

Project Prairie and Tallgrass Education on the Rice Lake Plains: A Journey from 1870 to Today and Beyond

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ABSTRACT Project Prairie began in 2011 as a curriculum-linked integrated environmental studies program to showcase the Rice Lake Plains (RLP), a tallgrass prairie landscape of sandy rolling hills located at the eastern extent of the Oak Ridges Moraine in southern Ontario. Project Prairie provides educators both indoor and outdoor activities that support their curriculum and share the story of the RLP. Project Prairie provides teacher and student resources that focus on the RLP from the mid-nineteenth century to present day. Learning objectives of Project Prairie are developed from the subjects of science, social science, language arts, geography, history, and Aboriginal culture. Additional educational resources that have been produced include a puppet show, maps, an educational booklet with poster, species at risk cards, species at risk booklet, magnets, and a website. The curriculum material can be used on smart boards, thereby giving students the most up-to-date educational experience. Project Prairie grew from successful work completed by Alderville First Nation Black Oak Savanna (ABOS) and other partners in the Rice lake Plains Joint Initiative (RLPJI). The Nature Conservancy of Canada (NCC) forged the multi-partner RLPJI in 2002 to raise awareness and work collaboratively to restore tallgrass prairie and savanna habitats on a landscape scale. To date, the partnership has grown to ten organizations that help deliver Project Prairie to students across the RLP.

KEYWORDS education, oak savanna, restoration, Rice Lake Plains Joint Initiative, tallgrass prairie

Education has been the key to spreading the word about the unique tallgrass ecosystem of the Rice Lake Plains (RLP). Alderville First Nation Black Oak Savanna (ABOS) and other partners of the Rice lake Plains Joint Initiative (RLPJI) have been educating students for many years. The Nature Conservancy of Canada (NCC) forged the multi-partner RLPJI in 2002 to promote and restore the habitat, raise awareness of its significance and foster understanding of tallgrass prairie and savanna habitats on a landscape scale. The initiative built a shared vision that recognized that a restored tallgrass landscape cannot be accomplished by one group acting alone; it takes coordinated conservation action. From the combined efforts of these organizations grew Project Prairie. Begun in 2011, it is a curriculum-linked integrated environmental studies program to showcase the RLP, a tallgrass prairie landscape of sandy, rolling hills located at the eastern extent of the Oak Ridges Moraine in Southern Ontario. This project provides indoor and outdoor activities that are linked to the local educational curriculum. The project uses posters, puppet shows, educational booklets, and other education materials to help students learn. Murals depicting the natural history of the area were created to be used with the most current smart board technology. Project Prairie is one of many outreach programs that are completed by the RLPJI. To date, the partnership has grown to ten organizations that help create programs, like Project Prairie, to educate students and raise awareness amongst landowners of the RLP and its unique habitats and species.

RICE LAKE PLAINS

The Rice Lake Plains (RLP) is Canada's easternmost tallgrass prairie and savanna landscape and, at an estimated 15,384 to 30,300 ha (Catling et al. 1992), was historically one of Ontario's largest tallgrass ecosystems. The Rice Lake Plains is located on the eastern extent of the Oak Ridges Moraine (Fig. 1), south of Rice Lake, north of Lake Ontario.

The story of the RLP begins with the advance and retreat of glaciers 20,000–10,000 yr ago. As they advanced, glaciers transformed the landscape resulting in new and extreme elevation changes. Rice Lake to the north and Lake Ontario to the south of Northumberland County were formed and now border the Plains with the Oak Ridges Moraine, running east-west between the two lakes (Stabb et al. 2007). With large accumulations of sand and gravel, the Moraine acts like a sponge allowing rainwater to be filtered and slowly released into cold water streams.

Historically, tallgrass prairie and savanna communities covered an estimated 70,000 ha of land across southern Ontario. The extent and amount of prairie and savanna in Ontario are based on early land surveys, historical plant and animal collections, and pioneer writings (Bakowsky 1993, Bakowsky and Riley 1994, Bakowsky 1999). On the Oak Ridges Moraine, tallgrass communities once made up to 10 to 20% of feature (Varga 2001). The eastern extent of the RLP was mapped and described based on early land surveys, writings and collections from early botanists (Traill 1836,

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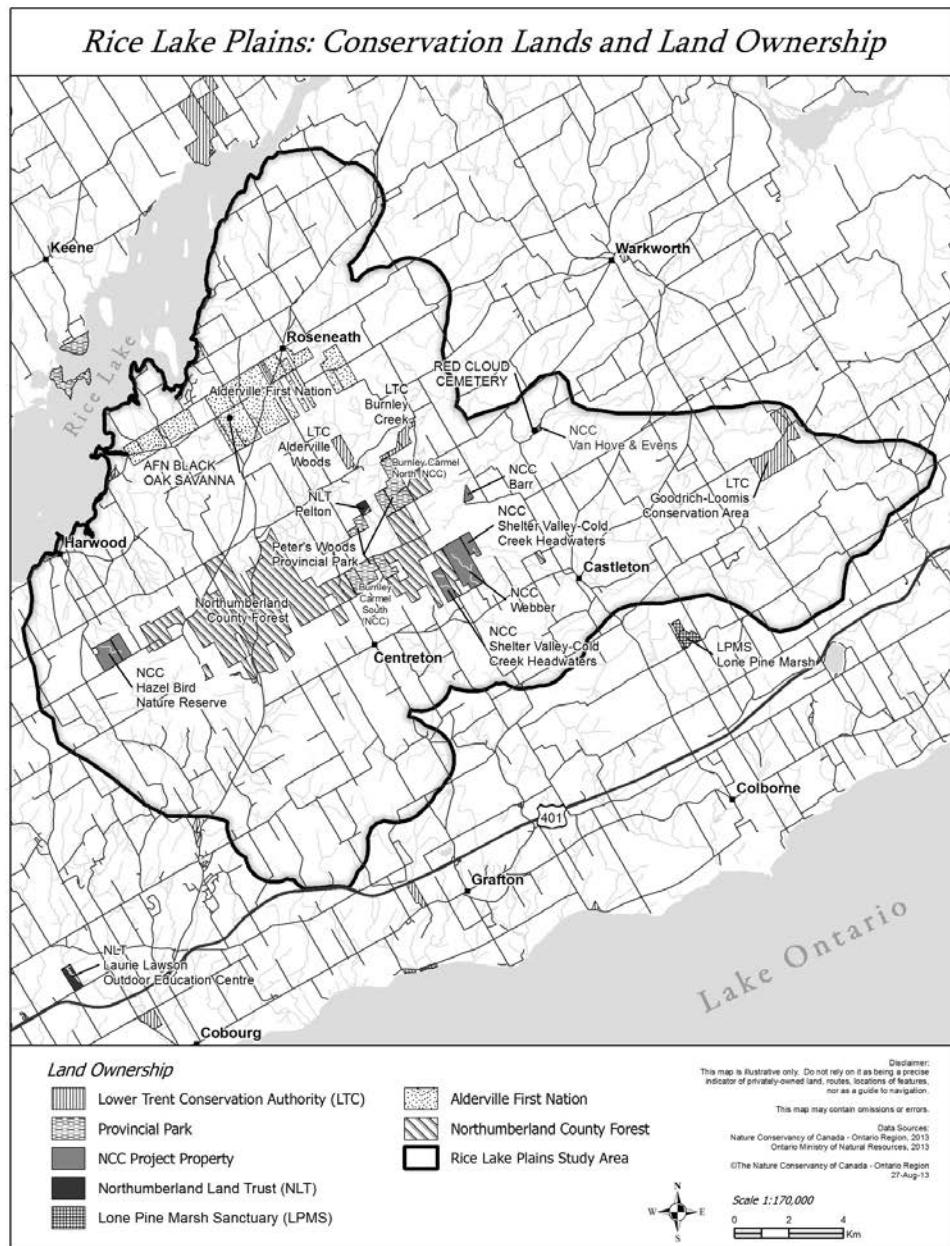


Figure 1. Land ownership of the Rice Lake Plains Joint Initiative Partners and General Location of the Rice Lake Plains.

Catling et al. 1992). Tallgrass in this area extended over an area of at least 17,200 ha and as much as 30,000 ha (Catling et al. 1992).

Like tallgrass habitats across central North America, the vast majority of the tallgrass prairies and savannas of Ontario and the RLP have been lost to development, vegetation succession and conversion to agriculture. The oak savanna, tallgrass prairie, oak woodland and sand barren communities on the RLP are now identified as globally and provincially significant. This area contains extensive tracts of natural cover with good populations of tallgrass communities, making it

an important area for protection, restoration and long term stewardship.

Rice Lake Plains Joint Initiative

The Nature Conservancy of Canada began preparing Natural Area Conservation Plans (NACP) for priority sites across Canada in 2005, adapting conservation planning tools such as those developed by The Nature Conservancy (TNC) in the United States. These plans identify strategic actions necessary to conserve the biodiversity targets found within

the Rice Lake Plains Natural Area. This natural area incorporates the Oak Ridges Moraine and additional lands to the east. The Rice Lake Plains Natural Area Conservation Plan (RLP NACP; Farrell et al. 2005) was the first such NACP completed in Canada, and laid out NCC's plans for securement, stewardship and community outreach in the area. Since then, NCC has refined, improved and standardized its national NACP protocols and has subsequently updated the RLP NACP (Stabb et al. 2007). In 2001, NCC purchased the 317 ha Burnley Carmel properties within the Rice Lake Plains Natural Area ($44^{\circ} 8' 12''$ N, $78^{\circ} 1' 11''$ W) in partnership with Ontario Parks. This was the beginning of NCC's work in the RLP.

The RLPJI started in 2001 with six partners including Ontario Parks, NCC, Northumberland County, Wildlife Habitat Canada, Lower Trent Region Conservation Authority, and Ganaraska Region Conservation Authority. These groups were brought together because they owned or managed land, or were actively connecting with landowners in the RLP area. The overall RLP project was first outlined by in previous proceeding for the North American Prairie Conference (Farrell et al. 2006).

Today, the group has grown and changed to include ten partners (Ontario Parks, NCC, Northumberland County, Lone Pine Marsh Sanctuary, Northumberland Land Trust, Lower Trent Region Conservation Authority, Ganaraska Region Conservation Authority, Tallgrass Ontario, Willow Beach Field Naturalists and Alderville First Nation [AFN]). As a result of the partnership, over 600 ha have been secured. Management of these lands has included invasive species removal, prescribed burns, seed collection and dispersal, plantings, educational opportunities, and trail creation and maintenance.

TALLGRASS EDUCATION IN THE RICE LAKE PLAINS

Alderville Black Oak Savanna

Alderville First Nation Black Oak Savanna (ABOS) has been successfully conducting education programs since 2000. The 50-ha site is located on the eastern edge of the Oak Ridges Moraine, close to the south shore of Rice Lake (Fig. 1). The site supports tallgrass prairie and oak savanna, and is the largest intact tract of native grassland habitat left on the RLP.

The Ojibway people who inhabited the land for many generations, before major European settlement, knew this region as '*Pemadashkotayang*' or '*Lake of the Burning Plains*' (ABOS 2013). This name reflects the important role fire played on these lands; clearing the land for both agriculture and hunting. Wildlife was attracted to the new green growth of the grasses that came after a spring burn. It was this practice that helped provide conditions necessary for the preser-

vation of the savanna and tallgrass prairie habitats.

Black Oak Savanna hosts workshops and events to promote the importance of this fragile ecosystem. Examples of programming available at the Ecology Centre or by staff in classrooms include:

- **Butterfly Bonanza:** Immerse yourself in the life cycle of a butterfly through a creative movement sequence and a special craft. Enjoy a puppet show and explore the significance of the butterfly as a symbol in indigenous cultures. Learn butterfly anatomy and look at migration patterns. For Kindergarten to grade 6 students, 2–3 hours in duration.
- **Biodiversity on the Plains:** Learn about the enormous diversity of plants, mammals, insects, birds, and herptiles in prairie and savanna habitats. Explore the inter-relationships of predators and prey through an outdoor action games. For grade 4–6 students, 2–3 hours in duration.
- **Fire Ecology:** Ever wondered how fire alters the natural succession of an ecosystem? Why are prairie plants dependent on fire? What special adaptations have plants and animals evolved to withstand fire? An exciting program exploring the cultural and ecological significance of fire in prairie and savanna restoration. We will use traditional fire-making methods to ignite curiosity and our flame as we journey together into the spirit of the fire. For Grade 7–12 students, 2.5 hours in duration.

Many of the other RLPJI partners conduct school programs or manage facilities where they lead hikes or workshops for visitors of all ages.

PROJECT PRAIRIE

Based on the success of the education projects of ABOS and RLPJI partners, a joint project was developed. Project Prairie was launched in 2011 with the debut of a puppet show highlighting the story of the RLP. Characters within the show included Savvy the RLP savanna sparrow (*Passerculus sandwichensis*), a Karner blue (*Plebejus melissa samuelis*) and an eastern hog-nosed snake (*Heterodon platirhinos*) as well as local human residents of Alderville First Nation. The story highlighted issues affecting prairie species, the RLP and what kids can do.

Materials for indoor and outdoor activities were developed including maps, poster and educational booklet, species at risk cards and booklet, magnets, activities and website (www.ricelakeplains.ca). The Nature Conservancy of Canada and other partners also have found funding support for school bus trips as part of the "Head for the Hills" initiative to bring students from surrounding lands up into the RLP.

Project Prairie provides local educators both indoor and outdoor activities that support the existing Ontario Ministry of Education curriculum and share the story of the RLP, which lies in their own backyard. The program provides

teacher and student resources that focus on the RLP from the mid-nineteenth century to present day. Learning objectives of the project are developed from the subjects of science, social science, language arts, geography, history and Aboriginal culture.

The story of the local tallgrass prairies, oak savanna and woodland, and sand barrens was largely forgotten up until the mid-1990s. This program is designed to tell that forgotten story in a way that can be shared with students. The natural history of Northumberland County integrates many of the topics taught in elementary school: pioneers, habitats, plants, biodiversity, and interactions within ecosystems.

Approaches to Learning

Teaching units are broken into four historical time periods: Prior to 1870, 1870–1940s, 1950s–1990s, and 1990s–present. Each period explores five topics: plants, animals, soil and landforms, fire, and human history. Local artist Cheyenne Blacker was commissioned to create murals to illustrate these periods and what was happening at the time (Figs. 2–5). Rice Lake Plains Joint Initiative partners provided recommendations for each of the time periods and local educator Mark Rupke guided the project. These murals were scanned so they could be used interactively with smart board technology. The lessons and activities address provincial curriculum guidelines for learning expectations in grades 4, 6 and 7. They also include the following approaches to learning:

- Local learning, specifically information about the local Rice Lake Plains landscape
- Integrating a variety of curriculum themes including: geography, science, media literacy, language arts, etc.
- Engaging the learner in activities rather than passive information acquisition
- Including real world connections, allowing the learning to be based in a context that the student understands and is familiar with
- Considering alternative perspectives, opinions and ideas
- Inquiry-based learning by encouraging students to learn what they are curious about

Learning Outcomes

The learning outcomes for the material are as follows:

- Identify different ways social and economic impacts affect biodiversity (e.g., urbanization and agricultural intensification)
- Understand why biodiversity is important in an ecosystem
- Identify how fire and natural processes help to preserve/restore biodiversity in an ecosystem
- Identify other factors that affect biodiversity
- Students learn how biodiversity is measured; develop

an awareness and appreciation of social and economic impacts that affect biodiversity and how the pioneers impacted the prairie and savanna ecosystems

Rice Lake Plains Tallgrass Communities pre 1870

This mural (Fig. 2) depicts the RLP during increasing European settlement. At that time, tallgrass species and habitats were still dominant. When the first pioneers came to Northumberland, they found a very different place from the one we now experience. One highlighted pioneer is Catharine Parr Traill who wrote of the area she observed. In her book, *Backwoods of Canada*, she notes:

"We now ascended the plains--a fine elevation of land--for many miles scantily clothed with oaks, and here and there bushy pines, with other trees and shrubs. The soil is in some places sandy, but varies, I am told, considerably in different parts, and is covered in large tracks with rich herbage, affording abundance of the finest pasture for cattle. A number of exquisite flowers and shrubs adorn these plains, which rival any garden in beauty during the spring and summer months. Many of these plants are peculiar to the plains, and are rarely met with in any other situation. The trees, too, though inferior in size to those in the forests, are more picturesque, growing in groups or singly, at considerable intervals, giving a sort of park-like appearance to this portion of the country" (Traill 1836).

The habitats she describes are now called tallgrass prairie communities and include oak barrens, tallgrass prairie, woodland and savanna.

Rice Lake Plains Tallgrass Communities 1870–1940

This mural (Fig. 3) shows the changes as pioneers continued to modify the landscape through planting of agricultural crops. Non-native birds and plants started to displace tallgrass species. As the light sandy soils were ploughed and the vegetation died, the land became very susceptible to erosion. The plants that were introduced to the prairie were very different from the native plants. Most were cool season grasses with much less extensive root systems than the native prairie vegetation.

As the prairie and forest was converted to farmland, the habitat for many of the distinctive prairie animals expanded. Much of the cleared land became pastureland, and this allowed mammals and birds that were displaced to expand their territories east. Historical fluctuations in numbers and changes in the distribution of bobolinks mirrored changes in the landscape and in agricultural practices. Bobolinks (*Dolichonyx oryzivorus*) originally nested in tallgrass or mixed-grass prairie of the Midwestern United States and south-central Canada. Their range spread eastward and their numbers increased as the northeastern forests were cleared. As civil-



Figure 2. Mural of Rice Lake Plains Tallgrass Communities Pre-1870 by Cheyenne Blacker.



Figure 3. Mural of Rice Lake Plains Tallgrass Communities 1870–1940 by Cheyenne Blacker.

zation spread westward and the land was cultivated, the bobolinks followed. Non-native bird species like European starlings and house sparrows were introduced and became more common, competing with native birds for habitat and food. The plants that were introduced with European settlement were very different from the native tallgrass plants. Native species have extensive root systems, and as they disappeared, the soil structure deteriorated, resulting in a loss of fertility and an extensive erosion problem. With the settlement of the plains, the periodic fires that once sustained the prairies no longer occurred. As the area was divided into fields, fenced and ploughed, the prairie lost the characteristic plants and was dramatically altered.

Rice Lake Plains Tallgrass Communities 1940–1990

This mural (Fig. 4) depicts the increased tree planting and changes in species populations in the RLP. Additionally, it showcases local hero Hazel Bird who worked to change things.

Afforestation of the area took place as a solution to soil erosion. Tree species used included conifers such as red, white, Scotch and jack pine, larch and spruce. As a rule these were planted in mixtures of varying quantities with occasionally hardwoods used on the better quality sites. The remnants of the prairie and savanna habitats were largely destroyed, and the areas became coniferous plantations. As the trees matured, they shaded out the remaining prairie species, caus-

ing the loss of much of what was left of the historic RLP. With the effort to grow forests on the Oak Ridges Moraine, the habitat for prairie species diminished.

Many of the prairie species declined in numbers to the point of being classified as species at risk. Grassland birds, such as the bluebird declined and were listed as a threatened species. This was of great concern to many naturalists who remembered the bluebird fondly as a common sign of spring and hope. Many naturalists started to build bluebird boxes to enhance their habitat and breeding opportunities. One local hero who is profiled is Hazel Bird, a well-respected and loved naturalist and volunteer who worked as a staff naturalist at the Laurie Lawson Outdoor Education Centre in Hamilton Township in the 1970s and 1980s. Today, Ms. Bird is cited internationally for her work restoring the bluebird population and educating all about the important features of Northumberland County.

Rice Lake Plains Tallgrass Communities 1990–Present

This mural (Fig. 5) depicts the current day RLP. Education and awareness about tallgrass prairie and the species associated with them are enhanced. Stewardship activities including prescribed burns, non-native species removal and planting are widespread. The oak savanna, tallgrass prairie, oak woodland, and sand barren communities on the RLP are now globally and provincially significant. The RLP contains extensive tracts of natural cover with good populations of



Figure 4. Mural of Rice Lake Plains Tallgrass Communities 1940–1990 by Cheyenne Blacker.



Figure 5. Mural of Rice Lake Plains Tallgrass Communities 1990–Present by Cheyenne Blacker.

tallgrass communities, making it an important area for protection, restoration and long term stewardship.

On RLPJI partner sites, many non-native plants have been removed or reduced. However, landscape-scale challenges are still associated with the ever-increasing list of non-native species. Scotch pine (*Pinus sylvestris*) was heavily planted in the area in the 1940s–1960s to stabilize the soil and reduce soil erosion. Other non-native plant invaders to the area include white sweetclover (*Melilotus alba*), European swallow-wort (*Cynanchum rossicum*), spotted star-thistle (*Centaurea biebersteinii*) and brown star-thistle (*C. jacea*). These plants displace native prairie plants and the animal species that depend on them.

Education materials will continue to be developed for Project Prairie. The draft material will be piloted at local schools and with educators and once complete, it will be rolled out to schools in the RLP. In addition, NCC and ABOS are working on plans to update the ABOS site to a regional visitor and education centre for tallgrass prairie and savanna, thereby allowing for more students to visit the habitats and learn the past, present and future of this unique ecosystem.

SUMMARY

The RLP is a thriving prairie landscape that has partners and landowners working together to raise awareness and help protect and steward this globally significant habitat and the

species that depend on them. A partnership education program, Project Prairie, shares the story of the RLP and provides teachers and students with activities that support their curriculum and share the story of the RLP. Smart board murals provide teaching units that are broken into four historical time periods. Each period explores five topics: plants, animals, soil and landforms, fire, and human history. Learning objectives of the project are developed from the subjects of science, social science, language arts, geography, history and Aboriginal culture. Project Prairie has helped connect educators and local youth with the RLP environment and the materials will continue to be refined and shared with local schools and educators.

Key Messages of the Project

- Tallgrass prairie is one of the most endangered ecosystems in North America
- The RLP contains some of the most extensive oak savanna and tall grass prairie remnants in Ontario
- The RLPJI, individual private landowners and conservation groups have been actively working together to increase awareness of these rare places within Northumberland County since 2001
- Private land stewardship is important in the restoration of the RLP

- Prairie and savanna habitats are important for conserving Ontario's biodiversity
- To have healthy prairie and savanna ecosystems they need high biodiversity
- There are many different types of indicators to measure biodiversity

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