



No. 35 • Winter 2000

Iris

The Newsletter of the Alberta Native Plant Council

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Alberta's Natural Landscapes—backyard to pipeline

The 13th ANPC Annual General Meeting and Workshop, April 29–30, Calgary Zoo

Ruth Johnson

Be sure to attend this year's ANPC workshop *Recreating Alberta's Natural Landscapes—Backyard to Pipeline*, April 29 and 30 at the Calgary Zoo. The ANPC is working in conjunction with the Calgary Zoo to plan this exciting and inspiring workshop. You can expect informative topics, interesting people, good food—all in a 'plantful' setting. Who could ask for more?

Saturday sessions will cover examples of naturalisation projects (urban settings, foothills and prairie areas, mountain parks and home projects), a variety of industrial naturalisation and restoration projects, creating backyard habitat, controlling invasive aliens, and more. There will be native plant material and seeds

for sale, guided tours of the naturalised areas at the zoo and lots of opportunity to share ideas and learn from other workshop participants. Saturday evening's banquet is not to be missed—dine amidst the vegetation of the Botanical Conservatory and listen to the Zoo's renowned Brian Keating spin his tales of the 'Alpine High Life'. Sunday will provide workshop participants the opportunity to stretch their legs and do some hands-on naturalisation work on our field trip.

The Calgary Zoo is generously assisting ANPC with advertising and promotion so it is expected that this workshop will be well attended. Be certain to register as soon as you receive your registration package in the mail so that you can reserve your spot!

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The Alberta Native Plant Council

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The gold in them there hills

Botany AB No. 2 in Cypress Hills Interprovincial Park

Patsy Coterill

Almost as soon as you turn south on Highway 41 from Medicine Hat, the Cypress Hills appear as a dark green ridge on the skyline. They lure with the promise of verdure as one surfs the rolling plains towards them. Captain John Palliser's comment from 1859 is oft quoted: "These hills are a perfect oasis in the desert we have travelled." Mind you, to those of us coming from the northern half of the province and fleeing the late, cool, wet spring of 1999, a desert would have been its own oasis.

The Hills stand out as a ravine-incised plateau of forests and grassland rising some 800 metres above the surrounding mixed-grass

plains of south-eastern Alberta. About 160 kilometres long and up to 40 km wide, they straddle the Alberta-Saskatchewan border east-west and are protected as the Cypress Hills Interprovincial Park. With a vascular flora of well over 700 plants representing both boreal/montane and plains elements, and a respectable sprinkling of "rares", the Alberta side of the Hills was an obvious choice for our second annual ANPC field outing.

An overcast Friday morning, June 11, thus found 20 or more of us crammed into the Park

see **Gold**, page 12

Call for nominations

The following elected positions on the Board of the ANPC are open for a two-year term, starting in May 2000:

- President
- Northern Director
- Southern director
- Treasurer
- Central Director

If you would like to nominate someone (or yourself), please contact Ken Sanderson at (403) 604-4415, or by email at <ksanders@sandnarrow.com>. You can also contact any board member.

We welcome new people and are always looking for new ideas and new energy. Volunteering can be a big commitment, but working with the ANPC is guaranteed to be a lot of fun. We are always looking for people to serve on our committees: Conservation Action, Education & Information, Rare Plants, Reclamation & Horticulture and the newsletter.



Volunteering for the ANPC is an excellent way to share and improve your botanical skills. Board members are exposed to a wide range of activities, although they usually become involved in specific projects of interest to them such as stewardship of natural areas (for example, the Cardinal River Divide Natural Area). We meet once every two months, with a break over the summer. Involvement on the Board is interesting, fun, and a great way to contribute to worthwhile activities.

Elections for these positions will be held at our AGM in Calgary on April 29.

Message from the President

Dan MacIsaac

Hello to all ANPC members. After careful consideration I have decided that I will step down as the president of the ANPC at the April 2000 AGM, one year before my term expires. I was recently given an opportunity by my employer to return to school and I will be very busy completing work obligations, starting my Ph.D. program and giving time to my wife Linda and four children. I will really need to focus on these priorities in order to avoid burnout and to keep my sanity! I have really enjoyed my three years as ANPC president, and my time on the board in various positions before that. I have been impressed with the calibre and enthusiasm of those I have been associated with on ANPC activities. Being involved with the ANPC has also been

very enjoyable, and it is one of the best organizations that I have had the pleasure of being a member of. I wish you all the best in your ANPC and other endeavors. Once my education is (finally!) completed, I will return to an active position with the organization. I hope to see many of you at the upcoming workshop and AGM in April.



Conservation group looking for volunteers to work in Calgary's Nose Hill Park

The Nose Hill Conservation Corps is looking for enthusiastic volunteers who are willing to pull their sleeves up, get a little dirt under their fingernails, have fun and learn more about unique Nose Hill Natural Environment Park.

The Nose Hill Conservation Corps (NHCC) is a group of volunteers who work in cooperation with Calgary Parks & Recreation to help preserve the natural character of Nose Hill Park—the City's largest natural area—in Calgary's northwest.

The NHCC was formed to help carry out a conservation program that is consistent with the Nose Hill Park Management Plan, help collect research data used in developing and implementing effective management plans, and to generate awareness of the natural values and appropriate use of the park.

The NHCC is working closely with Calgary Parks & Recreation to develop a variety of projects that offer meaningful and satisfying opportunities for volunteers — from native prairie restoration and wildlife and plant inventories to seed collecting and trail maintenance. Some projects are as short as one day; others require a longer-term volunteer commitment. All of them are exciting and worthwhile.

If you are interested in volunteering, call (403) 284-4920 or (403) 288-4161, or e-mail <amandastopicals@home.com>.

For more information on volunteering in Calgary's parks, contact Heather MacKay, Parks Volunteer & Sponsorship Coordinator, (403) 221-4689

Can we prevent the loss of any more Little Mountains?

Michael Phair

On December 1, 1999, the development company Brintnell Joint Ventures Ltd. leveled the trees, vegetation and prairie grasslands at Little Mountain natural area in northeast Edmonton. The question that needs to be asked is, why? In one day, a 40-acre landscape that had never been ploughed was scraped bare. An area that was home to over 200 species of flowering plants, including three that were listed as provincially rare, was destroyed, as was the habitat of at least 38 species of birds and many of the wildlife species common to the Edmonton region.

Under the provincial *Municipal Government Act*, 10% of any development must be set aside as municipal reserve for future parks and schools. Why did the developer not attempt to save some of the natural area as municipal reserve? When the company submits an area structure plan to Council, it will be required to set aside this land.

Is what occurred just part of the development process? I don't think so. The earthmovers will have to be brought in again to perform the normal geotechnical preparation of the site for subdivision. There were no elevation control stakes in place at Little Mountain when the bulldozers did their work. The machines were observed only scraping vegetation down to the surface of the soil.

The exact alignment of 50th Street, which will bisect the site, has not been determined. The revised Neighbourhood Structure Plan, associated Municipal Development Plan and Area Structure Plan amendments must still be developed and circulated to City departments. So what then panicked the developer into taking such rash action? The scraping of all vegetation down to sterile clay seems to have had no other purpose than to negate the potential of having any part of the site removed from development.

So where do we go now? Is there a way the development industry, citizens and Council can work together so that a tragedy like Little Mountain can be averted in the future? Years ago, Council,



Little Mountain then...

developers and the community experienced similar ongoing battles and frustrations in regards to the preservation of historical buildings. In 1988, Council passed the Heritage Conservation policy and committed to placing dollars aside each year to achieve this end. Since then,

there have been few confrontations and preservation of historical buildings has moved ahead fairly smoothly.

In 1995, Council approved a policy to encourage the conservation and integration of environmentally and significant natural areas into Edmonton's future urban environment. It is an excellent policy, but unfortunately Council did not provide the mechanism and resources to enact the policy.

In order to address this problem, the City's Community Services department (formerly Parks and Recreation) submitted the Natural Areas Acquisition and Conservation report. It has been endorsed by both the environmental community and by the Urban Development Institute, the voice of the development industry. This report contains a funding strategy to aid in the preservation of environmentally significant natural areas. It closely resembles the City's heritage building conservation strategy. The natural areas strategy proposes to set aside \$750,000 annually to assist in preservation and acquisition. Only one-third of this money will come

see **Mountain**, page 6



...and now

The Good, the Bad & the Downright Ugly

Casual observations of plant re-colonisation after the 1995 flood in Lethbridge

Liz Saunders

Over four years have passed since the Oldman River rose over its banks filling the floodplain with silty, swift-moving water. After the media-tagged "Flood of the Century", much of the ecological focus was on the resulting regeneration of cottonwoods.

But what about the other plants? What was the effect of the flood on the other components of a cottonwood forest – the shrubs, grasses and forbs?

Since the 1995 flood, I have been observing the large expanses of sand, silt, gravel and woody debris that were left behind by the flooding river. It has been interesting to note which species

colonized first and whether they persisted or not. As well as casual observations, photographs have been taken of several of these sites each year, to record the changes in the plant communities. I was expecting many of the photo points to be quickly obscured by the rapidly growing cottonwood suckers and seedlings. This has happened in some cases, but not all. At drier sites, the seedlings died and a mixture of native and non-native grasses and forbs quickly took over. Some sites still remain quite devoid of vegetation. From these personal observations, I have classified the recolonizing plants into "the good", "the bad" and "the downright ugly".

The Good

These are the native plants that have sprung up in the flood-disturbed areas. Some species were predictable, others

were rather unexpected. Many of the colonizing grasses and forbs are species that are more often associated with the eroded slopes in our coulees, such as golden bean (*Thermopsis rhombifolia*), indian rice grass (*Oryzopsis hymenoides*),



On June 7, 1995 the Oldman River swelled to fill the cottonwood forests with water, silt, sand, gravel and woody debris

prairie coneflower (*Ratibida columnifera*), butte primrose (*Oenothera caespitosa*) and common annual sunflower (*Helianthus annuus*). One of the most spectacular sights was a large gravel bar that was completely covered in sand lilies (*Mentzelia decapetala*). Wild licorice (*Glycyrrhiza lepidota*) was another plant that quickly colonized many of the gravel bars.

The flood also added a new native plant species to the Lethbridge plant checklist: Clammyweed (*Polanisia dodecandra*) is considered a rare plant in Alberta (now ranked S2) and it was not recorded in Lethbridge until after the 1995 flood. In 1997 we found approximately 50 plants growing in sand deposits left by the flood. By 1998 the population had grown to over 250 plants. As natural succession progresses, the clammyweed plants are being crowded out and in 1999 there were far

fewer plants. Another uncommon plant that did well by the flood is small annual lupine (*Lupinus pusillus*). Many individuals of this species are thriving in the sand and gravel deposits.

As for shrubs, there wasn't a whole lot of action in the first few years after the flood. In some places there were "shrub suckers" establishing from churned up root pieces. This was particularly obvious with rose (*Rosa* sp.), chokecherry (*Pinus virginiana*), snowberry (*Symphoricarpos occidentalis*) and wolfwillow (*Elaeagnus commutata*). Shrub seedlings were few and far between, at until 1999. Four years after the flood, shrub seedlings are sprouting up out of the large mounds of woody debris built by the flowing waters. Up until 1999 these large piles of logs, bark and twigs were mostly barren of vegetation, but were well used by insects, birds and small rodents. After four years, the woody matter has broken down and composted enough to create the perfect growing medium for shrub seedlings – a veritable shrub nursery. The most common seedlings are saskatoon (*Amelanchier alnifolia*), chokecherry, rose, snowberry and



In 1999 woody debris piles became productive shrub nurseries. Tucked between these two logs are three chokecherry seedlings and one saskatoon

dogwood (*Cornus stolonifera*). This is a very elegant example of why it is important to leave all parts of an ecosystem in place. Had we followed a few public requests to remove the debris piles in some of our river valley parks, we likely would have had a significant impact on the future structure and composition of our forests.

The Bad

These are those non-native species that are not too terribly nasty, but nonetheless are an annoyance. Unfortunately these species are usually widespread and they tend to fill in areas that would otherwise be inhabited by native species. For example, mullein (*Verbascum thapsus*) was not particularly common in Lethbridge prior to the 1995 flood.



Mullein spread to new areas on the floodplain as a result of the flood

However the flood seems to have introduced additional plants and distributed the species more widely through the river valley.

Other non-native plant species that have quickly colonized disturbed areas are wormwood (*Artemisia absinthium*), and yellow and white sweet clover (*Melilotus officinalis* and *Melilotus alba*). The gravel bar that was first colonized by sand lilies is now awash with sweet clover. Where introduced grasses such as awnless brome (*Bromus inermis*) and crested wheatgrass (*Agropyron cristatum*), were growing before the flood, they

very quickly grew up through the flood deposits. By the following year (1996), these areas were once again a monoculture of non-native grass, leaving no room for native species to take advantage of the natural disturbance.

The Downright Ugly

These are the hideous weeds that make a botanist's skin crawl. In Lethbridge, some of these are: leafy spurge (*Euphorbia esula*), Russian knapweed (*Centaurea repens*), spotted knapweed (*Centaurea maculosa*), and Canada thistle (*Cirsium arvense*), to name a few. The bad news is that the 1995 flood helped all of these species spread and establish on many sites where they were absent prior to the flood. Leafy spurge quickly

colonized many of the gravel bars. In some cases the spurge actually moved back into areas where bio-control beetles had almost eradicated it. The only "good" news, if you can call it that, is that the various bio-control agents that we have in Lethbridge did survive the flood and are still present in good numbers. At least two new, large and rapidly spreading patches of Russian knapweed became established after the flood as well as numerous small patches of spotted and diffuse knapweed.

Furthermore, the flood introduced two nasty weed species that were not



Leafy spurge became even more prolific after the flood. Plants established quickly on sand and gravel bars.

previously recorded in the river valley – scentless chamomile (*Matricaria perforata*) and black henbane (*Hyoscyamus niger*). Scentless chamomile has reared its ugly head on a few gravel floodplain areas in Lethbridge since the flood. Only one black henbane plant has been found to date in the Lethbridge river valley, however I have noticed numerous plants appearing along the Oldman River between Fort Macleod and Lethbridge – something that should be watched closely. We have been pulling both of these species on sight, hoping to nip the problem in the bud, so to speak.

Overall, the 1995 flood has presented a very educational plant-watching opportunity. In many ways the flood was highly beneficial, giving the floodplain ecosystem a natural boost and promoting the regeneration of cottonwood trees and now shrubs. The interpretive and learning opportunities for naturalists and the public have been phenomenal. Unfortunately non-native species are a part of the ecological picture these days, and they too have thrived as a result of the flood, often to the detriment of the native species. It will be interesting to watch how the story continues to unfold over time.



Little Mountain, from page 3

from the property tax base. The other two-thirds will come from community partnerships and the sale of surplus lands. The Natural Areas Acquisition and Conservation proposal is a winning strategy. This report will return to Community Services Committee on Monday, February 28, 2000. I urge Edmontonians to attend this meeting and show your support for the preservation of environmentally significant natural areas. The tragedy of Little Mountain must not be repeated.

Michael Phair is a Councillor with the City of Edmonton

Little Mountain Update

During Edmonton City Council budget deliberations in December, a motion was passed to establish the natural areas conservation fund by setting aside \$250,000, to come from the sale of surplus municipal reserve (in commercial/industrial sites where school and parks sites are not needed). This is less than the new natural areas strategy proposed, and I believe represents only a very weak commitment on the part of City Council to natural areas' preservation. (It was envisaged that a further \$250,000 would come from general revenues.) Edmonton naturalists need to communicate to City Council in no uncertain terms that they consider urban natural areas to be worth preserving and are willing to see tax dollars (general revenue) committed to this end. If you would like to know more about the new natural areas strategy or would like to participate in a citizens' committee that is helping to steer it, contact Councillor Phair's assistant, Harvey Voogd at 496-8146 or e-mail <michael.phair@gov.edmonton.ab.ca>, Barry Breau at the Alberta Environment Network, 433-9302, <aen@web.net>, or Patsy Cotterill at 481-1525, <nutmeg@planet.eon.net>.

—Patsy Cotterill

Counting Crocuses

Elisabeth Beaubien

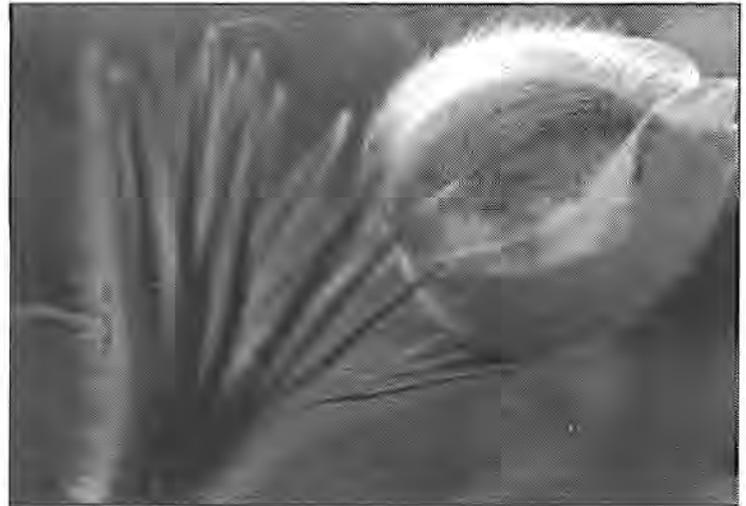
It won't be that long before spring begins to stir. If you are eager for the first chance to get out and do some botanizing, why not sign up for *Plantwatch*? *Plantwatch* is a program of the Devonian Botanical Garden at the University of Alberta that links students and other observers to track spring as it moves north. Observers monitor the flowering of up to eight species of plants and reports the blooming periods. Observations are collected and maps showing the advance of spring are updated weekly on the *Plantwatch* web site. The flowering data is compared with 10-year averages to determine if spring was early or late. This information is used to determine the best planting times and has applications in climatology, forestry and human health.

Last year I did an article on trembling aspen, one of the earliest plants to flower in the spring. This year I'll talk about the Prairie crocus, one of the first flowers to bloom in the spring.

The Prairie crocus (*Anemone patens*) has a pale blue or purple flower arising from the woody rootstock. Woolly white hairs

cover the whole plant. This furry little perennial isn't a crocus—a member of the Lily family—it's really an anemone, in the Buttercup family. Like all anemones, it does not have true petals. The blue or purple-coloured "petals" are actually modified sepals.

The flowers are about 4 centimetres in diameter, each with 5 to 7 sepals, many pistils and bright yellow stamens. The grey-green and much-divided leaves don't appear until the flower fades. Then a shaggy cluster of seeds form, each with its own feathery plume.



Anemone patens L.

Distribution:

Prairie crocus grows in northern latitudes more or less all around the world. It is common in eastern Russia and Asia, but there are wide gaps in its distribution in Europe. It is widespread in North America, from Canada south to New Mexico. In Canada, it occurs in the



Yukon and NWT, and from BC east to Manitoba. Its prairie population has declined greatly since pioneer days, as it grows in native prairie sod, most of which has been ploughed or cultivated.

Habitat

Prairie crocus grows on the prairie and in dry open woods, often on sandy soils. It prefers sunny, hot, dry areas, often together with with yarrow (*Achillea millefolium*) and golden bean (*Thermopsis rhombifolia*). Other early flowering plants in similar habitats on the prairies include shooting star (*Dodecatheon pulchellum*) and moss phlox (*Phlox hoodii*). In northern Canada it more often appears on warm south-facing slopes. In the drier southern prairie, it is mainly found on north-facing slopes.

How to observe

Crocus may be a difficult plant to observe in the first year, as plants can dry up and disappear after blooming, and appear again only with the first flowers the following spring. In your first observing year, you may not be able to locate a good site until after bloom has already started. Do your best to record dates, and mark your site for next year!

1. Remember to stay on paths, as crocus buds are easily damaged by feet. In the Yukon and Northwest Territories, crocus occurs on dry, fragile slopes easily damaged by hikers. To avoid walking on the slopes and damaging this fragile environment, choose plants near the base or the top of the hill. Note the location of your site on your

data sheet.

2. When a prairie crocus site is located, mark off an area approximately 1 metre by 1 metre. You may wish to use small rocks or sticks.
3. Record the dates when your crocus patch reaches first and full bloom, defined as follows:
 First bloom: when at least 2 to 5 flowers have opened in a crocus patch, revealing the yellow stamens.
 Full bloom: when most blooms are open—not many new buds are left. Some stems are starting to grow longer; that is, the stems between the leaves and flowers are approximately 3 cm long.
4. You may find that deer or ground squirrels eat your flowers! If so, please report this under additional information on your date sheet.

Life Cycle:

Prairie crocus is a very early-flowering plant, occasionally blooming in south-facing meadows and warm parts of the prairies as early as March. A crocus first emerges from the ground as a hairy flower bud; the furry leaves are hard to see at this point. When the purple sepals open they reveal bright yellow stamens inside. The flowers open in sunshine and close again in the evening and in cloudy weather.

As the days go by, the flower stem beneath the leaves lengthens. After pollination, the stem between flower and leaves grow longer too, pushing the developing seed head up 10–40 cm above the ground. At the same time, the leaves also fully expand. The flowering period lasts for about 2 weeks. The long, feathery seeds ripen in May to July depending on latitude and altitude, then the above-ground parts of the plant often dry up and disappear over the summer. The feathery seeds and the long mature flowering stem are special adaptations to assist in wind-dispersal of the seeds.

Phenology

Prairie crocus starts flowering in central Alberta about the third week of April, on average. At this time the mountain bluebirds are back searching for nest holes in trees or boxes, big flocks of snow geese are winging north, and aspen poplar is also blooming (catkins on male trees are

shedding pollen into the air). What spring events are occurring in your area?

Ecology:

Crocus seems to be generally limited to unbroken prairie. It forms a partnership with fungi in the soil, exchanging nutrients. These fungi are important for its success in dry prairie soils. Occasional fires seem to greatly improve growing conditions for prairie crocus, by boosting the supply of nutrients and sunlight when dry grass cover is removed. Two years after a fire, crocuses bloom in much greater abundance (see Range management, following).

Large clumps of prairie crocus in grazed pastures may show that the area is over-grazed; that is, it has more cows than the pasture can support. *Anemone patens* grows very well in a grazed habitat. As the taller-growing and better-tasting grass and forb species in a pasture are removed, prairie crocus increases. The deep roots live for many years and are not seriously affected by animal hooves.

The hairs on the plant make it less attractive to livestock. But just in case this isn't a strong enough defence, it has poisonous properties too! It contains a poisonous alkaloid, a powerful irritant that can cause inflammation and blistering. This can be a problem to domestic sheep when they eat the flower. But despite the poisonous chemical, flowers are eaten by deer, elk and ground squirrels, perhaps because the crocus is one of the first plants to appear in spring.

Prairie crocus does well in grazed areas, but ploughing is a different matter. Prairie crocus is slow to return even to favourable sites after ploughing, perhaps because it needs the fungal partners which occur in unploughed soils. In one case it took 40 years for crocus to return to a small ploughed section of hilltop in eastern Alberta.

American goldfinches (bright yellow and black birds also called wild canaries) visit prairie crocuses in summer, and eat the seeds.

Human uses/Folklore

Surely the most important use of the crocus is to decorate the prairies in

see **Crocus**, page 14

Rare plant communities in Alberta's Grassland Natural Region

Lorna Allen

In the Fall 1999 issue of *Iris*, I introduced the Alberta Natural Heritage Information Centre's project to document plant communities of conservation concern. Plant communities are defined as a recurring assemblage of plant species, the species occurring together because they respond similarly to a variety of site attributes. Plant communities of conservation concern are those that are found only rarely in the province. An initial listing is given in the Alberta Preliminary Plant Community Tracking List. It will be on the ANHIC website soon <www.gov.ab.ca/env/parks/anhic/anhic.html>. You can also get a copy by writing to Lorna Allen, 9820 - 106 St. Edmonton Alberta T5K 2J6.

In southeastern Alberta, you can still drive through mile upon mile of constant, waving green (or more often golden-brown) native grasslands. However, you will occasionally pass through areas with seasonal wetlands that are clearly different than the predominant grasslands, or you might be surprised by the sudden appearance of badlands. You might cross meandering rivers (sometimes edged by poplar forests or shrublands) and even pass areas

of sand dunes. The rare plant communities of the Grassland Natural Region are often associated with these site types that are generally more restricted in occurrence than the dominant grassland.

Manyberries Badlands

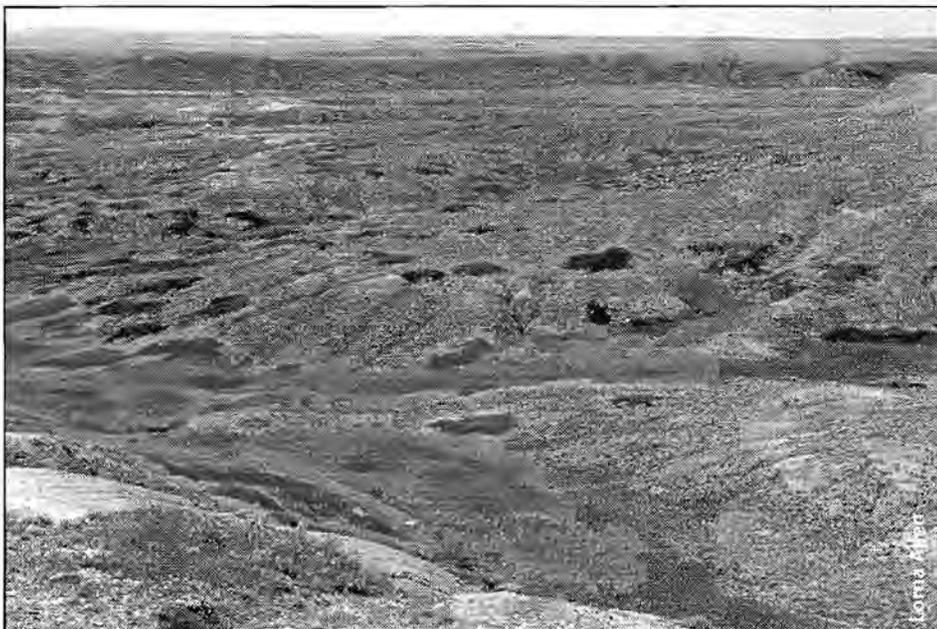
Just southeast of Manyberries, there are spots where the dry mixed grassland ends suddenly in steeply sloping badlands. The slopes are primarily composed of crumbly dark grey shales of a marine origin (part of the Bearpaw formation). The combination of a crumbly, highly erodible surface and high salt content from the marine shales makes these badlands a very difficult place for plants to grow, even for a badland.

The first time I looked at the aerial photographs for the area, I wondered what the funny looking spots and stripes were. On the ground it became clearer. It seems material from those highly erodible slopes has been caught and held by clumps of creeping juniper (*Juniper horizontalis*). Over the years these have built up into ridges, some up to 2 meters high. The ground between the juniper

Possible Plains Rough Fescue Communities of Alberta

- plains rough-fescue (*Festuca hallii*)
- plains rough fescue—western porcupine grass (*Festuca hallii*—*Stipa curtisetata*)
- plains rough fescue—western porcupine grass - sedges (*Festuca hallii*—*Stipa curtisetata*—*Carex* spp.)
- plains rough fescue—green needle grass / forbs (*Festuca hallii*—*Stipa viridula* / forbs)
- plains rough fescue—sand grass (*Festuca hallii*—*Calamovilfa longifolia*)
- plains rough fescue—sedge/bearberry (*Festuca hallii*—*Carex* spp./*Arctostaphylos uva-ursi*)
- plains rough fescue—June Grass/ Creeping juniper (*Festuca hallii*—*Koeleria macrantha* / *Juniper horizontalis*)
- western porcupine grass—plains rough fescue (*Stipa curtisetata* - *Festuca hallii*)

ridges is mostly bare, with only a sparse cover of badland plants, including some rare species. This "creeping juniper sparsely vegetated community" is fairly extensive in the Manyberries Badlands but has been reported from only a few other locations in southeast Alberta (see Table 1). The ridges have a high cover of juniper, with the other main species being June grass (*Koeleria macrantha*) or western wheat grass (*Agropyron smithii*). Other species can be found occasionally growing in the juniper mats. A string of blunt sedge (*Carex obtusata*) plants may pop up at regular intervals from rhizomes, or there may be the occasional clump of sun loving sedge (*Carex pennsylvanica*), but between the juniper mats it is mostly unvegetated. Two species that characteristic of these poorly vegetated bare patches are yellow umbrella plant (*Eriogonum flavum*) and, occasionally, rush-pink (*Stephanomeria runcinata*), a rare species in Alberta. *Xanthoparmelia chlorochroa* is an



Manyberries Badlands



Detail showing the creeping juniper clumps and the poorly vegetated areas.

interesting lichen that forms significant cover in some spots in the Manyberries Badlands. It is called a "vagrant" lichen because it rarely attaches to the soil and blows around easily with the wind when dry.

Other similar creeping juniper plant communities have been noted in the sand dune areas of the Parkland Natural Region, but both the habitat and associated species are quite different from this rare community type. Main species for the sand dune creeping juniper community include pasture sage (*Artemisia frigida*), hairy golden aster (*Heterotheca villosa*), sand grass (*Calamovilfa longifolia*) and June grass (*Koeleria macrantha*).

Riparian communities

Let's move on to another rare community. Riparian areas are habitats formed under the influence of water. Making up only a small portion of the prairie landscape, it is no surprise that a number of the associated plant communities have been included on the list of communities of conservation concern. The Sagebrush/Needle and thread (*Artemisia cana*/*Stipa comata*) shrubland is usually found just as small patches on old river terraces and at the base of valley slopes. Because of a restricted distribution, this is a plant community that is globally rare. Sagebrush and needle and thread are prominent. There are a few other species that occur commonly in this community, but not usually with significant cover, including pasture sagewort (*Artemisia frigida*), blue grama (*Bouteloua gracilis*) and thread-leaved sedge (*Carex filifolia*). A

Rough fescue is treated as a single species (*Festuca scabrella*) in many references, including the Flora of Alberta. However, it is now generally considered to be a complex of three separate species: Plains rough fescue (*Festuca hallii*), mountain rough fescue (*Festuca campestris*) and northern rough fescue (*Festuca altaica*). For further information see Aiken and Darbyshire 1990 or visit the following website: <biodiversity.uno.edu/delta/festuca/index.htm>

more complete list of species for this shrubland is given in Table 2.

Rare Fescue

So far the community types that we have looked at have been associated with some unusual or restricted habitats. Can the defining grassland types also be rare communities? The answer is yes. Plains rough fescue (*Festuca hallii*) communities are the defining grassland types for the Northern Fescue and Central Parkland Natural Subregions. These two natural subregions are among the most developed in the province. More than 95% of the subregions have now been converted to cropland or otherwise developed. Even in

areas that have remained untilled, invasion by non-native species such as smooth brome (*Bromus inermis*) and Kentucky bluegrass (*Poa pratensis*) is altering the remnant communities. Rough fescue is also sensitive to spring grazing, and can be almost eliminated in areas where grazing practices are unsuited to its biology. Taken together, these impacts mean that very little of the once-dominant grassland types remain.

Eight plant communities dominated by plains rough fescue have tentatively been identified (Biota Consultants 1999). A typical species list is provided in Table 3 for the plains rough fescue type. The distinctive, dense tussocks of rough fescue predominate the grassland. Although western porcupine grass is a common component of these grasslands, *Festuca hallii* is by far the dominant species. ANHIC has been working to better document and refine the description of plains rough fescue communities and to get a clearer picture of where they occur. Perhaps not all of the eight types will end up on Alberta's list of Plant Communities of Conservation Concern, but, as they are found in some of the most impacted portions of the province, some undoubtedly will.

see **Rare Communities**, page 10



Riparian communities along the Milk River

Rare Communities, from page 9

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Table 1. Creeping Juniper Sparsely Vegetated Shale Community

Species most commonly growing within the creeping juniper mat

Dominant Species

creeping juniper	<i>Juniperus horizontalis</i>
june Grass	<i>Koeleria macrantha</i>

Common species (found sporadically in almost all mats examined)

common yarrow	<i>Achillea millefolium</i>
plains reed grass	<i>Calamagrostis montanensis</i>
sun-loving sedge	<i>Carex pensylvanica</i>
rahbithrush	<i>Chrysothamnus nauseosus</i>
bastard toadflax	<i>Comandra umbellata</i>
yellow umbrella plant	<i>Eriogonum flavum</i>
common wild rose	<i>Rosa woodsii</i>
low goldenrod	<i>Solidago missouriensis</i>
golden bean	<i>Thermopsis rhombifolia</i>

Occasional species

northern wheat grass	<i>Agropyron dasystachyum</i>
western wheat grass	<i>Agropyron smithii</i>
prairie crocus	<i>Anemone patens</i>
pasture sagewort	<i>Artemisia frigida</i>
thread-leaved sedge	<i>Carex filifolia</i>
silverberry	<i>Elaeagnus commutata</i>
tufted fleabane	<i>Erigeron caespitosus</i>
three-flowered avens	<i>Geum triflorum</i>
wild blue flax	<i>Linum lewisii</i>
prairie groundsel	<i>Senecio canus</i>
wild vetch	<i>Vicia americana</i>

Swales between Juniper mats

blunt sedge	<i>Carex obtusata</i>
sun-loving sedge	<i>Carex pensylvanica</i>



Fescue prairie.

yellow umbrella plant	<i>Eriogonum flavum</i>
broomweed	<i>Gutierrezia sarothrae</i>
june grass	<i>Koeleria macrantha</i>
smooth blue beardtongue	<i>Penstemon nitidus</i>
low goldenrod	<i>Solidago missouriensis</i>
rush-pink	<i>Stephanomeria runcinata</i>
golden bean	<i>Thermopsis rhombifolia</i>
lichen	<i>Xanthoparmelia chlonchloa</i>

Table 3. Plains rough fescue (*Festuca hallii*) Grassland (from Biota Consultants 1999)

Dominant Species

Plains rough fescue	<i>Festuca hallii</i>
Slender wheat grass	<i>Agropyron trachycaulum</i>
Pasture sagewort	<i>Artemisia frigida</i>
Prairie sagewort	<i>Artemisia ludoviciana</i>
Thread-leaved sedge	<i>Carex filifolia</i>
Field mouse-ear chickweed	<i>Cerastium arvense</i>
Northern bedstraw	<i>Galium boreale</i>
Hooker's oat grass	<i>Helictotrichon hookerii</i>
Prairie rose	<i>Rosa arkansana</i>
Common wild rose	<i>Rosa woodsii</i>
Western porcupine grass	<i>Stipa curtisetata</i>

Table 2. Sagebrush / Needle and thread (*Artemisia cana* / *Stipa comata*) shrubland (from Comer et al. 1999)

Dominant Species

sagebrush	<i>Artemisia cana</i>
needle and thread	<i>Stipa comata</i>

Common Species

pasture sagewort	<i>Artemisia frigida</i>
blue grama	<i>Bouteloua gracilis</i>
thread-leaved sedge	<i>Carex filifolia</i>
scarlet butterflyweed	<i>Gaura coccinea</i>
june grass	<i>Koeleria macrantha</i>
silverleaf psoralea	<i>Psonalea argophylla</i>
scarlet inallow	<i>Sphaeralcea coccinea</i>



Book Review

Easy Lawns: Low maintenance native grasses for gardeners everywhere

edited by Steve Daniels

1999. Brooklyn Botanic Garden, Inc.
<www.bbg.org/gardenemporium>
105 pages, \$12.95 in Canada

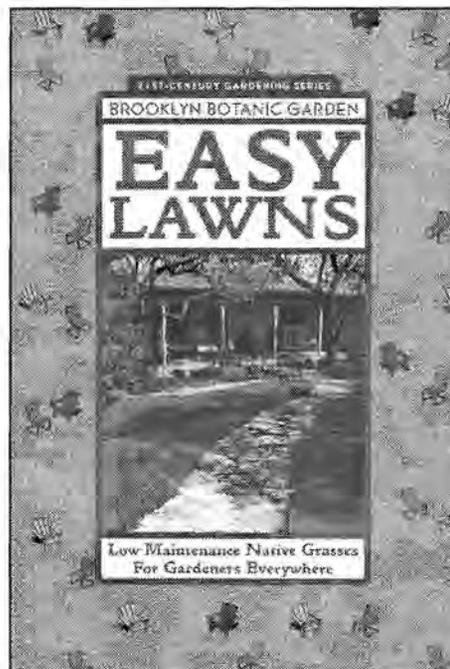
reviewed by Liz Saunders

Being somewhat of an anti-lawn activist and having experimented a bit with native lawns, I was excited about the opportunity to review this new book. Anyone who has slaved over the maintenance of traditional short, green and weed-free lawns should be immediately attracted to the main title "Easy Lawns". The sub-title refers to "native grasses for gardeners everywhere". This is rather an overstatement, as one of the first things that strikes me about the book is how U.S. oriented it is. That said, the book does contain some references to Canada and certainly some of the information can be applied to Canadian gardens. Readers will probably get more out of the book if they are already a little familiar with the native species found here—this helps to weed out the information that is not relevant to Alberta. It must be remembered that this book, as the title clearly says, is primarily about lawns. It is not about re-creating native prairie or other natural habitats in your yard.

The book starts with "The New American Lawn", a chapter on why using native species in lawns is a good idea. It also gives a rather brief introduction to grass ecology. More details in this area would help people to understand the biology behind establishing and maintaining native grasses. There is a short and perhaps oversimplified chapter on the basics of starting a new lawn. Having tried this at my last residence, I can say from experience that the book does not truly give you a feeling for some of the headaches that such an endeavour can cultivate.

Five chapters focus on specific grass or sedge varieties that are suitable for use across a wide geographic range. Of particular interest to Albertans is the

chapter on junegrass as well as the one on fescues. The junegrass chapter begins with "In the rarefied world of turfgrass research, junegrass (*Koeleria macrantha*) is hot stuff". It recommends this species for dry and infertile sites, which sounds ideal for yards in southern Alberta. However, according to this book, as a lawn grass, "junegrass is a bit of an unknown" and "if you decide to experiment with it, you will be charting new territory". For those of us in southern Alberta, there are probably some interesting possibilities here for experimentation (if you can find



a seed supplier). The chapter on fescues contains an Alberta reference. They make mention of Jan Weijer (a retired plant geneticist from University of Alberta) and his fescue cultivars that are not yet commercially available, but show much promise for drought-tolerant lawns.

The next chapters look in more detail at specific regions; the northeast, southeast, Florida, California, high desert landscapes and Colorado. Each chapter provides tables of suitable native grasses and their characteristics as well as suggestions for wildflowers that can be added as

accents. Again, if the reader is familiar with Alberta's native plants, it is possible to garner some useful information here. For example, some of the species recommended in the high desert section are also found in southern Alberta, such as Indian ricegrass, blue grama grass and western wheat grass. As well as information on how to get native lawns started in each region, considerable attention is paid to their ongoing maintenance.

A brief "native grass encyclopedia" at the back highlights 41 grasses and sedges suitable for turf and lists their site requirements, height, mowing guidelines, sources and whether they can tolerate foot traffic. Not surprisingly, all 24 nursery sources listed are in the United States.

Although the book does address lawn maintenance, one of the main questions that I have about my own native "lawns" was not answered in the book. Is it possible to have a native lawn in a high traffic area? We have been struggling with how to properly maintain areas that get a lot of foot and paw traffic. After several years, these areas are not doing so well. Perhaps native lawns are best left to front yards and other places that do not experience a lot of traffic? As the book recognizes "the information about using native grasses and sedges for lawns is new and still evolving".

Overall, *Easy Lawns* is easy to read and is a nice introduction to the idea of using native plants in lawns. Although there is little reference to the Canadian situation, it is possible to garner some useful information that applies here. The photographs and illustrations are attractive and they do justice to the beauty of native grasses and wildflowers. Wouldn't it be nice if there was a book like this that focussed entirely on the possibilities for native lawns in Alberta?

Liz Saunders is currently the Natural Resource Manager at the City of Lethbridge, but in April she will be moving on to focus her time on her ecological consulting company. She is a keen gardener and for ten years has been experimenting with using native plants for landscaping.

office at Elkwater, getting the inside scoop on the ecology and management problems of the Hills. Keith Bocking, Visitor Services Officer and a 15-year veteran at the Park, tells us how he had assumed that the forest ecosystems of lodgepole pine and white spruce were the Hills' most valuable ecological feature and should be the prime focus of management to keep them healthy. Yet "I saw the light" Keith says, "when the Alberta Research Council team from Vegreville came up here." The ARC scientists dug soil pits among the trees and showed that black earth soils characteristic of prairies underlay them, indicating that the forest was encroaching onto the grassland and that this in fact was the more endangered ecosystem. Nevertheless, although expanding peripherally, the "old growth forests" are a legitimate cause for concern.

With almost two-thirds of the trees having taken root at the time of the last great forest fire in 1886, much forest is decadent and dying. The challenge here is how to rejuvenate it without setting light to the "keg of dynamite" this dead wood represents. (Under the conditions of modern settlement, a major forest fire is simply politically incorrect.)

Given the problems, it was a relief to hear that since about 1997, a proper program of research has begun, steered by a group representing both government and non-government interests from both provinces. Our first field assignment that morning was to visit some of the experimental plots that have been set up on the plateau south of Elkwater. Here, the effects of burning, mowing and cattle grazing on the composition, productivity and health of the grasslands is being

studied. We observed with interest how prominent shrubby cinquefoil (*Potentilla fruticosa*) was amidst the grass (predominantly *Festuca hallii*), and learned that although this too is a target of management, no one is sure whether its abundance is natural or due to grazing.

After lunch back at the main Elkwater campground, where the first-comers were lucky enough to spot a flock of wild turkeys, we were on the road again with Cliff Thesen (Parks Planner) and Les Weekes (Forestry Agrologist), to visit a couple of their favourite orchid spots. These were in wooded ravines in which calcareous hillside seeps provided the abundant moisture beloved by orchids. Round-leaved orchid (*Orchis rotundifolia*) was still only in bud, but the blunt-leaved bog orchid (*Platanthera obtusata*), incredibly plentiful, was coming into flower, and we



Rob Staniland

Botanizing in fescue prairie on the northern flanks of the Cypress Hills

also found specimens of northern twayblade (*Listera borealis*). It was probably too early to find white adder's-mouth, *Malaxis monophylla*, known to occur in the Hills, though we looked hard for it. These woods, with the familiar flora of the boreal and the montane, were also excellent moss habitat. At the second site, we simply struck upslope from the road, by now in the rain. Jennifer Doubt and her assistant Martina Krieger, came up with a rare moss, *Aulaconium androgynum* (smaller than the ubiquitous *A. palustre* and a denizen of tree trunks rather than wet soil). The site was full of treasures, (a clump of striped coralroot, *Corallorhiza striata*, right by the fence, for example), so that I couldn't help but think how much the regular visitor to the park must miss, sticking to the beaten paths.

The next morning, Saturday, found us back at the Park Office, our anticipation mounting under sunny skies, pondering a choice of menus. Should we join the group led by Reg Ernst, and hike up the ridge north of Reesor Lake? Or should we join Cheryl Bradley's group and hike 7 km or so along Battle Creek down to rendezvous with the others at Reesor Lake? This last was billed by Cheryl as botanical *terra incognita* with no guarantees as to what we might find, though she provided us with a wish list of 18 rare plants that might lie along the route, and illustrations to match. Our first stop was on the plateau where the narrow stream nourished patches of brook grass,

Catabrosa aquatica. More striking were the huge boulders of conglomerate rock lodged in the stream bank. This rock appeals to even the most geologically challenged (like me) because it looks and sounds like what it is: a bunch of cobbles and pebblestones that have somehow got rolled up into a great, hardened muddy ball. (Our counterparts would be encountering this same rock along the ridge at Reesor Lake and possibly finding that it is not to be trusted as a climbing rock as the pebbles break off easily! Conglomerate rock caps the layers of sedimentary rock that make up the Hills and represents the bed of turbulent rivers that flowed from the south some 40 million years ago. It is porous, which explains the seeps and noticeable slumps on some slopes in the Park. But this bed of river stones also resists weathering, which is



Striped coral-root, *Corallorhiza striata*, growing in a mixedwood forest

why the plateau keeps its head when the surrounding landscapes lose theirs to erosion.) At this first stop we encountered the two rare species that were to be the only ones on the list we found. Biscuit-root, *Lomatium cous*, in dry grassland beyond the stream bank, occurs only in Alberta in the Cypress Hills. The yellow blooms of the more widely distributed but still infrequent American winter cress, *Barbarea orthoceras*, shone all along the stream edge. (In retrospect we could count more "rares" because Cheryl collected a couple of immature sedges that were later identified by Dr. Bill Crins as *Carex petasata* and *C. hookerana*. Cheryl went on to find several more of the wish list plants in the course of her fieldwork throughout the summer, which just goes to prove the limitations of parachuting into a location for a mere weekend!) Meanwhile, determined to discover, we fanned out like a bunch of detectives with mug shots in hand, crossing and re-crossing the (conglomerate-) pebbly creek, from the drier, pine-dominated forests of the south-facing valley slope to the dark, moist, *Calypso*-harbouring spruce forests of the north. Among the definitely not-rare plants was the dandelion, in peak bloom, mute testimony to the pervasiveness of seasonal cattle grazing in the Park. Tired by late afternoon, and finally thoroughly warmed up,

we were grateful to the Reesor ridge hikers who had stayed behind, their adventure long since finished, to pick us up and drive us back to our vehicles on the plateau.

On Sunday, another beautiful day, we left the hills to drive east, through the Manyberries area, and then north, to our destination at the Red Rock Canyon Natural Area. As we drove in convoy along roads of loose gravel at speeds faster than I would have attempted alone, the Sweetgrass Hills to the southwest were our constant and only landmarks. This part of Alberta is so devoid of human habitation that the farm- and acreage-pocked country around Calgary and Edmonton looks like downtown Manhattan in comparison!

For lunch we sat on a knoll overlooking the canyon, amid dry grass prairie bright with spring composites and colourful milk-vetches. A badland gully of undistinguished proportions, the canyon's claim to fame is the huge, round red boulders (technically known as concretions) that lie along its flanks, emerging from the surrounding grey shale as erosion proceeds. Fancifully, one could imagine it to be some giant's bowling alley. The rocks and crusty shale plateaux are not conducive to plant life, but there was more than enough to interest us botanically in the grass- and forb-filled slopes of the coulee. Here the provincially rare one-spike oatgrass, *Danthonia unispicata*, formed extensive patches and could be picked out by scanning the vegetation sideways for the fuzz of white hairs standing out along the stems. Easily winning the esthetics prize was butter-primrose, *Oenothera caespitosa*, though no doubt its setting against grey shale or mud had something to do with its egregious beauty.

After an afternoon in the cauldron of the canyon, and a hot drive back to camp by way of Medicine Hat, the Cypress Hills did indeed begin to look more like an oasis, their big draw now being abundant moisture in the form of tea and beer, for those of us spending another night in the Park.

By Monday morning (clear and beautiful, of course) most of us had already scattered or were scattering.

see **Gold**, page 14

Gold, from page 13

However, Joyce and Reg were staying on to explore another ridge top for the rare dwarf fleabane, *Erigeron radicans*, which, along with biscuit-root, had been a highly rated find on the Reesor ridge trip. Joyce was curious about the distribution of dwarf fleabane, a mountain-top plant, because the top 100

metres of land surface (above about 1370 metres elevation), or possibly even much more, at Cypress Hills is considered to have been free of ice during the last glaciation. (The implications of this *nunatak* for plant life, however, appear to have been little studied.)

Before heading home I decided to take a quick jog up to the top of Reesor ridge, striking through lush grassland and patches of hawthorn (*Crataegus rotundifolia*, I believe, although it co-occurs here with the very restricted *C. douglasii*) to the multi-colored alpine-like flower gardens at the top. Here amid the gravel and rock, tufted milk-vetch, *Astragalus spathulatus*, locoweed, *Oxytropis* sp., Macoun's cryptanthe, *Cryptantha macounii*, and rocky-ground sandwort, *Arenaria congesta*, featured prominently.

Taking advice from others, my traveling companion Margaret Nelson and I drove home north on Highway 41 to view the (to us) unfamiliar landscapes of the eastern side of the province. By mid-afternoon we were definitely in the mood for another oasis and found it along the South Saskatchewan River, at Sandy Point municipal park, near Bindloss. Here the riparian sandbar willows and lovely peach-leaved willows simply exploded with life: avian, reptilian and floral. As the day wore on and we centimetred north on the map, the smell of wolf willow in



Butte-primrose (*Oenothera caespitosa*), common at Red Rock Coulee Natural Area.

bloom filled our nostrils through the open car windows. Just south of Wainwright occurred the last memorable event of the long weekend. We drove past a family of badgers basking in the evening sun outside their den on the west-facing road embankment. When I turned the car round for a reprise they disappeared efficiently into the huge sandy excavation that was their home, but not before we had taken a good look and counted five of them! Smiling broadly, we resumed our journey: hedonism in animals is always a great source of pleasure!

As I write, plans for Botany AB No. 3 in 2000 are being hatched. Next year's trip will be to the Kootenay Plains. Stay tuned and consider joining us next June for another great Alberta venue!

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- Park brochure on geology.

Thanks to Keith Bocking, Cheryl Bradley and Joyce Gould for additional information and to Rob Staniland for graciously providing photographs.

Botany Alberta No. 3!

June 16-18, 2000.

This year's Botany Alberta field trip is to the Kootenay Plains, west of Rocky Mountain House. Registration is strictly limited and on a first-come-first-served basis. Look for more details in the spring issue of *Iris*. If you would like to help organise this year's field trip, please contact Elisabeth Beaubien.

Crocus, from page 7

celebration of the arrival of spring! Early settlers dubbed this native anemone the "prairie crocus" because it reminded them of their early crocuses back in Europe. It is also called Pasque flower, because in some areas it tends to bloom at Easter-time.

The poisonous properties of the prairie crocus were used to advantage by Native peoples. A poultice made from the plant was used as a counter-irritant, to treat rheumatism or other muscular pains. It was also used to stop nose-bleeds and draw out infection in cuts and boils. The Native people knew it was dangerous if taken internally.

According to Native legend the furry coat was given to the flower to protect it on chilly spring nights. The Blackfoot word *Napi*, the old man central in the Blackfoot creation story, also referred to the greyish seed heads of prairie crocus which appear in early summer. A Yukon child coined the term "elephant's Q-tips" for the fuzzy pointed buds.

This plant is the floral emblem of Manitoba and South Dakota.

Horticulture

This welcome little sign of spring is sometimes difficult to grow in a garden. It can be started from seed collected from

the wild (usually ripe in June), or purchased from nurseries specialising in native plants and seeds.

Please do not attempt to transplant plants from the wild to the garden. This usually fails (i.e. plants die within a few years), and it contributes to loss of biodiversity in our remaining natural habitats!

Range management:

Like other native prairie plants, prairie crocus often flowers much more abundantly after a fire. Small fires could occur all through the year in pre-settlement times, and native plants are well-adapted to fire. Fire removes the dead plant litter, returns minerals to the soil surface, and increases light. As awareness of the importance of fire is increasing, its use as a management tool for natural areas is also increasing.

Take note: Safety is a big issue. Fire should ONLY be used under the direction of trained, experienced people who can supervise a controlled burn – and



who will accept liability in case the fire gets away and someone is injured, or property is damaged. If permission and expert help is available to manage a burn of your prairie crocus habitat, you may wish to encourage this species by burning occasionally – in winter in the chinook belt, in very early spring, or in fall. Burning too often can damage other organisms.

Quotes

The name of gosling given the downy buds by prairie children is eminently suitable, but the Indian name is even better. The Indians... had a perfect genius for choosing the most poetic and significant name for things about them. "Ears of the Earth" they called these furry ears which, so soon after the snow drifts melt, the prairie thrusts up to listen for the first faint rustle of summer.

Annora Brown. 1970. *Old Man's Garden*. Gray's Publishing Ltd., Sidney, B.C.

*Spring comes with a rush in the Arctic. The snow disappears almost overnight; and long before the last drifts have entirely vanished, the first flowers put in an appearance. At the mouth of the Mackenzie Delta, the Pasque-flower or wild crocus (*Pulsatilla ludoviciana*) began growth on May 15, when a thin crust of snow still covered last year's withered leaves. On May 25, when the ground had dried, the large bluish flowers appeared while the new foliage was still undeveloped. On June 25 some of the seeds had already been dropped.*

—from *Plant Life in the Arctic* by A.E. Porsild, March 1951, *Canadian Geographical Journal*

If you would like to know more about Plantwatch, please contact Elisabeth Beaubien at the Devonian Botanic Garden at (780) 987-5455, or by e-mail at <e.beaubien@ualberta.ca>.

You can also check out the Plantwatch home page at <www.devonian.ualberta.ca/pwwatch/>.

News and notes

New Books

NatureScape Alberta—Creating and Caring for Wildlife Habitat at Home

Myrna Pearman and Ted Pike

Published by the Federation of Alberta Naturalists

Price: \$24.95

For more information, call (780) 427-8124

Savanna, barrens and rock outcrop communities of North America.

R.C. Anderson, J.S. Fralish & J.M. Baskin (eds.)

Cambridge University Press

ISBN 0-521-57322-X

Price: US\$ 110.00

The Goldenrods of Ontario: *Solidago* L. and *Euthamia* Nutt. 3rd edition

John Semple, G.S. Ringius and J.J. Zhang
University of Waterloo Biology Series

39:1-90

ISSN-0317-3348

The third edition of this popular guide to Ontario goldenrods has several improvements over earlier editions most notably the inclusion of colour plates for many species. Copies can be obtained for \$15.00 plus \$5.00 shipping (Canadian buyers add GST) from the University of Waterloo, Department of Biology, University of Waterloo, Waterloo, Ontario N2L 3G1 (specify spiral or perfect bound; make cheques payable to "University of Waterloo - Biology Series"). The 2nd

Edition of Semple, Heard, and Xiang's *Asters of Ontario* is available from the same source.



Meetings

Monitoring for Ecosystem Health

April 3-5, 2000, Regina.

First Announcement & Call for Papers Conference organizers invite papers that present state-of-the-art approaches to monitoring ecosystem health. For information visit the conference website at <www.serm.gov.sk.ca> or email: <monitoring.erm@govmail.gov.sk.ca>

See **News**, page 16

Wellness through the use of horticulture

March 29-31, 2000, Karsten Discovery Centre in the Calgary Zoo, Calgary
For more information call (403) 275-4540 or 232-9362.

Recreating Alberta's Natural Landscapes—Backyard to Pipeline ANPC 13th AGM and Workshop

April 29-30, 2000, Karsten Discovery Centre at the Calgary Zoo, Calgary

Learning from the past, looking to the future:

4th International Conference on Science and the Management of Protected Areas
May 14-19, 2000

For more information visit the conference website: <landscape.acadiau.ca/sampaa/firstannouncement.htm>

Caring for our land: stewardship and conservation in Canada

A National Millennium Conference

June 3-6, 2000, University of Guelph Guelph, Ontario

for more information see the conference website at <www.uoguelph.ca/~claws/conference/>

EcoSummit 2000 : integrating the sciences

June 18-22, 2000, Halifax

For more information visit the conference website <www.elsevier.com/locate/ecosummit>

Managing the Mosaic

27th Natural Areas Conference

October 16-20, 2000

St. Louis, Missouri

for more information visit the conference website at

<www.conservation.state.mo.us/nac>



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If you have an announcement, article or other item of interest to the ANPC membership, you are invited to submit it to the editor for publication. Items concerning native plants will be given the highest priority.

The editor reserves the right to edit submissions, but will review changes with the authors whenever possible. Disputes will be resolved in favour of the audience.

Deadlines for upcoming issues:

Spring	May 15, 2000
Fall	Oct 15, 2000
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