

## **McKnight Prairie Conservation History**

**By Maddie Reynolds '14**

**June 2014**

### **Introduction**

McKnight Prairie is a plot of land located seven miles east of campus that Carleton College purchased in the late 1960s. Although the land had previously been used for row crop agriculture and grazing, the hilly topography prevented past landowners from plowing the entire property. The hilltops contain remnant tallgrass prairie, in which soil and plant communities from before the time of European settlement remain intact. As such, it is a rare and beautiful landscape that serves as a great asset to the college. This paper will attempt to record the conservation history of this prairie remnant, as well as to show how Carleton faculty and students have used it for both research and educational purposes. It is intended to help visitors understand both how Carleton preserved this land and how the land is teaching students and community members about the importance of prairie ecosystems.

### **Property Purchase**

In the late 1960s, Carleton biology professor Paul Jensen decided that the biology department needed a way to teach students about natural prairie ecosystems (Bakke and McKone, 1999). He began searching for a piece of property at which faculty and students could observe and research prairie ecosystem processes, as well as engage in restoration management of native species. Jensen considered two properties, a wetland near St. Olaf College, and a prairie remnant seven miles east of Carleton's campus, before choosing the latter (Bakke and McKone, 1999). The college supported Jensen's aims, and Jensen approached Henry T. McKnight, the family representative of the Sumner T. McKnight Foundation, for the money to purchase the

property (Jensen, 1999). In 1968, McKnight provided the College with \$11,500 to cover the costs of the purchase. The College bought the property from a farmer, Frank Hand, for \$7,000 and named it after McKnight. The remaining money was used to purchase a trailer to house research projects on the property (Bakke and McKone, 1999).

Based on assumptions of the land use history, the property had been used by farmers for a long time. The hill tops consisted of remnant prairie that had never been plowed, whereas the surrounding land had been planted in corn and other crops (Bakke and McKone, 1999). Jensen had reason to suspect that the property had been grazed by cows and sheep until the 1920s. This fact was confirmed in the early 1990s when a local farming family, the Ringeisens, told Jensen that their predecessors had pastured the land (Jensen, 2000). Jensen maintained that the land “was in good shape” (Bakke and McKone, 1999) when the College purchased it, as there were still many native prairie species growing there. There was also a grove of cherry trees on the property, which provided shelter for foxes, birds, deer, and deer mice (Bakke and McKone, 1999). Although he later considered removing the cherry trees, Jensen ultimately decided to let them remain, due to their benefits for local wildlife. He jokingly remarked in an email to Carleton biology professor, Mark McKone, that McKnight may contain the only known “cherry savanna” (Jensen, 1990).

### **Early Restoration and Management**

In the early years at McKnight, Jensen eliminated the cropping that the previous owner had practiced in order to plant native prairie vegetation (Bakke and McKone, 1999). With the help of student workers, he also introduced many native prairie plants that were not present or were not well represented at the time of purchase. Some of the prairie species came from local

sites (within 50 miles), while others came from further away. Jensen later acknowledged that introducing species at McKnight from distant sites could have posed potential problems, but he said that he felt it was necessary because species would not establish themselves on the site without human assistance (Bakke and McKone, 1999). Most species were introduced through seeding, but some were planted using seedlings established in peat pots and plugs (Bakke and McKone, 1999). The process was conducted mainly through trial and error as Jensen and his students tried planting a variety of species to determine which would thrive. Some, like *Hudsonia* (*Hudsonia ericoides*), took off right away, but others, like wild lupine (*Lupinus perennis*), did not do so well at the site (Bakke and McKone, 1999). For a list of the suspected introduced species at McKnight, please refer to Appendix 1.

Jensen also established a prescribed burn program within the first few years. Initially, he burned the entire prairie every year in order to remove the woody species that had become well – established on the property before purchase, including plum, prickly ash, sumac, and aspen (Bakke and McKone, 1999). The first burn resulted in an explosion of one of the native grasses, little bluestem (Bakke and McKone, 1999). Jensen engaged student workers and volunteers to help him with many aspects of restoration at McKnight, and he later said that they always seemed most enthusiastic about assisting with prescribed burns (Bakke and McKone, 1999). After ten years, during which most of the woody species had been eradicated, Jensen divided McKnight into two parts, West Hill and East Hill, and began to burn each separately, every other year (Bakke and McKone, 1999). Later, the property was again divided, resulting in three sections that were each burned approximately once every four years, the fire regime used at McKnight today (Bakke, 1994).

The College had to make other minor changes to the property at the time of purchase. A broken fence, erected by a former owner, was removed (Bakke and McKone, 1999). Jensen did not want to enclose the property, but after incidents of people driving motorcycles and four-wheel drive vehicles through the prairie, he decided to build a new fence (Bakke and McKone, 1999). Another former owner had used part of the property as a dump, so student volunteers banded together to remove metal waste (Bakke and McKone, 1999). Although the college had fully supported the acquisition of McKnight, there is some evidence that people did not understand the property's importance in preserving remnant prairie. In the early years, Jensen says that many people at the college referred to McKnight as "Jensen's weed patch" (Bakke and McKone, 1999). However, as time went on, more and more students and faculty became interested in the property, using the site for research and class field trips.

### **Additional Property Acquisition and Recognition**

Most of the property of McKnight was purchased in 1968, but the College acquired the remaining amount of land near the southeast corner in 1990 (Bakke and McKone, 1999). The acquisition occurred due to a misunderstanding with the neighboring Christmas tree plantation owner, Russell Almendinger (Ophaug, 1992). The road that separates McKnight from the Christmas tree plantation had been long abandoned when Almendinger decided to improve it by widening it and leveling it (Braker, 2014). However, the road was no longer publically owned and had been deeded to the former owners, the Hand family, prior to the purchase by Carleton. The improvements that Almendinger began damaged areas of native vegetation that Jensen had been working to restore. After some discussion about appropriate reparation, Almendinger agreed to a legal settlement in which he ceded a small portion of his land to Carleton in exchange

for the use of the road (Braker, 2014). With this transaction, the McKnight property boundary reached the form that we see today.

Also in 1990, the Nature Conservancy, an international conservation organization, took notice of the ecological importance of McKnight. The organization approached professor of biology Mark McKone and college dean for budget and planning and professor of geology Clement Shearer about registering McKnight as a Minnesota Natural Area (Mueller, 2005). This designation is awarded to landowners whose property contains significant natural features in order to promote responsible land stewardship practices (Braker, 2014).

### **Conservation Easement**

In June of 2010, Carleton sold a conservation easement on the McKnight Prairie property to the Minnesota Department of Natural Resources (Braker, 2014). A conservation easement is a legal agreement between a government agency or land trust and a private landowner, in which the landowner transfers some of their property rights to a conservation organization. The landowner may receive monetary compensation for having land use restrictions placed on the property, or may make a donation of these property rights (MN DNR, 1999). Easements are created for many purposes, including the preservation of wildlife habitat and the improvement of water quality (MN DNR, 1999). Arboretum Director Nancy Braker decided to explore a conservation easement at McKnight Prairie through the Minnesota Department of Natural Resources (DNR) Native Prairie Bank Program because it would provide permanent protection for this important property. Generally, the Native Prairie Bank Program only places easements on land that has never been plowed, but the Minnesota DNR agreed to consider the entire McKnight Prairie for its program because only a portion of it had been disturbed in this way, and

the portion that had been plowed had been undisturbed for the last fifty years. Minnesota DNR biologists decided the disturbed portion of the land had recovered sufficiently to be ecologically valuable (Braker, 2014). Braker knew that gaining the support of a government agency would make McKnight Prairie less susceptible to potential threats, such as power line and natural gas pipeline construction (Braker, 2014). The agreement would also ensure that the Minnesota DNR would assist in protection of the site, especially if it were threatened by an outside party (Braker, 2009).

Braker began discussing the conservation easement with the Minnesota DNR in the fall of 2008 and appealed to the trustees of the College in April of 2009 (Braker, 2014). Because each easement is tailored to the landowner's needs, Braker and the trustees negotiated the specific restrictions of the easement in order to both ensure protection of McKnight Prairie and enable the college to continue using it for educational purposes (Braker, 2014). They hoped to keep McKnight Prairie open to public use, except during prescribed burns and sensitive research projects (Braker, 2014). Carleton requested that non-Carleton group use could be controlled by requiring groups to seek permission from the College before entering the property (Braker, 2014). Carleton also wanted to ensure that geology classes would still be able to conduct soil sampling on the site, which required special negotiations with the Minnesota DNR (Braker, 2014). Once the trustees were satisfied that the conservation easement would still allow for academic use of McKnight Prairie, Braker was permitted to move forward with the Minnesota DNR's process. A land title issue impeded the proceedings and had to be resolved before the conservation easement was finalized (Braker, 2014). When Russell Almendinger had ceded land to Carleton in 1990, the college had, unknowingly, failed to gain clear title to the property (Braker, 2014). Due to this fact, the Minnesota DNR requested that the title issue be resolved

before the transfer was completed. Carleton worked with Almendinger to clear up the land transaction, and the conservation easement at McKnight Prairie was completed in the summer of 2010.

In addition to the legally binding conservation easement, the Minnesota DNR and Carleton jointly drafted a Stewardship Plan that would govern management and land use at McKnight, in the hopes of “preserving the significant elements of natural diversity at McKnight Prairie in a natural condition with as little human degradation as possible” (Braker and MN DNR 2010). The Stewardship Plan describes what the easement both allows and prohibits at McKnight, as well as what rights the state government has regarding the property. According to the plan, Carleton can continue the management strategies that had previously been employed on the site, including prescribed burns and non-native species eradication (Braker and MN DNR, 2010). Research, educational use, and seed collection for Arboretum use are also permitted (Braker and MN DNR, 2010). The easement prohibits plowing and other topographical alterations, as well as subdivision of the property and the construction of buildings on the site (MN DNR, 2010). Only a small area at the southwest corner of the property remains free for other uses, in the case that the college would want to erect an entrance kiosk or bench, or allow for more intense geological study, such as digging soil pits (Braker, 2014). The easement does not allow for grazing or haying, and taking plants from the site is strictly prohibited (Braker, 2014; Braker and MN DNR, 2010). Although McKnight remains open for public use, no horses, bicycles, ATVs, or unleashed pets are allowed on the property (Braker and MN DNR, 2010). While camping is prohibited, hunting may be instated if over-browsing causes harm to native plant communities (Braker and MN DNR, 2010). The easement gives the Minnesota state government the right to place signs on the property to mark the easement and allows government

officials access to the property for the purpose of monitoring and management (Braker and MN DNR, 2010).

The Minnesota DNR approved Carleton's Stewardship Plan in June of 2010. In order to monitor future use and ensure that Carleton did not violate the contract by doing damage to the site, the Minnesota DNR drew up a Baseline Report, in which they surveyed and recorded the state of the property at the time the easement was put in place. As a result of the transaction, Carleton received \$92,438.00, which was invested in the Arboretum Endowed Fund (Braker, 2009).

### **Research and Class Use**

McKnight Prairie has been used by both faculty and students for both research and educational purposes since its acquisition by the College. In the fall of 1975, Paul Jensen and his field biology class conducted the McKnight Prairie Project, which categorized and mapped McKnight into regions based on moisture. This mapping allowed the class to determine where to transplant certain prairie species on the site (Freeman, 1975). The Biology 125 lab class conducts a regular project in which students collect goldenrod gall fly larvae from the Arboretum and compare them to those collected at McKnight Prairie. This project aims to determine whether there are genetic differences between Arboretum gall flies and McKnight gall flies. Geology professor Mary Savina often takes her geology classes to McKnight Prairie to observe the geologic history of the site. In addition to class lab work, some classes also allow students to conduct independent research and some of these projects have taken place at McKnight. For example, one student research project in Mark McKone's 2005 population ecology class examined the effects of spring burning on a species of prairie forb (Luterra, 2005).



Not all classes that use McKnight use it as a research classroom. Mike Kowalewski takes his American Nature Writing class to McKnight Prairie to gain a better sense of how writers have viewed the natural world and how literature and natural sciences interact (Braker, 2014, June 6). Additionally, field drawing and advanced photography classes also take field trips to McKnight to learn how to capture the natural prairie setting artistically (Braker, 2014, June 6).

Faculty and students also use McKnight Prairie for research purposes. In 2005, Diane Angell, a biology professor at St. Olaf College, conducted a small mammal survey at McKnight. Her project indicated that prairie deer mice, western harvest mice, and prairie voles all inhabit McKnight prairie (Angell, 2005). In 1996, then Carleton student Pat McIntyre, class of '97, inventoried all current plant species at McKnight. For a list of faculty and student research projects that have taken place at McKnight Prairie, please refer to Appendix 2.

## **Conclusion**

McKnight Prairie has enjoyed a long history under the ownership of Carleton College. From 1968 to today, it has undergone many restoration projects, with native plants being reintroduced and prescribed burn cycles being instated. Its ecological importance has been recognized by an international conservation organization and it has been protected by the Minnesota DNR under a conservation easement. Over the decades, it has acted as a site of research and study for faculty and students, and it has given a wide variety of classes the opportunity to learn about America's prairies. If you are interested in learning more about McKnight Prairie, please explore the Arboretum's digital collection through the Carleton Library's website. McKnight Prairie is open to visitors year round, and we encourage everyone to stop by and explore the rare beauty of this prairie remnant.

## Bibliography

- Angell, D., M. Watland. 2005. Short description of small mammal results from McKnight Prairie 2005. Unpublished material from Arboretum archives
- Bakke, M., M. McKone. 1999. Interview with Paul Jensen at McKnight Prairie.
- Bakke, M. 1994. 1994 Arboretum Report.
- Braker, N., Minnesota Department of Natural Resources. 2010. McKnight Prairie Stewardship Plan
- Braker, N. 2014. Faculty Scholarship. In Cowling Arboretum.  
<[http://apps.carleton.edu/campus/arb/connections/faculty\\_scholarship/](http://apps.carleton.edu/campus/arb/connections/faculty_scholarship/)> Downloaded on 6 June 2014.
- Braker, N. 2009. Memorandum to the Building and Grounds Committee.
- Braker, N. 2014 Personal interview. 31 January 2014.
- Freeman, S. K. Liegel, N. Read, S. Stewart, P. Thomas, C. Wilson. 1975. McKnight Prairie Project. Unpublished material from Arboretum archives
- Jensen, P. 1999. "date." Email message to Mark McKone. 6 October 1999
- Jensen, P. 2000. "pasturing." Email message to Mark McKone. 12 September 2000.
- Jensen, P. 1990. "Re: chain-sawing trees on the east hill of McKnight." Email message to Mark McKone. 28 June 1990.
- Ophaug, J. M. 1992 "RE: Carleton College/McKnight Prairie." Letter to Russell Almendinger. 14 July 1992.
- Luterra, M. 2005. Effects of spring fire on the rare prairie forb *Besseya bullii* (Scrophulariaceae). Unpublished material from Arboretum archives
- Minnesota Department of Natural Resources. Commissioner of Natural Resources. 2010. *Native Prairie Bank Conservation Easement*. 29 June 2010.
- Minnesota Department of Natural Resources. 1999. "Minnesota's Native Prairie Bank Program."
- Mueller, L. 1990. Nature Conservancy. Letter to Clem Shearer. 10 January 1990.

## Appendix 1

### List of plant species introduced to McKnight Prairie

McKnight Prairie - Record of Introduced Plants, compiled by Nancy Braker from various sources					
Note: Paul Jensen did not record whether or not a species that he introduced was already at McKnight or not. Some species were certainly not there previously, others may have been there but in small numbers only. Others, like big bluestem for example, may have been abundantly present, but introduced for unknown reasons.					
Species		Location of Origin	Already at McKnight?	Type of Propagule	Other notes
Allium stellatum	prairie onion	Schaefer and Owatonna prairies	Unclear. Owenby and Morely record it in this county.		
Andropogon gerardi	big bluestem	Two railroad prairies, one off Hwy 3 and one near the Cannon River, a prairie patchoff a road parallel to the road to McKnight, a hill over an adjacent farmer's field.	Likely		Jensen does not indicate why this species was added to McKnight. It is hard to imagine that it was not there already.
Aster sericeus	Mouse-eared aster	Hill to the south of McKnight	Likely		
Astragalus canadensis	milk vetch	From one mile away	Likely		

Baptisia bracteata	cream wild indigo		May have been there all along and Paul missed it, which is mysterious since it is such an obvious plant.		Mark McKone thinks that Paul means Baptisia bracteata, Cream Wild Indigo, but he could also mean B. tinctoria. One B. tinctoria was observed by Braker along south edge of site along gravel lane in ~2009, but has not been seen since. A number of large specimens of B. bracteata and many small specimens are found on the northwest slope and along the flat area on the north of the site. Jensen's comments in interview about this species need to be reviewed.
Castilleja sessiliflora	indian paintbrush	Crex Meadows, WI			
Chamaecrista fasciculata	Partridge pea	Weaver Dunes, MN			Jensen mentions in interview that he brought it from Weaver Dunes.
Dalea candida		Schaefer Prairie		Seeds	Jensen mentions in the video that he found this species across Cannon River in old cemetery, but does not say if he collected it from there.
Dalea villosa	Lavender prairie clover	Cannon Falls near a shopping center			
Desmodium canadense	Canada tick-trefoil	Schaefer Prairie and Northfield	Likely		It is hard to imagine that this common species was not at McKnight originally
Elymus canadensis	Canada wild rye	Railroad prairie near the Cannon River	Likely		It is hard to imagine that this common species was not at McKnight originally
Eryngium yuccifolium	Rattlesnake Master	Rail Road prairie north of St. Olaf			
Froehlichia cf floridana	cottonweed	Across RR tracks (NE of McKnight)			"Introduced to dune area by Paul Jensen?" McKone
Gentiana crinata	Fringed Gentian	Unknown	Likely		Members of class (1975) involved in project: Scott Freeman, Konrad Liegel, Nancy Read, Sue Stewart, Priscilla Thomas, Carol Wilson. This species is found throughout McKnight and was likely there historically.
Glycyrrhiza lepidota	Wild Licorice	Schaefer Prairie			

Hudsonia tomentosa	Beach Heather	Telemark - a subdivision south of Northfield			
Liatris punctata	gayfeather	10 miles away			This species has been recorded from both Rice and Goodhue Counties and may have been at the site already or at least found on nearby sites.
Lupinus sp	lupine	Crex Meadows Burnett County, WI			This is likely Lupinus perennis, the native species at Crex Meadows, WI. Not seen in many years.
Monarda punctata	dotted mint	Weaver Dunes, MN			This is a fairly common species in dry sites and was likely present in the landscape on other nearby sites. There are county records from Goodhue and neighboring counties.
Opuntia macrorhiza	prickly pear	Sauk County, WI (Baraboo area)		Pads	McKone's list says "Madison, Wisconsin". In video Paul says Baraboo. These most likely came from Konrad Leigel '78 around 1977 who is from Plain, WI (Sauk County) and interned at the International Crane Foundation near Baraboo, WI.
Panicum virgatum	Switchgrass	Low roadside along the Cannon River "by the new bridge" (perhaps Alta Avenue?) "introduced from one mile away" Jensen	Likely	Seeds and also grew plugs	
Paspalum setaceum		From across RR tracks north of McKnight			
Pediomelum esculentum	Scurf Pea	Hill to the south of McKnight	Likely		Braker thinks this species must have been at McKnight already. It is hard to establish and is present in good numbers scattered all along the ridge.
Penstemon grandiflorus	large flowered penstemon	Helen Allison Savanna			
Phemerantus rugospermus	fame flower	Cannon Valley Wilderness Park, Rice County Park System			Braker located in 2013; hundreds of plants are present in the blow out.

Prenanthes alba	white lettuce	Rail Road prairie north of St. Olaf			
Pycnanthemum virginianum	mountain mint	Rail Road prairie north of St. Olaf			
Salix humilis keewatensis	Prairie Willow	"introduced from nearby bluff to south" Jensen			
Silphium laciniatum	compass plant	Rail Road prairie north of St. Olaf		Grew plugs, planted 200	
Spartina pectinata	prairie cord grass	Along Cannon River (at Alta Ave bridge?) Not sure where this information came from. Video says RR prairie north of St. Olaf.		Dug plugs	
Sporobolus asper		"Probably from Schaefer Prairie" Paul Jensen			
<b>Sources of information</b>					
Jensen list			Undated list of species of plants observed at McKnight recompiled by Paul Jensen in 1998		
McKone list			Flora of McKnight Prairie, last revised in 1992. Includes records from Jensen (beginning in 1977).		
Video interview of Paul Jensen in 1999					

## Appendix 2

### List of Additional Published and Unpublished Resources Involving Research by Faculty and Students at McKnight Prairie

Angell, D., A. Murphy. 2010. Small Mammal Survey Results from Carleton College Cowling Arboretum and McKnight Prairie Summer 2010. Unpublished material from Arboretum archives

Bogard, T., P. Martin. 1981. Vegetational Mapping of McKnight Prairie Part II. Unpublished material from Arboretum archives

Heiser, D., R. Shaw. 2006. The Fitness Effects of Outcrossing in *Calylophus serrulatus*, a Permanent Translocation Heterozygote. *Evolution* 60(1): 64-76

Jensen, P. 1968. Changes in Cryptozoan Numbers due to Systematic Variation of Covering Boards. *Ecology* 49: 409-418

Jensen, P., G. Jacobson, D. Willard. 1973. Effects of Mowing and Raking on Collembola. *Ecology* 54: 564-572

Jensen, P., K. Corbin. 1966. Some Factors Affecting Aggregation of *Isotoma viridis*, Bourlet and *Arion fasciatus*, Nilsson. *Ecology* 47: 332-334

McKone, M., K. McLauchlan, E. Lebrun, A. McCall. 2001. An Edge Effect Caused by Adult Corn-Rootworm Beetles on Sunflowers in Tallgrass Prairie Remnants. *Conservation Biology* 15(5): 1315-1324

McKone, M., A. Forde, E. Sederberg. 2006. Orthopteran Diversity of the Cowling Arboretum and McKnight Prairie in Northfield, MN. Unpublished material from Arboretum archives

Rea, M., M. Lyon. 1977. Vegetational Mapping of McKnight Prairie. Unpublished material from Arboretum archives