Rare Species Surveys in Southwestern Manitoba in 2002

Including the Ellice-Archie & Spy Hill-Ellice Community Pastures

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Executive Summary

Manitoba Conservation Data Centre (CDC) staff conducted surveys for rare species in the Qu'Appelle Valley near the town of St. Lazare, and within the Spy Hill-Ellice and Ellice-Archie Community Pastures. The surveys were conducted between May and August of 2002, and resulted in 41 new or updated occurrences of 11 rare or uncommon species. Many species included in this study are rare because they are at the periphery of their range in Manitoba, and are more common elsewhere. Information was gathered on two nationally rare species, roundleaf monkey-flower (*Mimulus glabratus*), and Sprague's Pipit (*Anthus spragueii*), a COSEWIC (Committee on the Status of Endangered Wildlife in Canada) Threatened species.

Low townsendia (*Townsendia exscapa*) and Indian rice-grass (*Oryzopsis hymenoides*) occurred only on dry south facing slopes within the Qu'Appelle Valley outside the Community Pastures. Sand extraction and all-terrain vehicle (ATV) traffic threaten these occurrences. Within the Community Pastures, threats to grassland species are minimal. Oil wells are present in the Ellice-Archie Community Pasture, and further oil development may pose a threat to rare plants. Non-native grasses were observed in exclosures around the oil wells that could spread to native grasslands in the pasture.

Roundleaf monkey-flower occurs in freshwater springs within the Community Pastures, and may be trampled when livestock wade in the springs to drink. Fencing off the springs and pumping water from the spring into a watering trough could resolve this problem.

Including portions of the Community Pastures in the Protected Areas Network in Manitoba would provide protection for rare species, if management strategies like grazing and prescribed burns continue.

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Introduction

Rare species surveys conducted by the Manitoba Conservation Data Centre (CDC) in 2002 focused on a region in southwestern Manitoba near the town of St. Lazare. This area includes 22,902 hectares in the Ellice-Archie and Spy Hill-Ellice Community Pastures that represent important habitat for species that depend on native grassland. White and Johnson (1980) report seven rare plants from St. Lazare (Table 1). The ranges of these species likely extend into adjacent areas in Saskatchewan, but this study was restricted to Manitoba. For many of these species, records dated back to the 1950s. The Prairie Farm Rehabilitation Administration (PFRA) surveyed the range conditions of the Ellice-Archie and Spy Hill-Ellice Community Pastures in the 1990s (Houston 1993; Houston 1996); however, these surveys did not include targeted searches for rare species. Staff of the Manitoba Conservation Data Centre attempted to update rare plant records from St. Lazare, and search for new occurrences of rare flora and fauna. Current and comprehensive information is critical to assessing the status of rare species, and identifying population trends, and possible threats to rare species and their habitats.

Table 1. Rare plants known from the St. Lazare area before 2002 surveys (White and Johnson 1980).

Latin Name	Common name	NatureServe Rank
Astragalus aboriginum (=A. australis)	Indian milkvetch	S1?
Erigeron caespitosus	Tufted fleabane	S2
Orobanche ludoviciana	Louisiana broomrape	S2
Oxytropis sericea	Early yellow locoweed	S1
Panicum wilcoxianum (=*Dichanthelium wilcoxianum*)	Fall rosette grass; Sand millet	S2
Euphorbia geyeri (=*Chamaesyce geyeri*)	Geyer's sandmat; Prostrate spurge	S2
Oryzopsis hymenoides	Indian rice grass	S2

Europeans settled the St. Lazare area in the early 1800s, beginning with the establishment of nearby Fort Ellice as a trading post, which later became a post for the North-West Mounted Police. Many farms were abandoned after extended droughts in the 1930s. The PFRA Community Pasture program was initiated in 1935 to reclaim marginal lands from cultivation and overgrazing. PFRA currently manages 929,000 hectares in 87 pastures in the prairie and boreal plain ecozones of the Canadian prairies. Native rangeland comprises 782,000 ha (84%), while 147,000 ha (16%) is tame forage. Some 4,000 patrons use the grazing and breeding services provided by PFRA for 124,000 cows and 3,100 horses (Luciuk et al. 1999). The Spy Hill-Ellice and Ellice-Archie Community Pastures were established in 1941 and 1940, respectively.

Methods

Site description

The study area is an example of a grassland community within the Aspen Parkland ecoregion. Most of the ecoregion is now farmland, but in its native state, the landscape was characterised by trembling aspen (*Populus tremuloides*), oak groves, mixed tall shrubs, and intermittent grasslands. Open stands of trembling aspen and shrubs occur on most sites, and bur oak and grassland communities occupy increasingly drier sites on loamy Black Chernozemic soils (Environment Canada 2001).

The Assiniboine River forms the eastern boundary of the study area, and the Qu'Appelle river runs through the middle from west to east. The south slope of the Qu'appelle valley, near the town of St. Lazare, is dominated by aspen woodland, but the north side is characterised by grassland (Figure 1). Deltaic sand deposits mark the junction of the two rivers; sand extraction occurs here, as well as evidence of use by ATVs. Large Community Pastures are on either side of the Qu'Appelle River, with Spy Hill-Ellice to the north, and Ellice-Archie to the south. The pastures are mostly flat, open grasslands, except for creeks and gullies going through the pasture that are often lined with trees like birch (*Betula papyrifera*), bur oak (*Quercus macrocarpa*), balsam poplar (*Populus balsamifera*) and aspen. Several cross fences divide the pastures into fields (Figures 2 and 3). Cattle and horses graze these pastures. Stocking rates for 1999 and 2000 are shown in Table 2. A prescribed burning program is conducted on the Spy Hill-Ellice community pasture, in order to control aspen encroachment. The land surrounding the Community Pastures is used for hay, rangeland and annual crops.

Table 2. Size and stocking rates for the Ellice-Archie and Spy Hill-Ellice Community Pastures.

Pasture	**Size of pasture (ha)**	**Animals delivered 1999**	**Animals delivered 2000**
Ellice-Archie	14,612	1383 cattle; 337 horses	1450 cattle; 315 horses
Spy Hill-Ellice	15,760 (8,290 in MB)	1090 cattle; 180 horses	1061 cattle; 170 horses

Soils in the Community Pastures are mostly of the Marringhurst association, which is characterised by sandy loam, with moderate to excessive drainage (Ehrlich et al. 1956). These soils are susceptible to drought and wind erosion. Typical vegetation on this soil association includes blue grama grass (*Bouteloua gracilis*), porcupine grass (*Stipa spartea*), June grass (*Koeleria cristata*), spear grass (*Stipa comata*), prairie sagewort (*Artemisa ludoviciana*), low goldenrod (*Solidago missouriensis*), creeping juniper (*Juniperus horizontalis*), and three-flowered avens (*Geum triflorum*) (Mansell and Moore 1999).

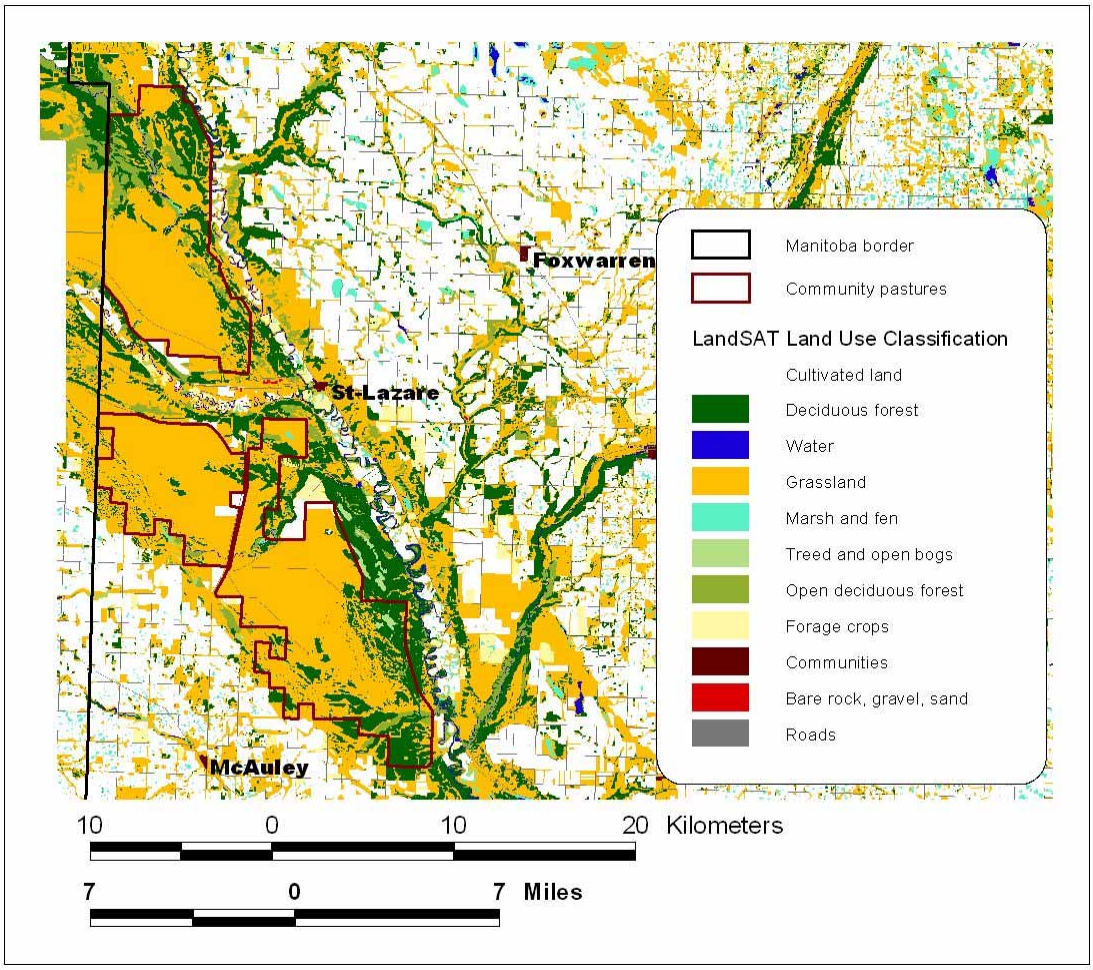

Figure 1. Land use of the study area including the Community Pastures, based on LandSat imagery.

Survey methodology

Within the Ellice-Archie and Spy Hill-Ellice Community Pastures, surveys focused on native grassland areas and freshwater springs. Grassland sites were identified based on aerial ortho-photos and springs were located using maps provided by pasture managers. Outside of the Community Pastures, surveys were concentrated on the sand hill area near the mouth of the Qu'appelle Valley, and on the open sand prairie on the north side of the valley.

The authors conducted surveys on May 27 to 28, June 17 to 20, and August 12 to 13. Study sites were accessed by truck, or on foot. The locations of rare species and other organisms of interest were marked with a Garmin GPS unit. At each site, information was recorded on the habitat, associated species, slope, aspect, and condition. Voucher specimens of select species (Appendix 1) were collected and deposited in the University of Manitoba Herbarium (WIN). Information on soil was collected by use of a soil auger. Bird observations were recorded on an opportunistic basis. Song and behaviour were used to identify Sprague's pipits, a standard identification practice for this cryptic bird (Ken De Smet, pers. comm.). All occurrences of rare organisms were mapped in the

Manitoba Conservation Data Centre (CDC) database using the Biotics 3.1 GIS application.

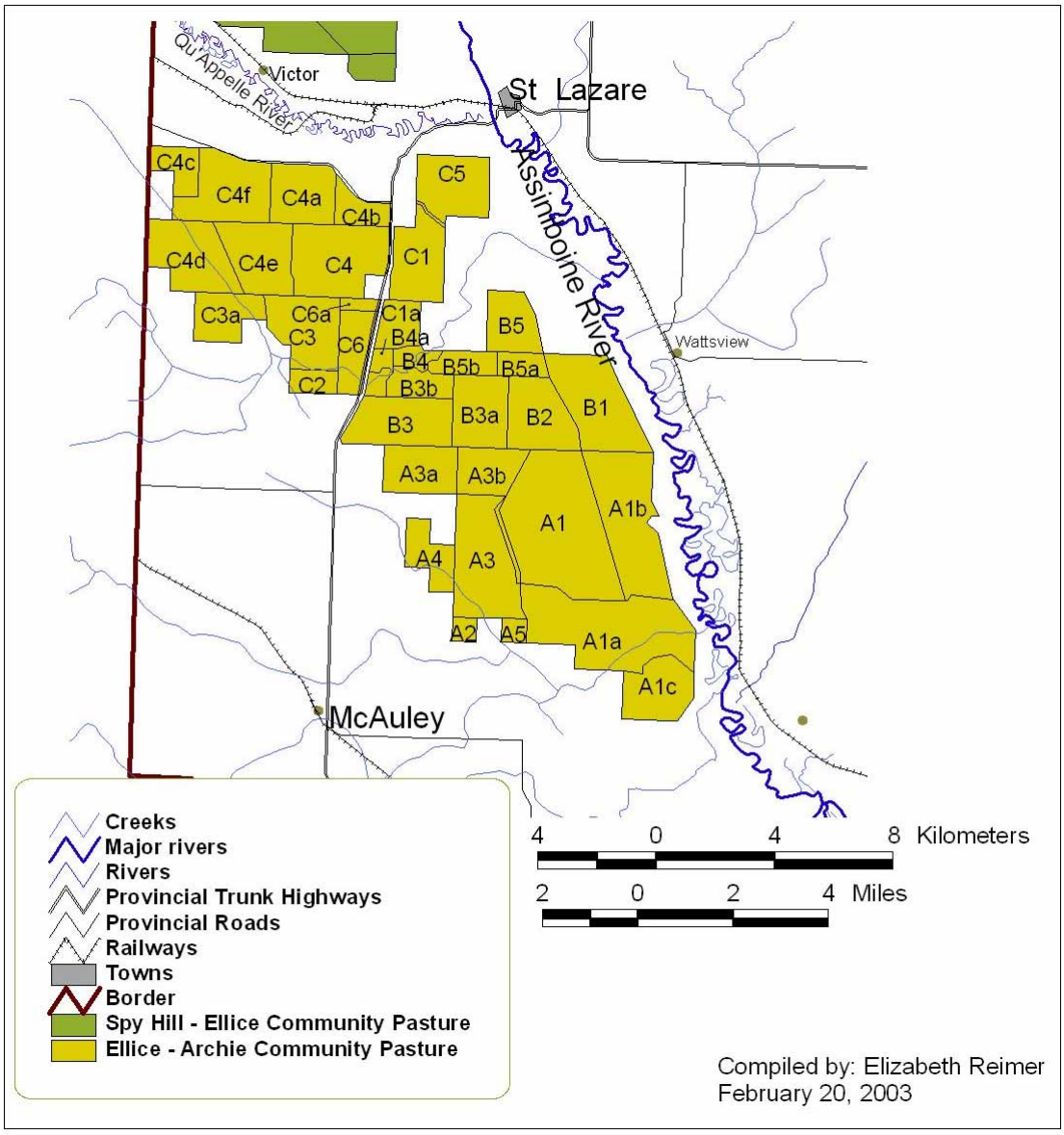

Figure 2. Ellice-Archie Community Pasture and surroundings. Alphanumeric codes represent separate fenced Fields within the pasture.

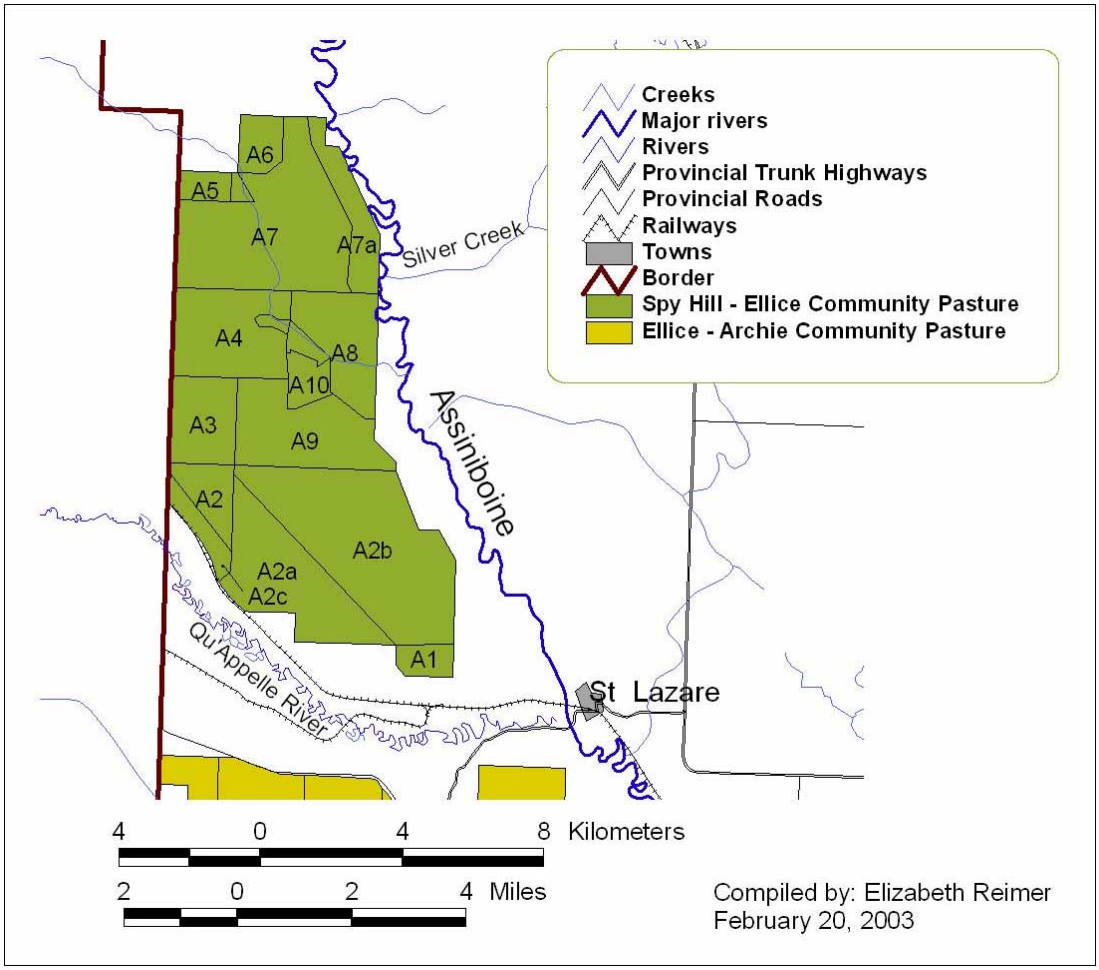

Figure 3. The Manitoba portion of the Spy Hill-Ellice Community Pasture and surroundings. Alphanumeric codes represent separate fenced Fields within the pasture.

Results and Discussion

Vegetation on the sand deposits at the junction of the Qu'Appelle and Assiniboine rivers was dominated by plains wormwood (*Artemisia campestris*), sand grass (*Calamovilfa longifolia*), sand dropseed (*Sporobolus cryptandrus*), Holboell's rock-cress (*Arabis holboellii*), and creeping juniper (*Juniperus horizontalis*). Smooth brome (*Bromus inermis*) and alfalfa (*Medicago sativa*) dominated roadsides at this site. Open sand at a sand extraction site supported waxleaf beard-tongue (*Penstemon nitidus*) and sandmat (*Chamaesyce* sp). On the south-facing slope above the Qu'Appelle River, the vegetation was composed of grassland species including sand bluestem *Andropogon hallii*, and sand grass. Open sand at the top of the slope supported the only occurrence of Indian rice-grass (*Oryzopsis hymenoides*) in the study area. Around the open sand, the top of the slope was characterised by woodland species, especially bur oak (*Quercus macrocarpa*), chokecherry (*Prunus virginiana*), aspen, and false Solomon's-seal (*Maianthemum stellatum*).

Soil in the Community Pastures is generally sandy, with dark organic material of varying depths above the sand (Figures 4a and 4b).

Figure 4a. Soil core from the Ellice-Archie Community Pasture.

Figure 4b. Soil core from the Spy Hill-Ellice Community Pasture.

Rare Species

Surveys resulted in 40 new occurrences and one updated occurrence (Table 3) of eleven rare or uncommon species in Manitoba. In addition, one potential occurrence of Geyer's sandmat was recorded.

Table 3: Rare species encountered in the St. Lazare Area. More details about each species can be found in the text. Definitions of NatureServe Ranks can be found in Appendix 2.

Latin Name	Common Name	NatureServe Rank in MB	Updated Occurrences	New Occurrences
Andropogon hallii	Sand bluestem	S1S2		2
*Anthus spragueii**	Sprague's pipit	S2S3B, SZN		8
Eriogonum flavum	Yellow wild buckwheat	S3		1
Chamaesyce geyeri‡	Geyer's sandmat	S2	1?	
Lomatium macrocarpum	Long-fruited parsley	S3?		2
Mimulus glabratus	Roundleaf monkey-flower	S1		3
Oryzopsis hymenoides	Indian rice grass	S2	1	
Oxytropis sericea	Early yellow locoweed	S1		11
Penstemon nitidus	Waxleaf beardtongue	S2		4
Penstemon procerus	Slender beardtongue	S1S2		5
Phlox hoodii	Moss pink	S3S4		2
Townsendia exscapa	Low townsendia	S2		2

- ‡ID questionable, requires expert confirmation
- *Listed by COSEWIC as Threatened

Low townsendia (*Townsendia exscapa*) was found only in the Qu'Appelle Valley on dry sandy soils. White and Johnson (1980) consider this species rare in Manitoba. This species is at the northeastern limit of its distribution in southwestern Manitoba. Ten occurrences are now known for this species, including the two records reported here. Other species that were found exclusively on sandy prairie in the Qu'Appelle Valley include sand bluestem (*Andropogon hallii*), and Indian rice grass (*Oryzopsis hymeniodes*). Argus and Pryer (1990) consider sand bluestem nationally rare.

Early yellow locoweed (*Oxytropis sericea*) was found on open prairie in May and June in the Ellice-Archie Community Pasture, and in the south end of the Spy Hill-Ellice Community Pasture. It was easiest to identify in May when the showy yellow flowers were in evidence, and the stems of the surrounding grasses were not elongated. The largest population was found in the Ellice-Archie Community Pasture along the fence north of the windmill between Field C3 and Field C3a, with 20 to 100 plants. Before 2002, the only known occurrence of early yellow locoweed in Manitoba was reported from St. Lazare (White and Johnson 1980, Scoggan 1957). This species is at the northeastern limit of its range in Manitoba, and is more common elsewhere. Several species within the genus *Oxytropis* may cause emaciation and abortions in livestock and wildlife if it is ingested in large quantities (Wolfe and Lance 1984). Immature pods of locoweed are most likely to be selected by livestock; leaves and flowers are only consumed at high grazing pressure or when livestock become habituated to locoweed (Ralphs 1987). Appropriate timing of grazing in pastures with locoweed may reduce the risk of livestock poisonings.

White and Johnson (1980) consider waxleaf beard-tongue (*Penstemon nitidus*) rare in Manitoba. Elsewhere in Canada, it is considered secure (NatureServe). Flowering specimens were found in the Qu'Appelle valley and the Spy Hill-Ellice Community Pasture in June. The largest population was on a gravel embankment in the south end of the Spy Hill-Ellice Community Pasture in Field A2c (Figure 3) where it occurred with pasture sage (*Artemisia frigida*). Houston (1995) observed this species at three sites in the Spy Hill-Ellice Community Pasture in both Manitoba and Saskatchewan, growing in association with western porcupine grass (*Stipa curtiseta*) and sedge (*Carex* sp.).

Slender beard-tongue (*Penstemon procerus*) is rare in Manitoba (White and Johnson 1980). Five occurrences of flowering specimens were observed in the Ellice-Archie Community Pasture between June 18 and 20. One occurrence was found within an oil well enclosure with a sign identifying it as property of Renaissance Energy. In Manitoba, this species is known only from the southwestern portion of the province. Previous reports in the CDC database from near Pierson, Virden, Miniota and Reston are dated between 1885 and 1950. These occurrences of slender beard-tongue represent the first Manitoba reports in 52 years.

Large-fruited parsley (*Lomatium macrocarpum*) was observed flowering in May, and fruiting in June. Fruits are required for reliable identification. Surveys located two occurrences in the Ellice-Archie Community Pastures, mostly in Field C3 (Figure 2). This species is at the northwestern limit of its distribution in southwestern Manitoba.

Roundleaf monkey-flower (*Mimulus glabratus*), ranked S1, was found in August in springs and seepy slopes in both pastures. This species is a freshwater spring-obligate and is rare in every Canadian province where it occurs. The Manitoba Endangered Species Advisory Committee recommended a status of Threatened for roundleaf monkey-flower in February 2003. Along with wind- and solar-driven water pumps, naturally occurring springs represent a portion of the livestock watering system in both Community Pastures. Cattle and horses had access to these springs, and extensive trampling was evident (Figure 5). This trampling may lead to physical damage of monkey-flower plants, or alteration of drainage with the creation of gullies. With direct access, feces may pollute springs, reducing water quality (Unmack 1994); improved water quality can lead to better livestock health (McKee and Braul 1999).

Figure 5. Cattle trampling in a spring in the Spy Hill-Ellice Community Pasture.

Sprague's pipits (COSEWIC Threatened) were observed in both Community Pastures in open prairie (Table 4). In the Ellice-Archie Community Pasture, this species was abundant in appropriate habitat, and was especially common in the north end of the pasture. In the Spy Hill-Ellice Community Pasture, Sprague's Pipits were present in open prairie with no trees or shrubs, and were especially common at the south end. No Sprague's Pipits were observed in an area of the pasture burned in the spring of 2002. A combination of factors may have contributed to the apparent absence of Sprague's Pipits, including reduced litter for nesting cover, and the timing of the survey, which was just after a thunderstorm that may have forced the birds to take cover. If the absence of Sprague's Pipits at this site is due to removal of nesting cover, then remnant unburned areas represent important refugia.

Madden et al. (2000) note that endemic grassland bird species of the northern mixed grass prairie prefer habitat characteristic of grasslands that are periodically burned or grazed. The long-term exclusion of fire or grazing may, therefore, limit the abundance of Sprague's Pipit. Pylypec (1991) found that burning decreased Sprague's Pipit densities, but that by year three following the burn, densities were comparable with unburned areas. In northwestern North Dakota, Sprague's Pipit was most abundant on prairie burned 2-4 times in the last 15 years (Madden et al. 1999). Sprague's Pipits are more abundant on native grassland than tame pasture or cultivated land (Schmutz 1993), and less abundant

in heavily grazed pastures than in moderately or lightly grazed pastures (Davis et al. 1999).

Table 4. Frequency of Sprague's Pipit (SPPI) sightings in the Ellice-Archie and Spy Hill-Ellice Community Pastures.

Pasture	Survey date	Stops Made	# Stops where SPPI Heard	Frequency
Spy Hill-Ellice	May 28	8	7	0.875
	June 19	8	5	0.625
Subtotal		16	12	**0.75**
Ellice-Archie	May 28	3	0	0
	June 18	16	12	0.75
	June 20	4	4	1.00
Subtotal		23	16	**0.696**
Total		**39**	**28**	**0.718**

One potential occurrence of Geyer's sandmat (*Chamaesyce geyeri*) was observed on open sand near the junction of the Assiniboine and Qu'Appelle Rivers in an area of sand extraction. Geyer's sandmat resembles thyme-leafed spurge (*C. serpyllifolia*); the roughened seeds and minute serration on the margins of the leaves of thyme-leafed spurge distinguish the two species. A specimen was collected and submitted to the University of Manitoba Herbarium for confirmation of identification. Manitoba is the only province where Geyer's sandmat occurs in Canada (Scoggan 1978). This species is considered rare in Canada (Argus and Pryer 1990). If the presence of Geyer's sandmat can be proven in the Qu'Appelle valley, it would be important to protect this area because this species has only been observed at three locations in the Province. Geyer's sandmat has not been observed in the area around St. Lazare since 1951. More significantly, this would represent the first observation in the Manitoba CDC database since 1960. Protecting this area would also provide continuity of native grasslands between the Community Pastures.

Yellow wild buckwheat (*Eriogonum flavum*) is uncommon Manitoba, but is secure in other parts of its range. Southwestern Manitoba has at least ten occurrences of this species. Moss pink (*Phlox hoodii*) is known from at least 25 occurrences in Manitoba. Both of these species are globally secure grassland species at the western limits of their ranges in this province.

Threats

Rowe (1987) estimates that 80% of the Aspen Parkland is now under cultivation, and with most remnants fragmented into patches less than 1000 hectares in size. Cultivation continues to be a threat to the prairies, with 4.7 million hectares of marginal land cultivated annually (Agriculture and Agri-food Canada 1997). Other threats to the region include resource extraction, especially sand and gravel, potash, and petroleum. Non-native species seeded in oil well exclosures could spread and threaten native grasslands.

Management Recommendations

The PFRA has been managing the Spy Hill-Ellice Community Pasture since 1941, and the Ellice-Archie Community Pasture since 1940. Management strategies in the Community Pastures include grazing and controlled burns (Figure 6). Using controlled burns with oil wells nearby could pose a prohibitive risk to safety. Most rare plants in the Community Pastures are prairie plants that are adapted to both burning and grazing, and have an excellent chance of persisting under the current management strategy. One exception may be roundleaf monkey-flower. This species only occurs in freshwater springs, and allowing livestock to access the springs in these areas may pose a threat to this nationally rare species. Pasture managers may wish to consider setting up an off-site watering system, including fencing around springs and wind or solar-driven pumps bringing water to the surface.

The greatest numbers of rare species were encountered at the junction of the Assiniboine and Qu'Appelle Rivers, especially in open sand. This area is used for sand extraction, and ATV tracks indicate that this area is also used for recreation. Other rare species "hot spots" were Field C3 of the Ellice-Archie Community Pasture (Figure 2) and the south end of the Spy Hill-Ellice Community Pasture, especially Field A2c and Field A2a (Figure 3). Efforts to preserve habitat for rare and uncommon grassland species should be focused in these areas.

In Saskatchewan, the PFRA Community Pastures are part of the Representative Areas Network, with the objective of preserving the ecological integrity of natural areas (SERM web site). The Manitoba Protected Areas Initiative has also been engaged in discussions with the PFRA and Manitoba Agriculture and Food to include community pastures in the Protected Areas Network (Maureen Peniuk, pers. comm.).

Private property on the sand hills at the mouth of the Qu'Appelle River was not included in this survey, and conducting surveys on privately owned land may yield new occurrences of rare species. Species that prefer open or partially destabilised sand, for example Indian rice grass and low townsendia, may benefit from disturbances like sand extraction that remove competing vegetation. Further research is required to determine the best management strategies for the St. Lazare sand hill species. The Rural Municipality of Ellice should be made aware of the importance of this area as habitat for rare species.

Figure 6. Controlled burn in the Spy Hill – Ellice Community Pasture. The foreground is unburned, and a black line can be seen in the middle used to contain the fire.

Acknowledgements

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Appendix 1. Vascular plant specimens collected in study area.

Identity of species in red is tentative pending confirmation.

Species	Date	Directions
Agoseris agrestis	June 18, 2002	Ellice-Archie Community Pasture C4f, NE 33-16-29W.
Allium stellatum	August 12, 2002	Spy Hill-Ellice Community Pasture A7a. 4 km south of the bridge where PR 478 crosses the Assiniboine River, west of the river, at the top of the valley wall.
Arabis holboellii	June 18, 2002	Ellice-Archie Community Pasture B3a, SW 17-16-28W.
Calamovilfa longifolia	August 12, 2002	West of St. Lazare. Slope above the railway tracks through the Qu'Appelle valley near the road to the Spy Hill-Ellice Community Pasture.
Calamovilfa longifolia	August 12, 2002	Spy Hill-Ellice Community Pasture A8. NW 15-18-29W. Western valley wall of Assiniboine river, 0.8 km south of the outlet of Silver Creek.
Carex duriuscula	June 20, 2002	Ellice-Archie Community Pasture C4a. South side of Hwy 545 1.6 km west of Hwy 41.
Carex rossii	June 17, 2002	SE 18-17-28W 1.4 km west of St. Lazare. Northwest of the junction of the Qu'Appelle and Assiniboine Rivers.
Carex siccata	June 20, 2002	West of St. Lazare. Slope above the railway tracks through the Qu'Appelle valley near the road to the Spy Hill-Ellice Community Pasture.
Castelleja sessiliflora	June 20, 2002	Ellice-Archie Community Pasture C1, SW 25-16-29W. East of Hwy 41.
Cerastium arvense	May 28, 2002	Spy Hill-Ellice Community Pasture A7. SE 32-18-29W.
Chamaerhodos erecta	August 12, 2002	Spy Hill-Ellice Community Pasture A7a. 4 km south of the bridge where PR 478 crosses the Assiniboine River, west of the river, at the top of the valley wall.

Chamaesyce geyeri	August 12, 2002	SE 18-17-28W 1.4 km west of St. Lazare. Northwest of the junction of the Qu'Appelle and Assiniboine Rivers.
Chamaesyce serpyllifolia	August 12, 2002	SE 18-17-28W 1.4 km west of St. Lazare. Northwest of the junction of the Qu'Appelle and Assiniboine Rivers.
Corispermum sp.	August 13, 2002	Spy Hill-Ellice Community Pasture A2c. NW 29-17-29W.
Cyperus schweinitzii	August 12, 2002	SE 18-17-28W 1.4 km west of St. Lazare. Northwest of the junction of the Qu'Appelle and Assiniboine Rivers.
Erigeron asper	August 12, 2002	Spy Hill-Ellice Community Pasture A7a. 4 km south of the bridge where PR 478 crosses the Assiniboine River, west of the river, at the top of the valley wall.
Eriogonum flavum	June 17, 2002	South-facing slope above rail line, 3.3 km west of St. Lazare. SW 13-17-29W.
Erysimum asperum	June 17, 2002	SE 18-17-28W 1.4 km west of St. Lazare. Northwest of the junction of the Qu'Appelle and Assiniboine Rivers.
Gaura coccinea	June 20, 2002	Ellice-Archie Community Pasture C4a. South side of Hwy 545 1.6 km west of Hwy 41.
Gaura coccinea	August 13, 2002	Ellice-Archie Community Pasture A1a. SE 22-15-28W. 5.5 miles east and 2 miles north of McAuley.
Lesquerella ludoviciana	May 27, 2002	SE 18-17-28W 1.4 km west of St. Lazare. Northwest of the junction of the Qu'Appelle and Assiniboine Rivers.
Linum lewisii	June 19, 2002	Spy Hill-Ellice Community Pasture A2b, 4 km east of Saskatchewan border. SW 33-17-29W
Lomatium macrocarpum	May 28, 2002	Ellice-Archie Community Pasture, C3. SE 21-16-29W near Husky Oil exclosure.
Lomatium macrocarpum	June 18, 2002	Ellice-Archie Community Pasture, C3. SE 21-16-29W near Husky Oil exclosure.

Maianthemum stellatum	May 28, 2002	West of St. Lazare. Slope above the railway tracks through the Qu'Appelle valley near the road to the Spy Hill-Ellice Community Pasture.
Mimulus glabratus	August 13, 2002	Spy Hill-Ellice Community Pasture A2c, spring near Saskatchewan border, feeds Qu'Appelle River.
Mirabilis hirsuta	August 12, 2002	Spy Hill-Ellice Community Pasture A7a. 4 km south of the bridge where PR 478 crosses the Assiniboine River, west of the river, at the top of the valley wall.
Muhlenbergia asperifolia	August 12, 2002	Spy Hill-Ellice Community Pasture A8. NW 15-18-29W. Western valley wall of Assiniboine river, 0.8 km south of the outlet of Silver Creek.
Oenothera biennis	August 13, 2002	Spy Hill-Ellice Community Pasture A2c, spring near Saskatchewan border, feeds Qu'Appelle River.
Oryzopsis hymenoides	June 20, 2002	West of St. Lazare. Slope above the railway tracks through the Qu'Appelle valley near the road to the Spy Hill-Ellice Community Pasture.
Oxytropis sericea	May 27, 2002	South-facing slope above rail line, 3.3 km west of St. Lazare. SW 13-17-29W.
Parnassia glauca	August 13, 2002	Ellice-Archie Community Pasture A2a. SW 22-15-28W. 5.5 miles east and 2 miles north of McAuley.
Penstemon gracilis	June 18, 2002	Ellice-Archie Community Pasture B2. NE 8-16-28W.
Penstemon nitidus	June 17, 2002	SE 18-17-28W 1.4 km west of St. Lazare. Northwest of the junction of the Qu'Appelle and Assiniboine Rivers.
Penstemon procerus	June 18, 2002	Ellice-Archie Community Pasture, C3. West of Hwy 41 in Renaissance Energy exclosure NW 15-16-29W.
Phlox hoodii	June 18, 2002	Ellice-Archie Community Pasture, C3. SE 21-16-29W near Husky Oil exclosure.
Ranunculus sceleratus	June 19, 2002	Spring in Spy Hill-Ellice Community Pasture A2c, approximately 150 m from the Saskatchewan border.
Senecio canus	June 18, 2002	Ellice-Archie Community Pasture B3a, SW 17-16-28W.

Solidago missouriensis	August 12, 2002	Spy Hill-Ellice Community Pasture A7a. 4 km south of the bridge where PR 478 crosses the Assiniboine River, west of the river, at the top of the valley wall.
Sporobolus cryptandrus	August 12, 2002	SE 18-17-28W 1.4 km west of St. Lazare. Northwest of the junction of the Qu'Appelle and Assiniboine Rivers.
Townsendia exscapa	May 27, 2002	SE 18-17-28W 1.4 km west of St. Lazare. Northwest of the junction of the Qu'Appelle and Assiniboine Rivers.
Veronica americana	June 19, 2002	Spring in Spy Hill-Ellice Community Pasture A2c, approximately 150 m from the Saskatchewan border.
Viola petatifida	June 19, 2002	Spy Hill-Ellice Community Pasture A2b, 4 km east of Saskatchewan border. SW 33-17-29W

Appendix 2. Definitions of NatureServe Ranks

Adapted from the Manitoba CDC website, 1998
http://web2.gov.mb.ca/conservation/cdc/info.php

Species are evaluated and ranked by the Conservation Data Centre on the basis of their range-wide (global - G) status, nation-wide (national – N) status, and province-wide (subnational - S) status according to a standardised procedure used by all Conservation Data Centres and Natural Heritage Programs. These ranks are used to determine protection and data collection priorities, and are revised, as new information becomes available.

For each level of distribution—global, national, and provincial—species are assigned a numeric rank ranging from 1 (very rare) to 5 (demonstrably secure). This reflects the species' relative endangerment and is based primarily on the number of occurrences of that species globally, nationally, or within the province. Other data are also considered when assigning a rank, such as the date the information was collected, degree of habitat threat, geographic distribution patterns and population size and trends. The numbers of occurrences listed below are suggestions, not absolute criteria. For example, the Green Frog (*Rana clamitans*) is ranked G5, S2. That is, globally the species is abundant and secure, while in Manitoba it is rare and may be vulnerable to extirpation.

Rank	Definition
1	Very rare throughout its range or in the province (5 or fewer occurrences, or very few remaining individuals). May be especially vulnerable to extirpation.
2	Rare throughout its range or in the province (6 to 20 occurrences). May be vulnerable to extirpation.
3	Uncommon throughout its range or in the province (21 to 100 occurrences).
4	Widespread, abundant, and apparently secure throughout its range or in the province, with many occurrences, but the element is of long-term concern (> 100 occurrences).
5	Demonstrably widespread, abundant, and secure throughout its range or in the province, and essentially irradicable under present conditions.
U	Possibly in peril, but status uncertain; more information needed
H	Historically known; may be rediscovered.
X	Believed to be extinct; historical records only, continue search.