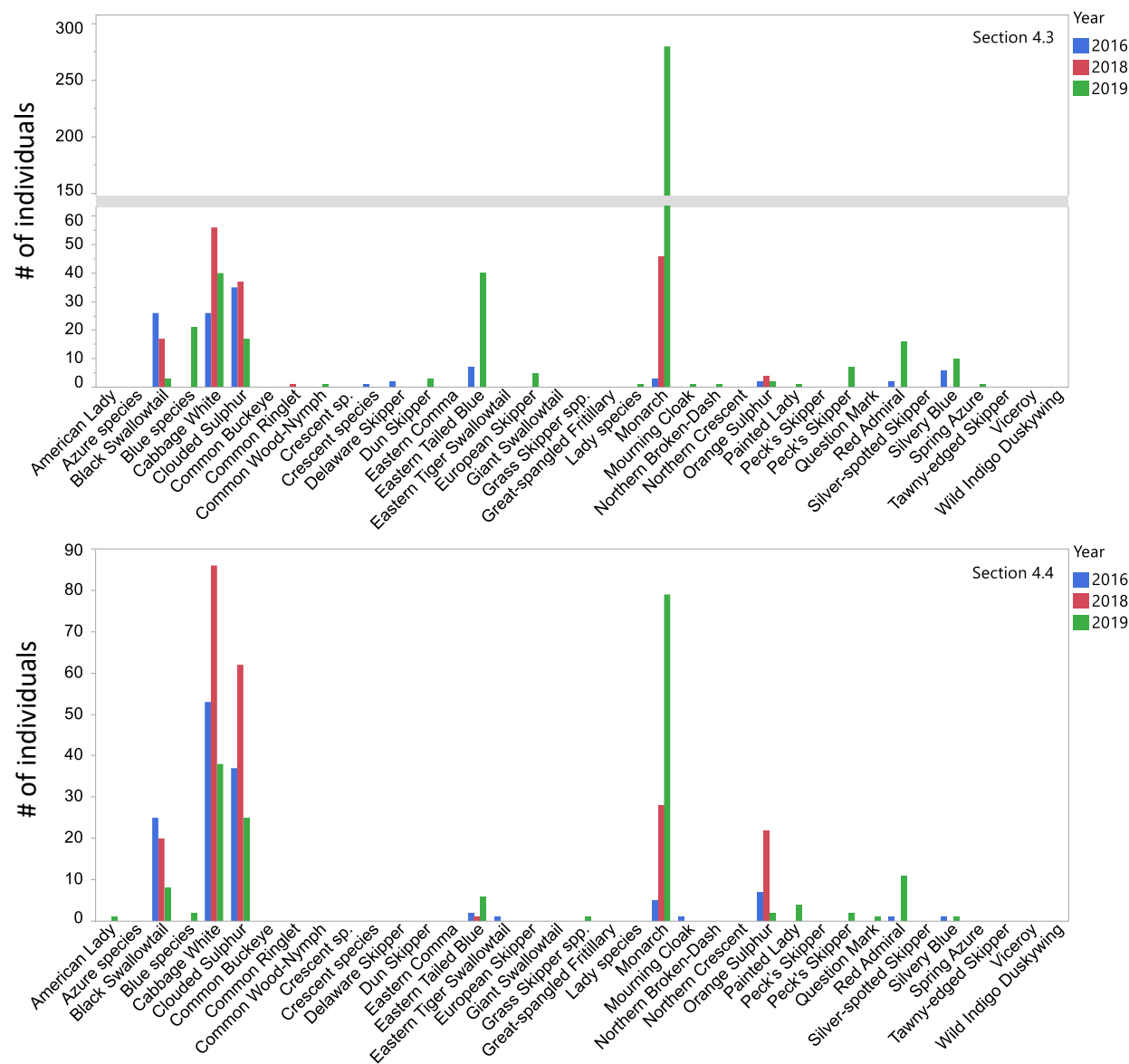


Figure 22. Total butterfly abundance per year at The Meadoway in section 4.3 (top) and section 4.4 (bottom). Note that there is a scale-break to facilitate viewing less abundant species at the same time as more abundant species.

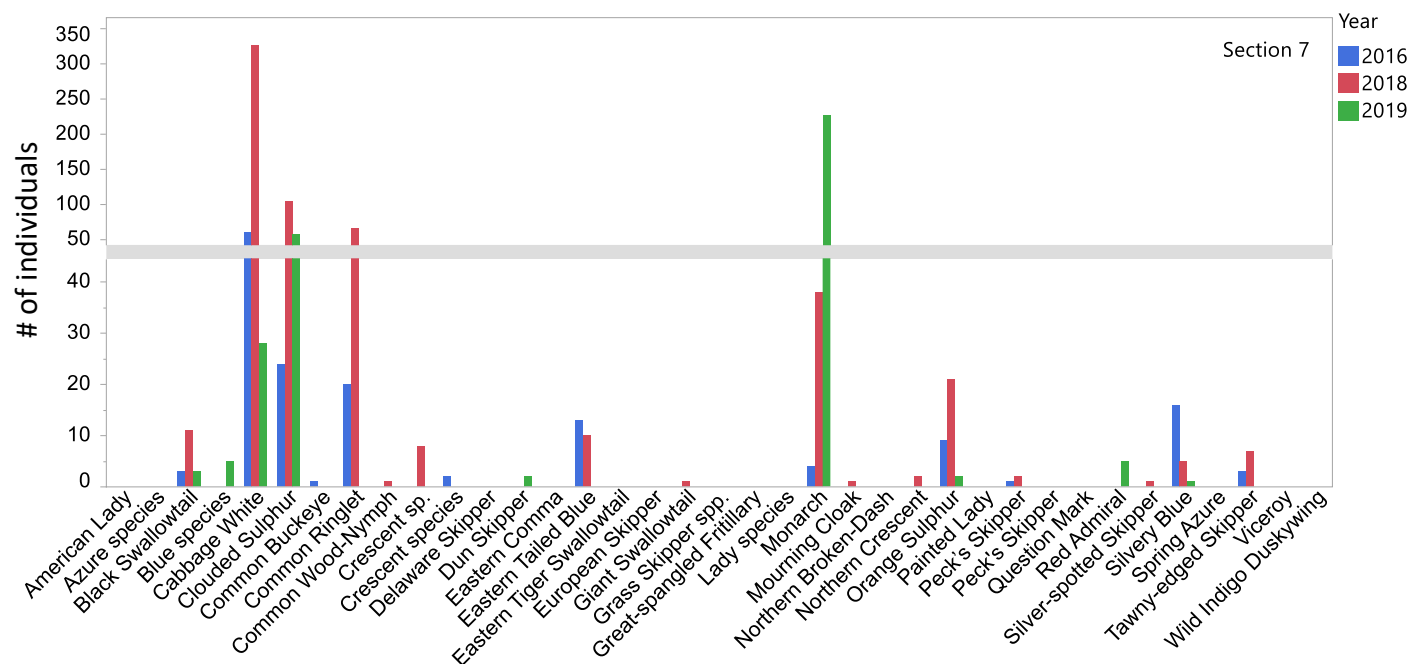


Figure 23. Total butterfly abundance per year at The Meadoway in section 7. Note that there is a scale-break to facilitate viewing less abundant species at the same time as more abundant species.

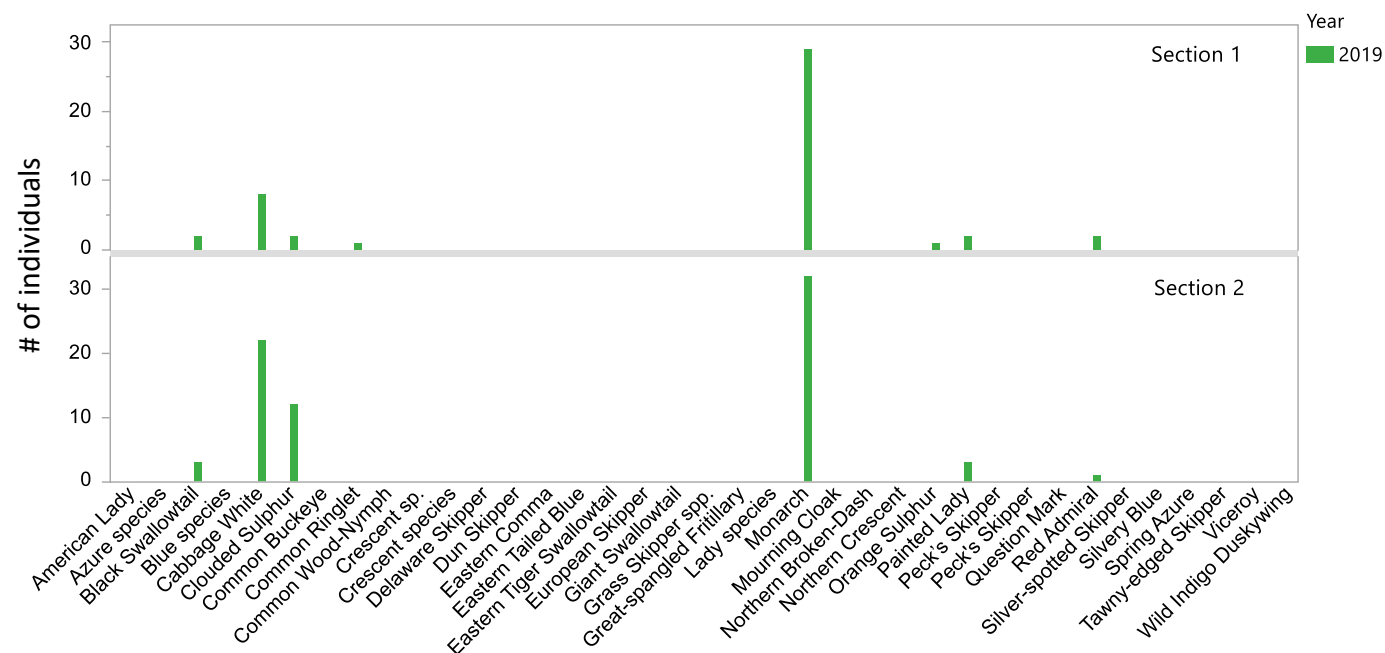


Figure 24. Total butterfly abundance per year at The Meadoway in section 1 (top) and section 2 (bottom). Sections 1 and 2 were monitored for butterflies for the first time in 2019.

4 Summary

Meadow monitoring during 2016, 2018 and 2019 generally indicated that The Meadoway continues to support a plant community consisting of a mix of native and non-native flora species, provides habitat used by meadow birds and foraging opportunities for butterflies. A wide range of species were found during monitoring including federally, provincially and locally-ranked species-at-risk or species of conservation concern. In addition to these sensitive species, The Meadoway continues to be occupied by numerous invasive flora species although recent management initiatives have been successful at reducing their extent.

Flora composition in the vegetation plots was variable based on location and management activities. In general, there was a high percent composition of non-native species in the plots. This recognition in 2018 led to the implementation of more intensive invasive species management. The results of these efforts were apparent on site and in the flora data collected in 2019 with many plots showing a decrease in the amount of dog-strangling vine and creeping thistle.

Several native flora species that had been seeded, were found in the plots for the first time in 2019 including pale purple coneflower, fox-glove beard-tongue and hairy beard tongue. The late appearance of these species suggests that several years of monitoring may be needed to assess the effectiveness of the seed mix. Throughout the entire Meadoway with all plots combined, the seed mix appears to be successful aside from four species that have yet to be found: bottle gentian (*Gentiana andrewsii*), cardinal flower (*Lobelia cardinalis*), nodding wild onion (*Allium cernuum*) and Culver's root (*Veronicastrum virginicum*). An analysis of percent cover of these species may further highlight the success of the seeding and provide insight into the cover of native versus non-native species. Plot N continues to be a unique plot containing many native species including several sensitive species such as hairy aster (Figure 26) and plantain-leaved pussytoes.



Figure 26. Hairy aster (*Symphyotrichum pilosum* var. *pilosum*)

The bird community at The Meadoway continues to consist of a mix of generalists, meadow and forest-edge species. Meadow-dependent bird species using the site include savannah sparrow (Figure 27) and eastern meadowlark. Savannah sparrows continued to use the site in 2019 while eastern meadowlark were last found in 2018. Both of these species nest on the ground and as such are especially susceptible to disturbance in managed landscapes. Mowing should continue to occur only outside of the breeding season which occurs between late April and early August (Peck and James 1987, Cadman et al. 2007). The turfgrass stations in sections 1 and 2 continue to have fewer bird species and individuals while stations 1 and 2 in sections 4.1 and 4.2 had the greatest number of bird species and individuals.



Figure 27. Savannah sparrow (*Passerculus sandwichensis*)

Butterfly monitoring detected species characteristic of meadows in more urbanized areas of southern Ontario. Species that were especially abundant included cabbage white (*Pieris rapae*) and monarch (Figure 28). Cabbage white (a non-native species) continues to be the most abundant species. The greatest number of monarchs (280) was observed in section 4.3 in 2019. In 2018, the majority of monarchs were observed using section 4.2 feeding almost exclusively on red clover (*Trifolium pratense*), a non-native species. In 2019, the majority of monarchs were again in section 4.3 and during the fall visit they were nectaring and roosting on tall sunflower. This report has identified that both resident and migrant butterfly species continue to use The Meadoway in high numbers and that the restored areas tend to have higher numbers. Although the number of migrating butterflies using The Meadoway for nectaring is impressive, perhaps more relevant to the restoration project is the change in occurrence of local resident species that are using the new availability of food-plant species. Going forward, this suite of species (e.g. eastern tailed blue, common ringlet, various skipper species) will present an excellent indication of the quality of meadow habitat being provided. Nevertheless, the provision of a well-linked nectaring corridor for all species is an exciting development in the Toronto urban landscape.



Figure 28. Monarch (*Danaus plexippus*)

5 References

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6 Appendix

Appendix 1. Flora species found in vegetation monitoring plots at The Meadoway in 2016, 2018 and 2019

[illegible]

The Meadoway: Vegetation, Bird and Butterfly Monitoring 2016, 2018, 2019

[illegible]

The Meadoway: Vegetation, Bird and Butterfly Monitoring 2016, 2018, 2019

[illegible]

The Meadoway: Vegetation, Bird and Butterfly Monitoring 2016, 2018, 2019

[illegible]

The Meadoway: Vegetation, Bird and Butterfly Monitoring 2016, 2018, 2019

[illegible]

The Meadoway: Vegetation, Bird and Butterfly Monitoring 2016, 2018, 2019

[illegible]

Species specified in seed mix; not found in plots			
<i>Allium cernuum</i>	allcern	nodding wild onion	L+
<i>Gentiana andrewsii</i>	genandr	bottle gentian	L3
<i>Lobelia cardinalis</i>	lobcard	cardinal flower	L1
<i>Veronicastrum virginicum</i>	vervirg	Culver's root	L+

Legend
L1-L3: species of regional conservation concern
L4: species of conservation concern in urban area
L5: species not of conservation concern at this time
L*: native to southern Ontario but no known natural records in TRCA jurisdiction
LX: species is extirpated from TRCA
L+: introduced species, not native to TRCA
L-?: species is probably introduced

Appendix 2. Bird species detected and abundance during bird monitoring at The Meadoway in 2016, 2018 and 2019

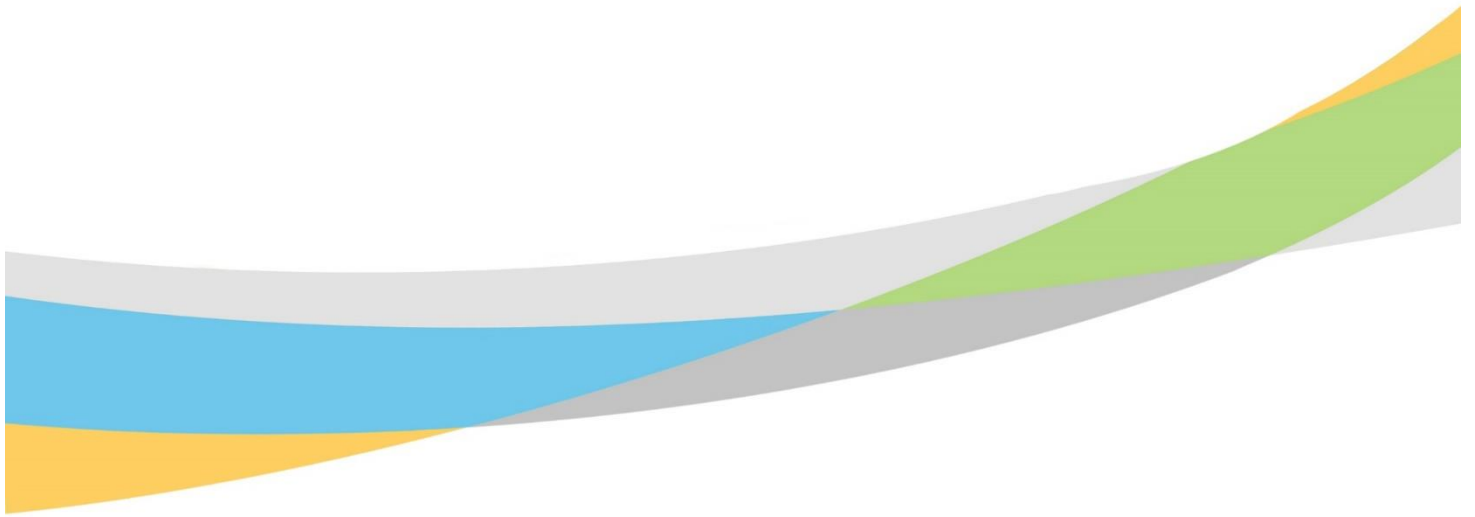
Common name	Nesting guild	L-rank	Station 1			Station 2			Station 3			Station 4			Station 5			Station 6			Station 7		
			2016	2018	2019	2016	2018	2019	2016	2018	2019	2016	2018	2019	2016	2018	2019	2016	2018	2019	2016	2018	2019
eastern meadowlark	meadow low-level nester	L3		1			1		2									-			-	1	
eastern kingbird	meadow upper-level nester	L4						1				1			1			-			-		
gray catbird	generalist mid-level nester	L4		1	2			1										-			-		
great crested flycatcher	forest upper-level nester	L4			1													-			-		
hairy woodpecker	forest upper-level nester	L4			1													-			-		
northern flicker	generalist upper-level nester	L4													1			-			-		
savannah sparrow	meadow low-level nester	L4										1						-	1	2	-	2	2
American goldfinch	generalist mid-level nester	L5	2	2	1	2	1		1		3	2		1				-			-		
American robin	generalist mid-level nester	L5		1	1	1	1	3	3		1	2		1	1	3		-	1	1	-	1	1
Baltimore oriole	generalist upper-level nester	L5	1	1			1	1		1								-			-		
blue jay	generalist upper-level nester	L5						1										-			-		
brown-headed cowbird	special case	L5	1														3	-			-		
common grackle	generalist mid-level nester	L5				1		1	1	1	2							-			-		
downy woodpecker	forest-edge mid-level nester	L5							1		1							-			-		
mallard	wetland low-level nester	L5			2													-			-		
mourning dove	generalist mid-level nester	L5				1	1	2	1	1	1	2			1	1	1	-			-		
northern cardinal	generalist mid-level nester	L5	1	1	2				1		1			1	1			-		1	-		
northern mockingbird	generalist mid-level nester	L5							1									-			-		
red-winged blackbird	generalist mid-level nester	L5	3	7	7	9	10	4	11	6	6	3	12	7	6		1	-			-		1
song sparrow	generalist low-level nester	L5	1	4	3	4	1	3	3	2	2	2	1	2	4	2	4	-			-		
warbling vireo	generalist upper-level nester	L5						1										-			-		
yellow warbler	generalist mid-level nester	L5	1	1	1		1	2							3	4	2	-			-		

Legend
L1-L3: species of regional conservation concern
L4: species of conservation concern in urban areas
L5: species not of conservation concern at this time

Appendix 3. Butterfly species detected during monitoring at The Meadoway in 2016, 2018 and 2019 (S-rank definitions from Nature Serve 2018)

Common name	Scientific name	S-rank	Section 1			Section 2			Section 4.1			Section 4.2			Section 4.3			Section 4.4			Section 7			Host plant		
			2016	2018	2019	2016	2018	2019	2016	2018	2019	2016	2018	2019	2016	2018	2019	2016	2018	2019	2016	2018	2019			
American Lady	<i>Vanessa virginiensis</i>	S5									1			1					1					Sunflower family, pearly everlasting, plantain-leaved pussy toes, wormwood, ironweed, burdock		
Azure species*	<i>Celastrina</i> spp.	n/a									1			1												
Black Swallowtail*	<i>Papilio polyxenes</i>	S5			2				3	3	5	3	22	19	7	26	17	3	25	20	8	3	11	3	Carrot family... parsley, dill, celery and Queen Anne's lace	
Blue species	Lycanidae family	n/a													2				21		2		5			
Cabbage White	<i>Pieris rapae</i>	SNA			8				22	55	90	24	21	51	36	26	56	40	53	86	38	61	327	28	Mustards... cabbage, cauliflower and broccoli	
Clouded Sulphur	<i>Colias philodice</i>	S5			2				12	5	5	1	32	52	17	35	37	17	37	62	25	24	105	58	Legumes... cultivated crops	
Common Buckeye	<i>Junonia coenia</i>	SNR (GS)																				1			Uncommon breeding migrant	
Common Ringlet*	<i>Coenonympha tullia</i>	S5			1					2	1			1	3	7			1				20	66	Kentucky bluegrass	
Common Wood-Nymph	<i>Cercyonis pegala</i>	S5												1	1				1				1		Grasses (Poaceae)	
Crescent species*	<i>Phyciodes</i> spp.	n/a															1					2	8			
Delaware Skipper*	<i>Anatrytone logan</i>	S4														2									Big bluestem and old switch panicgrass	
Dun Skipper*	<i>Euphyes vestris</i>	S5																	3					2	Sedges: chufa flatsedge, sun sedge	
Eastern Comma*	<i>Polygona comma</i>	S5										1													Elm and nettle families: American elm, hops, nettle, false nettle, wood nettle	
Eastern Tailed Blue*	<i>Cupido comyntas</i>	S5								4		1	6	4	8	7		40	2	1	6	13	10		Clovers and legumes	
Eastern Tiger Swallowtail	<i>Pterourus glaucus</i>	S5											1	1					1						Trees... hop tree, cherries and ashes	
European Skipper*	<i>Thymelicus lineola</i>	SNA												1	1			5							Grasses but prefers common timothy	
Giant Swallowtail	<i>Papilio cresphontes</i>	S4																					1		Common prickly ash and common hop tree	
Grass Skipper spp.	Hesperiinae family	n/a										1										1				
Great-spangled Fritillary	<i>Speyeria cybele</i>	S5											1												Violets	
Lady species	<i>Vanessa</i> spp.	n/a													1			1								
Monarch	<i>Danaus plexippus</i>	S2N,S4B			29				32		6	37	7	217	195	3	46	280	5	28	79	4	38	227	Milkweeds	
Mourning Cloak*	<i>Nymphalis antiopa</i>	S5																1	1				1		Trees... willows, elms, cottonwoods and hackberries	
Northern Broken-Dash*	<i>Wallengrenia egeremet</i>	S5																1							Panic grasses: deertongue	
Northern Crescent*	<i>Phyciodes cacyta</i>	S5									1	2												2	Asters	
Orange Sulphur	<i>Colias eurytheme</i>	S5			1						2	1		3	1	3	2	4	2	7	22	2	9	21	2	Legumes... clovers and alfalfas
Painted Lady	<i>Vanessa cardui</i>	S5			2				3							7			1			4			Broad: most often thistles, hollyhock, mallow, various legumes	
Peck's Skipper*	<i>Polites peckius</i>	S5										1	2	1	3			7				2	1	2	Kentucky bluegrass and little bluestem	
Question Mark	<i>Polygona interrogationis</i>	S5																				1			American elm, red elm, hackberry, Japanese hop, nettles, false nettle	
Red Admiral	<i>Vanessa atalanta</i>	S5			2				1				13	1	1	15	2		16	1		11			5	Nettles
Silver-spotted Skipper*	<i>Epargyreus clarus</i>	S4								2				1										1		Legumes... showy tick-trefoil, Am. hog peanut and black locust
Silvery Blue*	<i>Glaucopsyche lygdamus</i>	S5												1		2	6		10	1		1	16	5	1	Legumes... tufted vetch, white sweet clover and alfalfa
Spring Azure*	<i>Celastrina lucia</i>	S5																	1							Cherries, blueberries and early blooming viburnums
Tawny-edged Skipper*	<i>Polites themistocles</i>	S5																					3	7		Panicgrasses and bluegrasses
Viceroy*	<i>Limenitis archippus</i>	N5										1														Willow and poplar
Wild Indigo Duskywing*	<i>Erynnis baptisiae</i>	S4								1	1			1		1										Purple crown-vetch

Legend
S2N (non-breeding)-Imperiled-imperiled nationally because of rarity due to very restricted range, very few population (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation nationally
S3B (breeding)-Vulnerable-vulnerable in the 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 Ontario
N5-Secure-common, widespread, and abundant in the nation
SNR-Unranked-provincial conservation status not yet assessed (GS-globally secure)
SNA-Not applicable-a conservation status rank is not applicable because the species is not a suitable target for conservation activities
*resident species



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