



# *the Bluestem Banner*



Summer 2021

Tallgrass Ontario

Volume 20, No. 1

***Tallgrass Ontario will identify and facilitate the conservation of tallgrass communities by coordinating programs and services to aid individuals, groups and agencies.***

**Tallgrass Ontario thanks:**

Our members for their generous support.

**Board of Directors:**

- Season Snyder
- Jack Chapman
- Izabela van Amelsvoort
- Jeff Bakker
- Pat Deacon
- Dan Stuart
- Jennifer Neill
- Karen Cedar
- Jennifer Lau Balsdon
- Val Deziel
- Tom Purdy
- James Appleyard
- John F. Foster
- Steve Rankin



## ***Prairie Summer***

Go to [www.tallgrassontario.org](http://www.tallgrassontario.org) to download the Bluestem Banner in colour.

### ***Inside the Bluestem Banner***

***Invitation to TgO's 2021 Annual General Meeting ..... Page 2***

***Interploidy variation in Ontario Big Bluestem populations .....Page 3***

***Tallgrass Ontario – 20 years..... Page 6***

***Become a Member.....Page 14***

## TALLGRASS ONTARIO

Invites all members to attend our

### 2021 Virtual Annual General Meeting

Wednesday, June 16, 2021

#### Zoom Meeting

10:00 am – 12:00 pm

#### Agenda Includes:

Business Meeting  
President's Remarks/TgO's Accomplishments  
Board Member Elections  
Guest Speaker – Mr. Mark Stabb

Tallgrass Ontario is excited to host a presentation by **Mark Stabb**, the program director for the Nature Conservancy of Canada's (NCC's) Central Ontario – East region. Mark oversees conservation projects across the Rice Lake Plains, on the Oak Ridges Moraine, the limestone landscape of the Napanee Plain and around Prince Edward County and the islands and shores of eastern Lake Ontario. At over 40,000 hectares, the Rice Lake Plains represent a significant portion of the remaining tallgrass prairie and oak savanna habitat in Ontario. Since 2002, the NCC has helped lead the Rice Lake Plains Partnership (RLPP) — a collaborative collection of private landowners, Alderville First Nation, conservation groups and governments that share the goal to protect and restore the Rice Lake Plains. Mark will join us to discuss the important work being undertaken by the RLPP to preserve the natural and cultural history of the Rice Lake Plains and to ensure the long-term sustainability of tallgrass communities.

### REGISTRATION IS NOW OPEN!

The Tallgrass Ontario Annual General Meeting is **free** to Tallgrass Ontario **current** and **new members only**. If you are not yet a member but want to join us, please visit <https://tallgrassontario.org/wp-site/memberships/>.

To register for this virtual event, please send an email to **info@tallgrassontario.org** with the name of the person/people attending. Tallgrass Ontario will send you a Zoom invitation via email with the event link and instructions.

***Interploidy variation in Ontario Big Bluestem populations: Implications for Restoration of Ontario Tall Grass Prairies – Hilary Lefort***

I am a graduate student at Trent University, in the Sustainability Studies program. In 2016, I graduated with a degree in Ecological Restoration from Trent and since have been working on a variety of site revegetation and nursery projects. I returned to Trent in 2019 to pursue my current research interests which are native seed restoration strategies and community- based resource management. This project developed as a collaboration between Trent, the Nature Conservancy of Canada's project in the Rice Lake Plains and Tallgrass Ontario (TgO); and was inspired by the research themes outlined in TgO's 2019 Update to the (1998) Recovery Plan.

**Background for Research:**



*Hilary counting and recording Big bluestem tillers for field fitness data at Hazel Bird Nature Reserve*

There are several vital restoration initiatives underway for endangered grassland communities in Ontario; a keystone activity within them is replanting and reseeding native species. Recently grassland revegetation research has brought attention to an important seed sourcing factor that is commonly left out of restoration narratives. Variation in chromosome numbers, or intraspecific ploidy variation (IPV) occurs widely in grassland species, it is especially common in the graminoid (grass) family Poaceae. IPV is a phenomenon that occurs when an individual creates more than two copies of its chromosomes. Transforming diploid individuals, into tetraploid or hexaploids etc. The term to describe an individual with a differing chromosomal factor

is referred to as cytotype.

Because changes in cytotype often occurs on the edge of species natural ranges, this can impart an adaptive advantage on some, such as an increased tolerance to environmental extremes as well as a resistance to inbreeding depression; which is a large concern when dealing with the conservation and restoration of endangered plant communities. Potential disadvantages of IPV in species can occur when different cytotypes are unknowingly mixed during restoration projects; variation in chromosome numbers is often phenotypically indistinguishable in the field unless compared side by side. Interbreeding between differing



*Big bluestem seed after processing from its' florets. In this naked form, the seed is also known as the caryopsis.*

cytotypes can reduce reproductive potential within a restored population and result in reduced seed set, poor seed viability, and offspring that display low fitness. These factors could ultimately contribute to instability and low resilience in restored populations. In the Western United States, where massive grassland restoration projects are underway, researchers and practitioners have begun to screen restoration seed sources for ploidy level compatibility with extant populations to avoid intermixing incompatible cytotypes.

### Research

Based on this knowledge, I am researching whether Intraploidy variation is present within remnant and restored populations of Big Bluestem in Ontario and how this might be affecting the fitness of these populations. I will also be looking at the effect of seed origin (local vs non-local), environmental variables such as soil type and site classification (remnant vs restored) on fitness.

In pursuit of these research objectives, I've performed tissue sample surveys of 18 populations of Big Bluestem within remnant and restored sites between South Western and Central Ontario to estimate the variation in ploidy levels within. The sample sites fell in six Eco-Districts and five *Ontario Ministry of Natural Resources and Forestry* (OMNRF) seed zones. At each site I observed and recorded multiple field parameters of fitness for individual plants. I included plant height, number of vegetative and flowering tillers, and total seed yield per plant as measurable fitness proxies.



*A Big bluestem seed undergoing a "Cut Test". Here the seed is dissected with a longitudinal cut to get a sense of the seeds viability by looking at the condition of the embryo and endosperm. (The embryo is noticeable at the top left and bottom right corner of the seed halves here, distinguishable through its whiter, more opaque pigment)*

In order to describe and compare the fitness traits of the seed collected; I am in the process of performing trait, germination and viability tests, along with observing seedling early growth rates and biomass partitioning. I also gathered soil samples at each site to characterize and understand if soil type and base soil chemistry levels are correlated within plant fitness levels and cytotype distribution and prevalence. I am looking forward to the final stage of my research where I plan to present my findings to a group of practitioners in order to receive feedback on how to integrate any new information gathered within this study.

### Goals:

My goal for this research is to be able to provide restoration practitioners with more information about the keystone species Big Bluestem, as it relates to seed sourcing and compatibility for Tallgrass Prairie restoration in South Central Ontario!



A Big Bluestem individual flagged for field observations and seed collection at Hazel Bird Nature Reserve

Hilary Lefort was the recipient of **TgO's 2020 Mary Gartshore Grant**. This research study was inspired by the [Provincial Conservation Strategy for Tallgrass Communities](#). There is an increasing demand for native seed for use in Tall Grass Prairie restoration projects in *Southern Ontario*, because of this, the risk of introducing non locally adapted genotypes and cytotypes is also increasing. The introduction of foreign material has unknown consequences on the remnant gene pool but could result in outbreeding depression and restoration failures. The following question will be investigated: i) Do remnant populations in the study area display higher fitness levels than restored populations?



[Tallgrass Ontario](#) is an all-volunteer organization which relies on member donations and government grants to carry out our important work. Our administration costs are among the lowest of Canadian environmental charities. Donating is easy – go on-line to our website and donate at Canada Helps at <http://www.tallgrassontario.org/>. The Canada Helps button is on the upper right side of our home page.

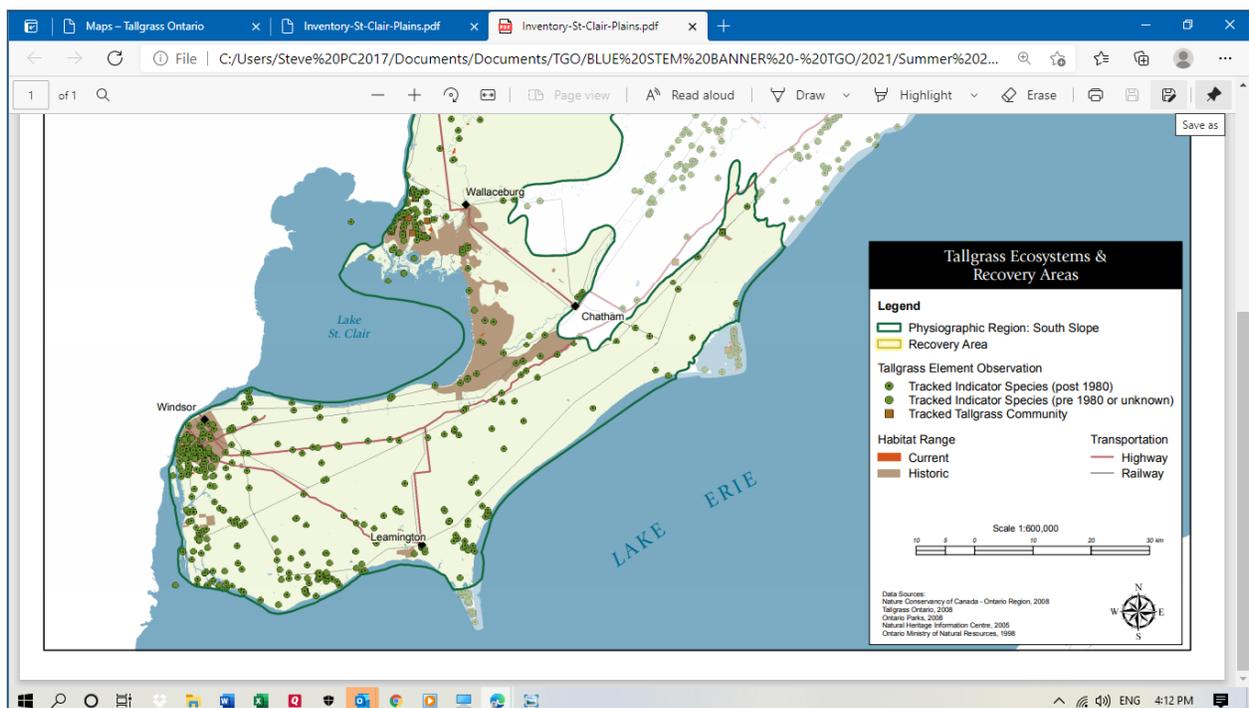


## Tallgrass Ontario, 20 years - Steve Rankin

*"It is the sole remnant of this plant along this highway, and perhaps the sole remnant in the western half of our county. What a thousand acres of Silphium (1) looked like when they tickled the bellies of the buffalos is a question never to be again answered and perhaps not even asked." Aldo Leopold (2) - Prairie Birthday (1949) ASC 45*

With the Holocene extinction (3) well under way and being alive in an era that geologists are considering naming **Anthropocene**; this year (2021) marks the 20<sup>th</sup> anniversary of **Tallgrass Ontario**; 23 years since the 1998 **Recovery Plan for Tallgrass Prairie in Ontario** was published. This article reflects on how TgO came to be, why it remains relevant today and looks to some of the challenges that lie ahead. For this article I've re-visited **Tallgrass Communities of Southern Ontario: A Recovery Plan** and the **2019 Update to the Recovery Plan**. Some of the information in this article is drawn from the recovery plan and is arranged to tell TgO's story.

West of **Chatham**, by the **Thames River** near the rural hamlet **Prairie Siding**, a sea of tallgrass prairie stretched to **Lake St. Clair** before turning north and following the lake to **Walpole Island**. When I was a kid growing up on my Father's farm in the former **Dover Township** in the **Municipality of Chatham-Kent** I was not aware that large parts of our township and neighboring **Raleigh township**, had in the centuries before, been a lush landscape of tallgrass prairie, home to rare plants and uncounted insect species, some found only in grasslands. Today, the insects and plants for the most part are gone with the exception of **Walpole Island** where large remnants have been conserved. The legacy of the former tallgrass prairie landscape today is deep dark soil, rich in carbon that can grow any kind of crop. The map below was generated by the **TgO mapping project** and displays historic tallgrass prairie in **West Kent** and **Essex County** that predated the arrival of settlers.



Ecologically-speaking, humanity has been described as an unprecedented "global super-predator" that preys on all other apex predators having planet-wide impacts on food webs. There have been species extinctions on every continent and in every ocean at levels far above background. Today's *Holocene extinction* can be linked to humanity's impact on the biosphere with meat-eating, overfishing, ocean acidification and decline in amphibian and avian populations being a few examples of a much broader cosmopolitan decline in planetary biodiversity. Human population growth and ever-increasing consumption are considered to be the primary drivers of this decline. It is against this grim backdrop that the challenges of modern conservation come into sharp focus.

### **What are they**

In Canada, the word "prairie" most often brings to mind images of vast, flat or rolling grasslands with buffalo roaming about in the western provinces. There is no evidence that buffalo ever roamed in *Southern Ontario* however few people realize that, historically, prairie extended through *Southern Ontario* and once covered a significant part of this region's land area. Tallgrass prairie remnants found in *Southern Ontario* represents the far eastern fringe of a once lush and expansive tallgrass ecosystem that thrived prior to human *settlement in central North America* extending from *Manitoba* south to *Oklahoma*. Unlike the mixed-grass prairies found in *Alberta* and *Saskatchewan*, *Southern Ontario*, and part of *Southern Manitoba* was home to tallgrass communities with small pockets also in *North-Western Ontario*. The ample amount of precipitation in comparison with that of the western provinces produced taller, lush vegetation with a collection of flora and fauna different from that in the west. Tallgrass prairie was not found everywhere in *Southern Ontario* but in scattered pockets where climate and soil conditions were the most favourable. The term "*tallgrass communities*" is used in this article to describe the assemblages of flora (plants) and fauna (animals) making up tallgrass prairie and savanna systems in North America.

### **Where are they**



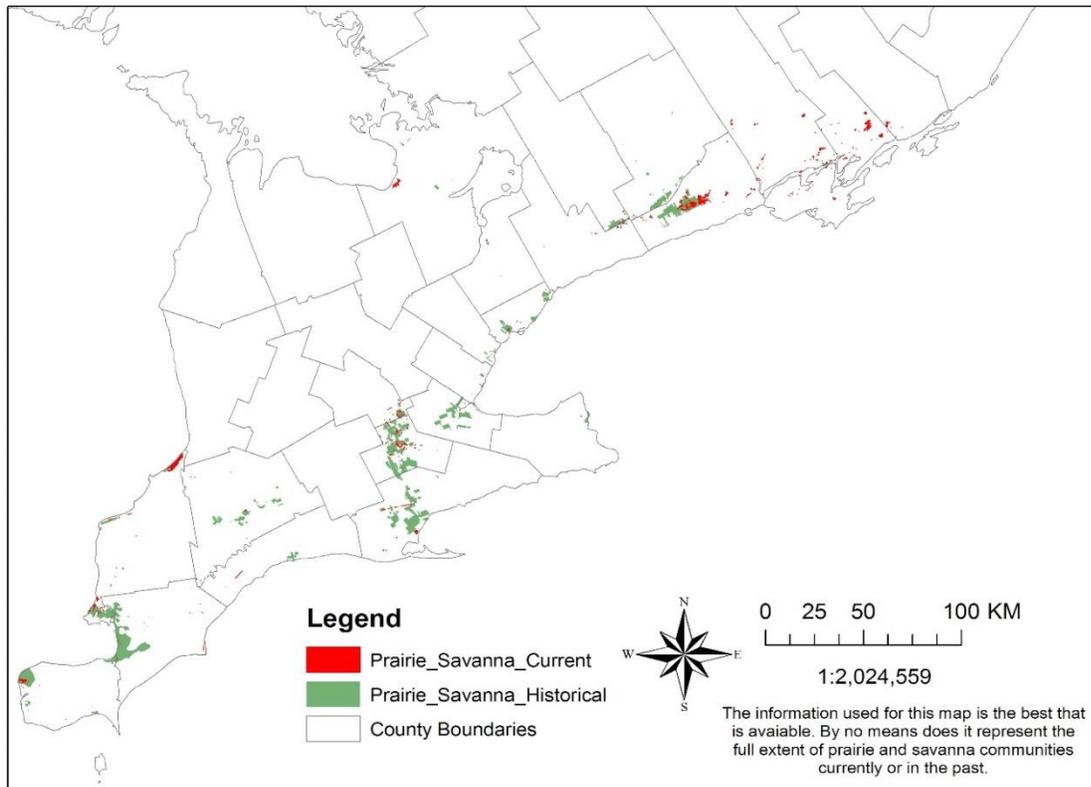
According to an analysis by *Kraus and Buck (2009)* the historic extent of tallgrass communities amounted to 115,900 km<sup>2</sup>. In 1992, approximately 2,100 ha (21 km<sup>2</sup>) of tallgrass prairie and savanna were known to be remaining in *Southern Ontario* (*Bakowsky and Riley 1994*). By 2009, the area of known remnants had grown to 6,600 ha (66 km<sup>2</sup>). This total represents approximately 6 percent of the presettlement extent of prairie and savanna in Ontario. The increase from

1992 to 2009 has been attributed to improved mapping and new grassland creations.

In *Southern Ontario* the large majority of remnant tallgrass habitat (measured by total hectares) is protected on publicly owned and maintained management lands. These include *Ojibway Prairie Complex* (savanna and prairie), *Turkey Point Provincial Park* (savanna), *Alderville First Nation and the Rice Lake Plains* (savanna and prairie), *Walpole Island First Nation* (savanna and prairie) and on the southern edge of Lake Huron, from Grand Bend to Kettle Point, including *Pinery Provincial Park*

(savanna). These sites are by far the largest contiguous sites in the province, they are also the largest single fragments of tallgrass communities.

Most other remnants exist as small, isolated patches of less than 2 ha. The [Ojibway Prairie Complex](#) near Windsor is one of Ontario's largest tallgrass prairie remnants. [110 species of rare native plants](#) associated with tallgrass prairie have been recorded at Ojibway, dozens of which are listed as threatened, endangered or special concern. No other site in Ontario supports such a concentration of rare species.



Natural Heritage Information Centre (NHIC) estimated historic and current extent of tallgrass communities in Southern Ontario as cited by Kraus & Buck (2009)

Natural and anthropogenic (people-caused) fire as well as grazing by hoofed-mammals prevented the encroachment of woody plants, natural enemies to tallgrass prairie. The negative impact of woody plants – they provide shade in an ecosystem that thrives on full-sun.

One tallgrass community that tolerates some shade is known as **Tallgrass Oak Savanna**. In Ontario the best examples are at **Pinery Provincial Park** on Lake Huron and at **High Park** in Toronto. Savanna can be thought of as a transitional community type between prairie and forest. “The delineation between what constitutes a prairie and a savanna, and what separates these two from other community types sharing various structure and process elements, is not clear cut. Various methods of distinguishing these communities from each other include the use of percent tree cover, canopy cover, density, basal area, mean area per mature tree and distances between trees ([Bakowsky 1993](#)). In Ontario, the **Natural Heritage Information Centre (NHIC)** treats tallgrass communities with less than 10 percent tree cover as

tallgrass prairie, and those between 10 percent and 35 percent as savanna (Bakowsky 1993)”. TgO has recently published a new reference document: [Restoring Tallgrass Oak Woodlands in Southern Ontario](#). The proliferation of the moldboard plow allowed for the widespread conversion of tallgrass prairie to farm land. Tallgrass prairie survives in areas unsuited to plowing.



*Burr Oak Savanna; Steepcone, CC BY-SA 3.0*

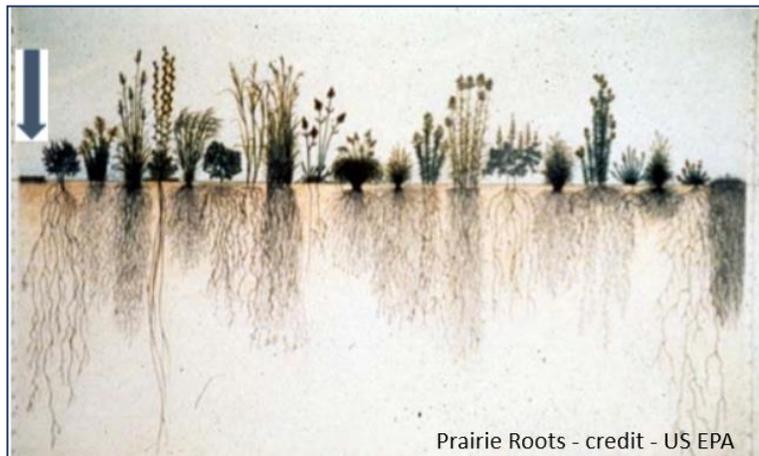
In modern times climate change represents a major new risk to ecosystems world-wide.

***Why are they important***

Grasslands provide a refuge for pollinating insects and grassland birds and play a role in mitigating climate change. [Research is showing](#) that grasslands are more reliable carbon sinks than forests. In a warming world forests are exposed to hotter temperatures, droughts and increased wild-fires that return stored carbon back to the atmosphere. While a grassland also occasionally burns; fire is a necessary

disturbance for healthy grassland, most of its stored carbon is under the soil surface in the plant roots and surrounding soil which effectively sequesters it until released to the atmosphere by a plow. Soils under long-established prairie grasslands can contain more than 22 metric tons of roots per hectare with most of this bulk in the top 24 inches.

The roots of some prairie plants can extend to a depth of 10 feet or more. ***In the illustration (right)*** native prairie plants typically have deep and extensive root systems. By comparison cool season turf grasses, such as ***Kentucky bluegrass*** at the far left in the illustration, under the arrow, have very shallow root systems which are much less effective in controlling erosion and withstanding drought.



Prairie Roots - credit - US EPA



Soil carbon makes up approximately [81% of total ecosystem carbon found in grasslands](#). Because plant productivity is limited by precipitation in grasslands, carbon stocks are highest in regions where rainfall is the greatest, such as the tallgrass prairie in the humid temperate region of *Southern Ontario*.

Various studies of the potential for tallgrass prairie carbon storage have shown that [storage rates vary between .7 and 4.2 metric tons per hectare per year](#). This storage ability is cumulative over time so prairie soil is able to sequester or store large volumes of carbon in a natural, safe, effective and reliable way compared to the risky and expensive practice of pumping CO2 underground. An additional benefit of this grassland carbon storage system is that the sequestered carbon is supporting a lush prairie ecosystem above ground. Healthy grasslands are fire-dependent by design to keep shade-producing woody plants from moving in. Before modern day this function was provided by nature in the form of dry lightning strikes and First Nations agriculture.

A remnant old growth tallgrass prairie is like a coral reef, only on Earth's surface. Instead of coral, algae and exotic fish, there are diverse flowering plants, bunch grasses, many species of insects and animals that prey on insects like dragonflies, mantises and grassland birds. Aerial insectivores and Turkey vultures rule the air column high above. Both the marine and grassland biomes hold resources in abundance that other species rely on to complete their life-cycle. A Minnesota Department of Natural Resources [literature review](#) identified 728 insect and allied species that were considered to be possible prairie grassland specialists. In Ontario the **NHIC** has identified over 200 vascular plants associated with tallgrass prairie, (see Table A1 in the [2019 update to the recovery plan](#)).



Bobolink (*Dolichonyx oryzivorus*) at Kenesserie Tallgrass Prairie, Chatham-Kent

### **Enter Tallgrass Ontario**

Thanks to increased interest and conservation efforts over the past 40 years, it is still too soon to sign the death warrant for tallgrass and at least some of its inhabitants. The **1998 Recovery Plan** – a joint effort between **World Wildlife Fund** and the **Ontario Ministry of Natural Resources** was prepared by Lyndsay Roger with the assistance of an expert advisory team. Nikki S. May led the 2009 recovery team efforts which played a major role in the production of the 2019 update.

***In Southern Ontario with sky-high land valuations, the limiting factor for creations or restorations isn't lack of technique but a shortage of real estate upon which it can be practiced.***

The recovery plan “identified a need for greater coordinated leadership, communication and consolidated information to help direct current and to incite new involvement. To make significant strides toward recovering tallgrass communities region-wide, a larger, more coordinated and strategic approach was required.”

In 1999, many of the same individuals who had helped get the recovery plan off the ground formed the **Ontario Tallgrass Prairie and Savanna Association**. In 2001, the association shortened its name to **Tallgrass Ontario (TgO)** and was incorporated as a Canadian charity, able to apply for and acquire funding from private foundations and government agencies. Over the past 20 years Tallgrass Ontario has been focused on the goals outlined in the 1998 Executive Summary.

Unlike old-growth forests that take centuries to evolve yet are vulnerable to destruction in a day, bio-diverse tallgrass prairie can be created in a manner similar to seeding a field of wheat. A broad mix of native prairie forbs (flowering plants) and warm season bunch grasses are seeded into the soil using a specialized seed drill. Care is taken with the selection of seed to ensure that local genotype is used to preserve remnant gene pools. Once seeded this “created” grassland evolves over time with more forbs



making an appearance each succeeding year. Prescribed fire is applied periodically to keep out unwanted plants. In *Southern Ontario* with sky-high land valuations, the limiting factor for creations or restorations isn't lack of technique but a shortage of real estate upon which it can be practiced.

Considered the birthplace of **ecological restoration**, the first tallgrass prairie restoration was the 1936 **Curtis Prairie** at the **University of Wisconsin-Madison Arboretum**. The practice of prairie creation and landscape restoration have been honed over the years. In partnership with Environment Canada, Tallgrass Ontario published the **Planting the Seed** restoration guide 20 years ago. This guide can be [downloaded here](#).

On the dry rolling hills of the Rice Lake Plains, at the eastern end of the Oak Ridges Moraine in Central Ontario, significant portions of an historic 17,000 ha – 30,000 ha tallgrass prairie landscape are being brought back from the brink. The Nature Conservancy of Canada (NCC), in partnership with the Alderville First Nation, private landowners and conservation groups, forged the multi-partner **Rice Lake Plains Joint Initiative** in 2002 to raise awareness and to collaboratively work on a landscape scale to restore tallgrass habitats. Ganaraska, Lower Trent, St. Clair Region, and the Upper and Lower Thames River Conservation Authorities have all been involved in the restoration and management of remnant prairies.



TgO has undertaken state-of-the-art GIS mapping and field verification of most of the remnant tallgrass community patches in *Southern Ontario* and the delineation of networks of tallgrass habitats and species. TgO has produced

high quality educational materials, including factsheets, displays, guides and enhanced communication in protecting and enhancing local tallgrass remnants through our [Bluestem Banner](#) newsletter and the [TgO website](#).

TgO is involved in a wide range of activity from habitat management to grassland creations and public education. TgO has an all-volunteer board of Directors with no paid employees. We work with landowners, foundations, municipalities, provincial and federal funding agencies to provide habitat management services and to improve tallgrass prairie ecosystems in *Southern Ontario*. TgO has undertaken many small and medium size creations and worked with landowners to protect and enhance remnants.



TgO has completed several projects to improve prairie ecology benefiting Slender Bush Clover at Ojibway in Windsor. Other species that benefited from similar work included Butler's Gatersnake, Eastern Foxsnake, Purple Twayblade, Willowleaf Aster and Dense Blazing Star. Efforts have been made to protect the habitat of American Columbo near Cambridge and Bird's-foot Violet in Brant County. TgO has recently completed projects to improve prairie ecosystems at Luther Marsh near Grand Valley and Monarch butterfly habitat in Norfolk and Chatham-Kent.

Despite all the efforts and progress made by TgO and others "the main challenge for the survival of tallgrass communities and the organisms that depend on them is simply to have enough space to survive and to allow natural processes, such as fire, to occur. The sum total of the tiny, isolated remnants left in *Southern Ontario* is not sufficiently large enough to conserve healthy tallgrass communities in perpetuity – and many of these have no form of protection from further destruction. Already, various species have declined and disappeared due to lack of habitat, and more extirpations are likely if the trend of habitat loss is not reversed. In order to recover tallgrass communities, ways must be found to address these threats and their underlying factors.

Tallgrass communities remain among the most at-risk plant communities in *Southern Ontario*; all are listed as S1 (extremely rare in Ontario) by the **NHIC**. These communities provide habitat for about 20% of Ontario's at-risk species listed as S1-S3. Most of these species face similar threats to survival, including habitat degradation, fragmentation or outright loss. By far the largest threat to tallgrass communities in *Southern Ontario* has been the conversion of natural areas to other land uses. Despite this critical situation, tallgrass communities--their biological diversity, beauty, and even the fact that they occur in Ontario--are still often overlooked".

(1) *Silphium* are a genus of tallgrass prairie sunflowers that include *Prairie dock (Silphium terebinthinaceum)*, *Cup plant (Silphium perfoliatum)* and *Compass plant (Silphium laciniatum)*. Genus is a principal taxonomic category that ranks above "species" and below "family".



(2) **Aldo Leopold** (1887- 1948) was the father of wilderness and grassland conservation in the United States. Leopold was influential in the development of modern environmental ethics and is best known for his book **A Sand County Almanac** (1949) which has sold more than two million copies.

*Further reading: The Essential Aldo Leopold, edited by Curt Meine and Richard L. Knight*

(3) *The Holocene extinction is the sixth mass extinction event in Earth's 4.5-billion-year history. Anthropocene (the proposed name for our current geological age) is defined by humans being the dominant force on Earth.*

For more information about TgO maps see here: [Maps – Tallgrass Ontario](#)

Unless otherwise stated, Photos in this article (and on page 1) taken at Kenesserie Tallgrass Praire. All rights reserved. Kenesserie Tallgrass Praire is a 3.2 ha. creation in Chatham-Kent. The forb pictured in the foreground of the page 1 photo is Round-headed bushclover (*Lespedeza capitata*). This photo was taken in the same location as the photo that appears on Page 1 of last Winter's edition of the Bluestem Banner (Volume 19, No.2). Both photos provide a contrast between Winter and Summer.

Steve Rankin is a Director and Past-President, Tallgrass Ontario.

**The Bluestem Banner is published twice per year by Tallgrass Ontario. The next edition will appear in December 2021.** All previous editions of the Bluestem Banner can be found here: [Bluestem Banner – Tallgrass Ontario](#)

#### Become a Member

##### Tallgrass Ontario's Goals

1. Ensure organizational capacity
2. Facilitate the creation and restoration of tallgrass communities;
3. Increase public awareness and stewardship of tallgrass communities;
4. Identify and secure existing potential tallgrass communities across the province;
5. Promote research and knowledge transfer of tallgrass communities

##### Membership

**Tallgrass Ontario** is always actively seeking individuals who would like to learn the roles of a TgO Board member and work to achieve a position on the TgO board.

The first step in the TgO volunteer path is to become a member. A **General Membership** is \$20 per calendar year, a **Student Membership** is \$10.00 annually and a **Lifetime Membership** is \$100.00. All memberships entitle the member to voting rights in the organization.

**Tallgrass Ontario** is a Registered Canadian Charity. You can donate to **Tallgrass Ontario** by visiting <https://www.canadahelps.org/dn/13376>

You can become a member by visiting our website at: <http://www.tallgrassontario.org/memberships.html>

