

Nisku Prairie Report, Season 2021 - submitted by Patsy Cotterill

Nine visits to Nisku Prairie were made in 2021, involving eight volunteers who contributed a total of 55 hours of volunteer time.

The visits were as follows:

May 2. First of the season reconnaissance with Aaron Von Beers of Leduc County, including an assessment of the area that the County has agreed to mow. Some of the larger stones were located and removed. (The Prairie is full on stones and rocks, making mowing somewhat difficult and hazardous.)

May 6. Further stones were removed. Seeds of 17 common species of prairie plant (many originating in the Prairie) were sown in a bed near the gate from which the brome had been killed by herbiciding in previous seasons. In addition, 13 plugs representing three species (low goldenrod, stiff goldenrod and three-flowered avens) were transplanted.

May 14. The South Field was mown by the County, but the cut hay was not removed. Not all areas were mown; those considered hazardous due to the presence of large rocks were excluded. Mowing included smaller trees and shrubs, e.g., narrow-leaved meadowsweet, common wild rose, and saskatoon; many small aspen saplings extending into the grassland were pushed over.

May 17. Volunteers raked the hay and removed more stones. The hay was stacked in piles in the adjacent patches of aspen forest.

May 27. Further raking and stacking of hay was carried out. These two visits (May 17 and 27) involved the largest number of volunteers (seven), but even so we were able to cover less than about one-quarter of the field. (The County does not have the appropriate machinery to bale and remove the hay. A field on the other side of the road, also a municipal reserve, is hayed by a private contractor.) A local resident later queried the operation by email and I replied by explaining the benefits of mowing to a prairie.

The next visit to Nisku Prairie did not take place until July 24. This was due to heat and drought creating unsuitable working conditions, and to other commitments. The County was not able to supply water in the two barrels this year, although in any case conditions were too hot for transplantation until after mid-season.

July 24. The east bed was weeded (mostly of stinkweed) and 16 transplants belonging to 11 species were planted in it. There was no sign of any native seed germination by this time, hence weeding and further soil disturbance seemed justified. Seven transplants belonging to four species were planted in an area farther west in the South Field where a consolidated patch of brome had been herbicided last year.

August 9. Tarpaulins were laid down in an area of consolidated and unmown brome on the southeast side. These consisted of a heavy plastic cover that had been successfully used to kill vegetation elsewhere, and a commercial product. Further weeding, particularly of Canada thistle, and some transplanting (of *Muhlenbergia glomerata*) was done in the east bed near the gate.

August 29. Herbiciding was done on remaining Canada thistle (individual plants and patches) in disturbed areas near the gate, and of areas of smooth brome and meadow foxtail in the South and Middle Fields that had been sprayed last season. Thistle was also pulled by volunteers. Seeds of bearded wheatgrass were collected (although not particularly abundant in the Prairie, occurring only in diffuse patches in certain areas, it is a desirable component of a seed mixture because it is robust and easy to identify once in flower). Western goldenrod (*Solidago lepida*) has appeared among the regenerating saskatoon at the west end of the South Field. Some cuttings of narrow-leaved meadowsweet were taken for growing in pots and possible later transplantation into the Prairie. This shrub regenerates well after mowing and colonizes moist depressional spots in the Prairie.

September 6. Further weeding was done on disturbed areas near the gate and in the west bed in the South Field, where seed panicles of brome were removed to prevent seeding into bare ground. Seventeen transplants representing 10 species were transplanted in areas in the South Field with sparse or no vegetation. Aspen suckers in peripheral (adjacent to grassland) patches were showing shrivelled leaves and possible mortality, likely due to drought.

September 20. Transplantation of 20 plugs representing six species into various small sites was done.

November 6. Final reconnaissance visit of the season. Seeds of six species (graminoids and Asteraceae) were collected.

Ideas for Activities for 2022.

- The tarpaulin remains intact and should survive the winter. It could be extended to cover an adjacent disturbed area.
- Some of the stockpiled hay could be dumped in this area also to kill non-native vegetation.
- Some old hay could be placed on tufts and patches of meadow foxtail to kill it. This method worked quite well on an infestation of meadow foxtail in the "neck" (narrow opening between the South and Middle Fields) a couple of years ago.
- Further cuttings of narrow-leaved meadowsweet could be taken and checked for root development. Eventually they could be transplanted into some of the wet areas now being colonized by northern willowherb and knotweed.
- Herbiciding of brome and foxtail should continue, particularly on remnants in the areas previously targeted.
- The goldenrod (*Solidago lepida*) population which has appeared at the west end of the South Field among the saskatoons could be wick-herbiced. Possibly this plant has proliferated because of reduced vigour of the saskatoon due to mowing, but it is not a normal component of the stable prairie grassland. It could be monitored for a couple of years to see if the regenerating saskatoon keeps it under control.
- Transplanting of plugs into areas with sparse vegetation could continue. Transplanting has not proven hugely successful (see below), but I have a large number of plugs of tufted white prairie aster and smooth aster which grow readily from seed and could perhaps be planted in relatively large numbers in bare spots (or in areas under the tarpaulin).

General Considerations

Over the years our efforts have concentrated on rehabilitating the disturbed area (where rocks were piled) at the east end of the Prairie near the gate. When we re-grouped after Birgit Friedenstab left we tackled huge infestations of mainly annual weeds, particularly common-hemp nettle and stinkweed, as well as minor weeds such as annual hawkbeard and Shepherd's purse, which were followed by or accompanied by such perennials as Canada thistle and perennial sow-thistle and, of course, smooth brome. Goldenrod (possibly both species, *Solidago lepida* and *S. altissima* are present) constitute major ground cover along with brome. On numerous occasions we tried clearing the weeds down to ground level, transplanting with natives, and follow-up weeding, but the result has always been the same. While a few isolated robust natives, e.g., blue giant hyssop and bearded wheatgrass, may persist in a matrix of non-native species or goldenrod, the majority become overwhelmed by this matrix within a couple or more years. The Catch-22 situation is that the creation of bare ground necessary to introduce native seed mixes or transplants invariably results in these being overtaken by first annual and then perennial weeds. To keep on transplanting into these bare spots would then seem to be a case of the triumph of hope over experience!

A common strategy for restoration of bare ground is to sow a native seed mix. We tried this once in Nisku using commercially obtained Rocky Mountain fescue on ground that had been cleared of brome. It germinated and established well, persisting for about three years; it is now barely discernible. The site is not monolithic brome, but it is not recognizable native prairie either. (We have had the same experience in Fort Saskatchewan Prairie, on much sandier soil, which is better suited to RMF.) The forb seeds sown in the east bed this year have so far failed to germinate and, given continuing soil disturbance, (sometimes exacerbated by coyotes in the winter), I do not expect them to.

In herbicided ground where no tall weeds exist and the brome is sufficiently kept at bay clover (usually *Trifolium hybridum*) becomes a problem.

I have noticed some encouraging signs, however. Areas with discrete patches of brome and meadow foxtail that have been herbicided (Roundup is always used) in the Middle and South Fields are showing signs of colonization by natives. Here the ground is not bare, but covered by the stalks and leaves of dead grass. Species such as northern bedstraw and yarrow seem able to penetrate them, most likely encroaching from adjacent areas. The western portions of the South Field and the Middle Field are of course much less weedy than those in the easternmost portion of the South Field and are generally surrounded by native vegetation. My intention is to leave these areas with natural colonization by native pioneers alone, monitoring the result. Remnants of the non-native grasses will be herbicided, however.

My experience with sowing a native seed mix at Fort Saskatchewan Prairie (another aspen parkland remnant we are involved in) hasn't been good. As a result, I have considered sowing bare ground with commercial Kentucky bluegrass, already a very large component of the Prairie. Although this would be increasing a non-native element, it likely would lose vigour in time and allow the ingress of native species. (If brome came in, it would have to be controlled.) Kentucky bluegrass is less aggressively invasive than smooth brome and might in any case allow for the establishment of native populations through various means.

Bottom line, I vacillate, usually swearing at the beginning of the season that I will do little transplanting, but then if the home-grown native stock is available, I am persuaded to have another go at replacing weedy species with natives.

A question I often ask myself is: would the Prairie look any different today than if we had never done anything to it. The disturbed area near the gate remains a disturbed area, distinctly different from areas of the same field farther west that have a greater component of natives. As mentioned above, rather than disturbing more ground and transplanting, I sometimes I think that our main management function should be to remove Canada thistle (which can be done over the years by pulling), the meadow foxtail and dandelions and ignore the brome. On the scale we are able to operate as volunteers excluding brome after disturbance seems impossible. I am the only volunteer who uses herbicide.

Leduc County Agriculture staff have no interest in doing prescribed burns, despite the fact that the Prairie is completely open to the west where it is bounded by the Gwynne Channel, and separated from acreage homes by the road to the east. Acreages to the south and north are a considerable distance away. Nevertheless, I think Nisku Prairie would make a perfect site for experimental restoration work and the goal remains of trying to engage academic staff in projects there. Apart from burns, experimental plots with scientifically designed treatments and controls, and careful recording and monitoring, might produce some usable results. It is unfortunate that permanent sample plots were not established years ago.

The Prairie is overdue for a complete floral inventory. This past season would not have been a good year to have attempted it, however. Growth was poor in the early part of the growing season due to heat and drought, and flowering and seed set was low. It will be interesting to see if the population of prairie crocus in flower increases next year as a result of mowing in the South Field.



L. Prairie buttercup, *Ranunculus rhomboideus* (2021.05.02); prairie crocus, *Pulsatilla nuttalliana* (2021.05.06). Both have managed to push through the heavy leaf litter, but who knows what their populations might be if the Prairie was burnt regularly?



Raking and piling hay at Nisku (2021.05.17)



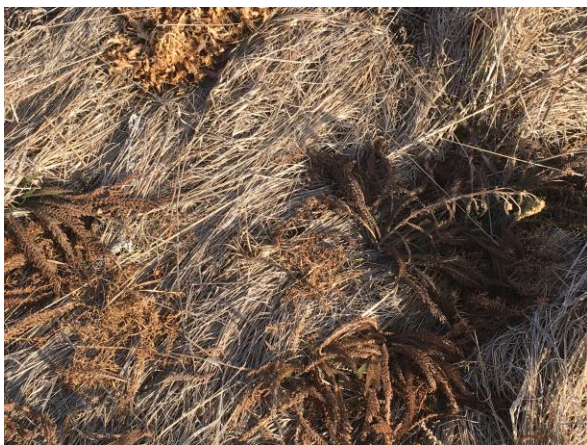
L: East bed created by herbiciding a patch of smooth brome (*Bromus inermis*), shows a healthy crop of stinkweed (*Thlaspi arvense*), and robust, pioneering perennials (2021.07.24); R: tarpaulin and commercial matting placed on southeast side to kill extensive patch of smooth brome and create bare ground ready for sowing or transplanting (2021.08.09).



L: Same east bed after weeding (2021.08.24). R: South Field looking north, showing leaf loss by aspen due to drought (2021.09.06).



L: Tuft of meadow foxtail (*Alopecurus pratensis*), probably dormant for the winter, not dead (2021.11.06); R: remains of *Polygonum* sp., which colonizes some of the wetter, bare spots in depressional areas (2021.11.06). The major colonizers of wet ground appear to be *Polygonum achoreum*, *Epilobium ciliatum* and *Stachys pilosa*, all weedy natives.



Following extensive herbiciding of large patches of smooth brome and meadow foxtail in the Middle Field towards the end of last season (2020), expanses of flattened straw were conspicuous. By mid-2021 these were being colonized by L: yarrow (*Achillea borealis/millefolium*), and R: northern bedstraw (*Galium boreale*), both pioneering species. Both photos: 2021.11.06.



L: A pipeline clearance over a decade ago has colonized with smooth brome and reed canarygrass (*Phalaris arundinacea*). It is also wet. Volunteer efforts to remove the flush of annual weeds after clearance were probably a waste of time. R: Upland edge of the pipeline corridor in the Middle Field. Photos: 2021.11.06. Virtually any disturbance to soil level stimulates rhizomatous spread of smooth brome, and the reed canarygrass no doubt migrated upslope from the Gwynne Outlet where it is rampant. Meadow foxtail present in the Prairie likely entered the same way. Regarding the origin of the latter, it may be significant that cattle graze the wet meadows surrounding the Gwynne Outlet.