

The Field Open Space Grassland Restoration Plan October 2024

Prepared for the City and County of Broomfield
Open Space & Trails Department

Consultant: Pryde Land & Water



Table of Contents

I. Plan Purpose	Page 2
II. Project Area Description, Use, and Existing Conditions	Pages 2-4
○ Soils	
○ Vegetation	
○ Use	
○ Existing conditions	
III. Revegetation Process Overview	Page 5
IV. Steps to Revegetation	Pages 6-9
1. Preplant weed control	
2. Seed bed preparation	
3. Plant cover crop	
4. Monitor cover crop of milo	
5. Plant perennial seed into cover	
6. Post planting management	
V. Expectations for the New Grassland Stand	Page 10

The Field Open Space Grassland Restoration Plan

I. Plan Purpose

The concept for the project is defined in the Field Open Space Master Plan. A location map (Attachment 1) for the property and The Field Open Space Master Plan (Attachment 2) are enclosed. Attachment 3 includes photos of the property.

The Grassland Restoration Plan's (Plan) purpose is to convert the southwest parcel of the Field Open Space from dryland cropland to a grassland of native species that closely resembles a native grassland plant community and provides some of the same open space values that a native grassland provides.

The Plan is intended to be brief and is written in an outline format to facilitate useability and easy reference through the duration of the project. It is expected that the Plan will change as conditions, especially environmental conditions are encountered.

II. Project Area Description, Use and Existing Conditions

The information below is an overview of the project area including soils, vegetation, history of use and existing conditions. The southwest quadrant of the Field Open Space is approximately 26 acres.

Soils

- Clayey plains ecological site, as identified by the National Resources Conservation Service (NRCS)
- Soils
 - Nunn (NuB) soil series map unit
 - Texture - Clay loam and clay – Surface tends to be clay loam and below 10" tends to be clay.
 - Few rocks or cobble
 - 1% to 3% slopes
 - Deep and well drained soils
 - Water permeability is slow due to the high clay content.
 - Water holding capacity is high. Plant roots can penetrate to 60+ inches
- Productive soils are typical of soils that evolved under grassland ecosystem
- NRCS Major Land Resource Area (MLRA) 67B-Central High Plains of the Great Plains

The characteristics of the soils described above have a high potential for revegetation success and establishment of a native, shortgrass and midgrass species plant community and strong potential for sustaining a native plant community long term.

Vegetation

- The land has been in dryland crop production (primarily hard red winter wheat) at least since approximately World War II.
- Prior to cultivation, which likely began around World War II, the site was native rangeland.
 - The native vegetation was a mid-grass plant community dominated by western wheatgrass and blue grama.
 - The plant community included many other species of perennial and annual grasses and forbs and shrubs. Small remnant areas of the native plant community still exist in the Broomfield area.

Use

- For the last approximately 75 years, the land has been in dryland crop production. The land is part of the Field Open Space that is owned by the City and County of Broomfield (Broomfield). Since early 2000, Broomfield has had a farming lease with local farmers. Dale Brunner farmed the property originally for Broomfield. Currently, Matt Hulstrom farms the property.
 - As dryland cropland, a crop, usually hard red winter wheat, was planted and harvested every other year. Following harvest, the land was kept fallow during the off-production year. Fallow operations were performed as a soil moisture conservation practice. Fallow operations consisted primarily of shallow tillage to prevent growth of volunteer wheat and weeds that would consume soil moisture.
- The land has been farmed by Matt Hulstrom for the last 10 or 12 years. Under Mr. Hulstrom's management, the land has produced good dryland crop yields. In July of 2024 during the creation of this Plan, the wheat crop was scheduled to be harvested with the prediction of a productive yield of 30 to 35 bushel per acre.

Existing Conditions

The parcel was inspected on June 24th, 2024 and the following relevant property conditions were observed:

- The wheat crop stand density, vigor and crop health were good. The plants were still fairly green. This is all indicative of good farming practices and the presence of good soil moisture.
- The following weeds were observed and are listed in order of prevalence:
 - Bindweed is present over a significant portion of the property but plants are small due to competition from the wheat crop.

- Four or five relatively small patches of Canada thistle, totaling approximately 3 acres, exist. Canada thistle is a tenacious, very deep rooted perennial. Untreated, Canada thistle will limit establishment of the cover crop and native seeding in the areas where it exists. The extent of the Canada thistle patches observed are limited in size and can be treated relatively easily.
- Cereal Rye is commonly found on the majority of dryland wheat fields in eastern Colorado. It typically presents one of the greatest weed issues for the restoration of former dryland wheat fields. The rye on the Field Open Space however, is surprisingly sparse, existing primarily around the margins of the cultivated area. The limited amount of rye present is encouraging.
- A very small, isolated patch of jointed goatgrass exists on both sides of the trail at the south end of the trail intersection with 3rd Avenue. Goatgrass is difficult to control, so the area identified should be monitored.
- Other weeds observed include prickly lettuce, kochia, lambs quarters, wild sunflower and Russian thistle but they were very minimal in terms of density, scale and distribution. Again, a very good sign and indicator of the status of the weed pressure being reasonable at this point.

The heaviest weed growth is adjacent to the trail edges where the lack of competition from the wheat crop and runoff precipitation from the trail supplements soil moisture.

Looking ahead, the two weed species that will likely be encountered and will have to be addressed most are bindweed and Canada thistle. Both are rhizomatous, perennial and tenacious. The bindweed exists over a very large proportion of the project area but the Canada thistle exists primarily in several patches totaling approximately 3 acres.

- Soils

- Tilth – Tilth is defined as the condition of tilled soil, especially in respect to suitability for sowing seeds. Uniformly good tilth was observed over the entire field. Soils were loose, friable and “soft”, with fingers being able to extend 4” to 6” into the surface of the soil. There was no evidence of a hard crust or capping. Some crusting and capping is to be expected with a soil with a higher clay content. The good tilth is important to accommodate good infiltration of precipitation and storage of soil water. There was no evidence of surface runoff, rills or smaller incised channels and other signs of erosion. The good soil tilth is a significant factor in achieving revegetation success.

III. Revegetation Process Overview

The basic process for grassland restoration is outline below:

1	Pre-planting weed control in the wheat stubble	Sept / October 2024 & March- May 2025
2	Seedbed preparation: <ul style="list-style-type: none"> a. Leave wheat stubble through winter to protect soil and catch snow. b. Determine whether deep ripping is necessary to relieve deep compaction of soil. If warranted, ripping would occur late fall 2024 or early spring 2025. c. Will monitor soil conditions to determine whether/when tillage is necessary or if we will attempt to no-till plant the cover crop seed directly into the wheat stubble. Timing of tillage (discing and field cultivator) should occur later in the spring (Late March to Mid-April). d. Monitor weeds after tillage; treat weeds as necessary. 	Window between Sept 2024 and May 2025
3	Plant cover crop of milo with drill seeder (5 lbs/acre)	Last week of May 2025
4	Monitor cover crop for weeds & potential control	July – August 2025
5	Plant perennial seed into cover crop	October 2025
6	Post planting weed control	March-April 2025 thru 2028

The greatest threat to the success of the restoration is the competition that weeds offer to the establishing planted species. The presence of weeds can result in a complete failure of a planted stand to a marginal stand (marginal density of desirable species interspersed with bare spots and weeds).

IV. Steps to Revegetation

1. Preplant weed control

The last wheat crop was harvested in the beginning of August of 2024. There will be several opportunities to address weeds between now and when the targeted date to plant the cover crop is at the end of May of 2025. The best windows for weed suppression activities are following precipitation early this fall and next spring. Ideally, there will be enough precipitation in 2024 for a fall treatment of weeds. Fall treatment of perennial weeds is especially effective.

Winter and early spring moisture stored in the soil will usually bring a flush of weeds in early spring as soil temperatures increase. Weed control in the form of tillage or herbicide is usually necessary in early to mid-April. Finding a window that is dry enough to utilize tillage in the spring can be challenging. Herbicide application is less influenced by soil moisture than tillage.

Typically, additional precipitation during the last half of April and the month of May will bring a second flush of weeds that will require treatment before planting a cover crop the last week of May. The drawback of using tillage is the soil moisture lost from tillage. The advantage of herbicide is conservation of soil moisture to germinate the cover crop.

2. Seedbed preparation

The goal of seedbed preparation is to ready the soil for planting/placing the seed at the proper depth and rate (spacing) and accomplishing good contact of the surface area of the seed to the soil.

The easiest, least expensive and perhaps the most effective approach to providing a good seedbed for the cover crop is simply to drill the cover crop directly into the wheat stubble from the 2024 crop. In order for this to be an option, deep ripping to relieve compaction will not have been necessary AND herbicide will have to be used as a means of weed control for the first and second flushes of weed control. One of the advantages of planting cover crop seed directly into the stubble is that the reduced amount of soil disturbance with this approach will likely only require one herbicide application instead of two. Planting directly into the wheat stubble precludes the need for tillage, potentially conserving soil moisture. A cost savings would be realized as well.

If deep ripping is deemed necessary, additional tillage operations (discing, chisel plow and field cultivator) will be necessary to prepare a good seedbed. There are several drawbacks to this approach. Tillage in the spring can be a challenge because of

increased possibility for wet soil conditions. Tillage operations under wet conditions can damage soil structure which can significantly impair revegetation success. The disturbance of the soil during tillage can also stimulate weed seed to germinate and require an otherwise unnecessary additional weed control effort. Tillage also causes a loss of soil moisture.

3. Plant cover crop of milo

The perennial seed mix will eventually be planted into the standing, dead cover crop (cover crop dies due to a killing frost). The cover crop will serve to protect the seeded area from wind erosion throughout the winter, collect snow, preserve soil moisture and reduce desiccation of new plants after they have emerged in the spring. In the early growing season, the cover crop residue protects from wind and slows onset of weeds, while native species seedlings germinate, emerge and achieve early growth.

Milo is the cover crop of choice. It is very competitive for soil moisture and offers a very significant measure of weed control throughout the summer as it grows. Its leaves are broad and the dense cover competes with weeds for sunlight. If summer precipitation is somewhat drier than normal, it is quite possible that no herbicidal control in the growing milo will be necessary.

The milo must be planted during the last week of May 2025. Earlier planting dates risk failure due to potential for cool soil temperatures and later dates miss historically dependable rain events in early June. The ideal seeding rate is 3 to 4 pounds/acre depending on the seed size of the lot of seed purchased. Every other drill row in the seed box should be blocked to achieve drill row spacing of approximately 16". Planting is best achieved with a no-till drill (seed planter), drilling at an angle to the rows of wheat stubble.

If deep tillage was necessary earlier in the revegetation process, additional tillage would have occurred and most of the wheat stubble would be eliminated during tillage and seedbed preparation. In this case, the cover crop will be planted into a clean seed bed and a conventional drill can be used for planting. A shoe drill can prove to be very effective in planting the seed into deeper soil moisture. The target planting depth should be 1 1/2".

4. Monitor cover crop for weeds & potential control

Once the cover crop is planted, it will be important to monitor weed populations and respond with control if needed. Herbicide application and hand pulling or hoeing of very small populations are the only options for control in the standing cover. If herbicide application is needed, it may be applied as spot treatments or broadcast depending on the size and distribution of the weeds.

5. Plant perennial seed into cover crop

The perennial seed will be planted in October 2025, when air/soil temperatures will preclude the opportunity for the perennial seed to germinate before spring. Fall seeding avoids the uncertainty associated with spring seedings in which typical spring moisture nearly always limits the windows in which soil moisture is dry enough to do an effective and timely job of planting. Another great advantage of fall seeding is that seed planted in the fall is poised to germinate in the spring the moment that soil temperatures are right, giving the native seed an edge over weed species.

The seed will be planted directly into and at an angle to the standing residue of the milo cover crop at an angle. A no-till drill that can accommodate native seed will be used. Drill row spacing of most native seed drills is about 8 inches.

The native grassland seed mix and seeding rates will be determined by referencing the NRCS Ecological Site Description for Clayey Plains. ESDs are the best source for an estimation of the kinds of native species and the percent composition of each that occurred on this site prior to being plowed for farmland. The mix will consist of cool and warm season grasses, forbs and shrubs. The number and variety of species included in the mix will be determined by availability of supplies from seed companies. Seed price will likely be a factor as well. We will strive to provide for the greatest diversity of species within the budget provided. The final seed mix will be determined in the winter of 2025 if not sooner, to allow time to find the seed and prepare for the planting in October 2025.

6. Post plant management – Monitoring and weed control

Follow up management is going to consist primarily of monitoring the progress of the site as the new seedlings emerge/develop. The primary focus will be the development and growth of weeds relative to that of the desirable species. Weed pressure is the greatest threat to establishing an acceptable stand of diverse native vegetation throughout the entire project area. Vigilance in monitoring the entire site to detect weed species, their location and stage of growth is essential. Monitoring will guide planning for implementing timely, effective weed control.

Seedlings of cool season grasses and some forbs will start appearing as early as the first half of March. Other forbs, shrubs and warm season grasses will follow as soil temperatures warm. The appearance and growth of weed species will depend on soil moisture. Unless the previous winter was unusually dry, expect weeds to begin to appear in early March or possibly even late February.

Weed control should be timed to prevent seed production and to reduce weed competition to the new native species seedlings. Herbicide choices are somewhat limited when applied to seedlings of a diverse seed mix and when there is a large variety of target weed species. Therefore, mowing will most likely be the best option for these initial control activities.

The frequency of mowing will be determined to a great extent by the amount and timing of precipitation through the summer months. The wetter the growing season, the greater

the weed pressure. Expect to mow 2 or 3 times in a normal precipitation year, and at least 3 and possibly 4 times in a wet year.

In addition to timing the mowings well, mowing height is very important. The goal is to mow as low as possible while staying above the height of the new seedlings. A 6 to 8" mowing height is likely to be the lowest that can be achieved with the correct equipment and should be adequate. Do not mow lower than 8" in order to preserve the cover crop residue which will continue to offer benefits to the new stand. Using a tractor and a 10' to 16' wide rotary mower is recommended. Narrower mowers or turf type mowers will have more negative impact on the new stand. The mower operator should be careful when making turns, to minimize the disturbance to the soil and seedlings with the front tires of the tractor.

Canada thistle and bindweed should receive special attention for control. Mowing alone will not offer much control for perennial Canada thistle and bindweed. While mowing can prevent Canada thistle from going to seed, bind weed is low enough that mowing has little effect on seed production or in reducing the biomass of the weed. It is likely that these two weeds will be present and will require control. Herbicide application in the fall will be the best means of control. Monitoring will determine whether that application would happen during the first year (fall 2025) or the following year.

V. Expectations For the New Grassland Stand

Establishing a new grassland of native species takes time. During the first growing season, expect the stand to look like a weed patch. The following year or two, expect a gradual evolution to a stand that has the appearance of a very weedy area with grass plants interspersed. Blooming forbs will begin to be apparent. Young shrubs will begin to become more obvious from a distance. It will take 3 to 5 years for the new stand to become established to the point that plant density and diversity, vegetative cover and structure of the seeded species will exist with relatively few weeds. Some bare ground will be expected for a grassland site.

The time it takes to reach full establishment will be most influenced by precipitation (amount and timing), weed pressure and the effectiveness of the management response to weed pressure. Wetter years will provide for greater growth of desirable species however, weed pressure will increase. Greater weed pressure will require more frequent control. Dry years will slow growth and development of native species but weed pressure will be reduced, requiring as little as one weed control operation. A normal precipitation year with timely spring and summer rain is ideal, resulting in good growth and development of desirable plants and little weed pressure.

Execute the Plan, monitor, modify the Plan

It must be acknowledged that as this Plan is implemented, it is likely that the Plan may have to be modified as conditions and plant response are influenced by weather and other factors. Therefore, the Field project site should be monitored closely throughout implementation. As the project evolves, monitoring and observation will determine whether modifications to the Plan are needed. Modifications should be expected and incorporated by recording in writing into the “living” Plan.

Pryde Land & Water, the consultant for the Plan, will provide documentation of Plan implementation that will include a brief written review of site visits to the property. Twelve site visits are anticipated. The site visits will involve site evaluation/planning purposes, observation/monitoring site conditions to determine timing of revegetation activities (before, during, after), advising/guiding revegetation activities and methods with Broomfield Open Space staff and contractors, monitoring cover crop and/or perennial stand growth and development, monitoring weed pressure, need for weed control and timing and monitoring establishment/growth of seeded perennial species.

A compilation of a “Field Open Space Revegetation Diary” will serve as a record of management for reference during the project and as a learning tool for future projects. It will also provide the beginning of the management history of the Field Open Space land.

Appendix I

Project Location: Southwest Quadrant of the Field Open Space



G:\shortcut-targets-by-Id\0B7cRcIAmYnQnRzFGV51p51E\GIS\Map_Production\Project_Maps\Broomfield\Vicinity_Maps\Vicinity Maps\The_Field_Open_Space\The_Field_Open_Space.aprx 10/15/2024 1:22 PM

Appendix II
The Field Open Space Master Plan

RECOMMENDATIONS FOR THE FIELD
SUBMITTED BY THE OPEN SPACE AND TRAILS ADVISORY COMMITTEE

GENERAL RECOMMENDATIONS

Native Grasses and Wildflowers

1. Recommend the conversion of The Field from an agricultural production to native grasslands.
2. Discussion with the current farmer needs to take place to determine the best time to terminate his lease.
3. The conversion should be in a timely manner which mitigates weed problems.
4. Grass and wildflower mixes need to be native to the Rocky Mountain Area, and specifically to the plains ecosystem. Experts in range management and/or plant ecology should be consulted to determine the best seed mixes for The Field and four quadrants.

Open Space Signs

1. Located at key intersections on the perimeter of The Field.
2. Additional area maps and/or regulation signs may be needed once the trail system is constructed and visitor use increases.

Soft Surface Trails

1. Crusher fine trail surface.
2. Need to accommodate multiple-use, allowing for users to easily pass each other.
3. The recommended soft surface trail system allows visitors to access The Field from a variety of points and travel through the property.

Underpasses

1. Midway traffic is heavy during rush hours in the morning and evenings, and will only get busier in the future.
2. Underpasses serve as a safe means of separating trail users from motor vehicles.
3. The western underpass is a higher priority because it likely would be used more because of the Farm house and trailhead parking and desire to visit the arboretum area.

NORTHWEST QUADRANT

Farm House Site

1. Farm house site and trailhead parking area are approximate in size on map.

2. Esthetic improvements to the farm house, as well as structure reinforcement.
3. Pathways from the Farm House parking lot can also be used as a trailhead for The Field, allowing users to travel south to the arboretum area or northeast to the enhanced wetland area.
- 4 Another work group needs to determine best use of site, using previously written material about the possible alternatives and direction from City Council.

NORTHEAST QUADRANT

Wetland (Pond 3207)

1. The expansion of the wetland will enhance both the wildlife habitat and recreations value (i.e. wildlife observation, photography and nature studies) of the area.
2. Additional, and appropriate, plant materials will be needed for wildlife habitat improvement, including trees (i.e. cottonwoods, willows and alder) shrubs (ie. willows, currants and chokecherry) and aquatic plants (ie. bulrushes, sedges and rushes).
3. Wildlife habitat considerations for shelter, food and space should include small mammals, birds, amphibians and reptiles.

Native Grass Test Plot

1. Council member Ralph Johnson recommends a native grass test plot to be planted in the fall. The area would be taken out of the current farmer's control to study the growing conditions and success rate of native grasses for the remainder of The Field.

SOUTHWEST QUADRANT

Reshaping Landscape Contours

1. Creating some elevation change at The Field is desirable. In this area, it may limit the number of social trail crossing from the east to the arboretum area.
2. Experts should be consulted to determine the best shape and elevation gain for contouring of this quadrant.

Arboretum Area

1. The area would create an enjoyable place to sit and enjoy the outdoors.
2. A variety of native trees and shrubs should be planted and labeled,

allowing residents to see the difference in plant material available to grow on their own property.

Overlook

1. Since this area is currently elevated above sidewalk area, it would allow visitor a place to stop and enjoy the view of the Continental Divide and The Field.
2. For those walking or jogging The Field, the two recommended overlooks could be sources of rest and relaxation.
3. Appropriate landscaping including trees, shrubs and native flowers
4. Benches should be included.

SOUTHEAST QUADRANT

Overlook

1. Since this area is currently elevated above sidewalk area, it would allow visitor a place to stop and enjoy the view of the Continental Divide and The Field.
2. For those walking or jogging The Field, the two recommended overlooks could be sources of rest and relaxation.
3. Benches and landscaping should be included.

Primitive Picnic Area

1. Scattered picnic tables.
2. Native grasses would also be located in this area.
3. Provides a resting area for those visiting the Recreation Center/Senior Center.

BRUNNER RESERVOIR

Brunner Reservoir Enhancement

1. Please note-Before any improvements are made to the reservoir, the dam would first need to be reconstructed.
2. Additional, and appropriate, native plant material should be planted in the area, including trees, thickets of shrubs and aquatic plants to improve wildlife habitat.
3. The Colorado Division of Wildlife (D.O.W.) should be consulted to create the fishery and enhance the waterfowl habitat of the site.
4. D.O.W.s "Fish Is Fun" program provides funds for fishery enhancement and could be a good partnership for Broomfield during that phase of work.
5. Fishing at Brunner Reservoir would be open to kids only -- anyone under the age of 16 years old -- as defined by D.O.W. Adults would be permitted to be with their children and to help cast a line, but would not be

permitted to fish.

Developed Picnic Area

1. The area south of Brunner Reservoir would be a good site for a developed picnic area because of the surrounding recreational uses.
2. A group picnic shelter could be used by families, organized groups, and environmental education programs.

PRIORITY RECOMMENDATIONS

HIGH PRIORITY (alphabetical order)

1. Conversion of farmed fields to native grasses and wildflowers
2. Contouring landscape in Southwest Quadrant
3. Expanding wetland in Northeast Quadrant
4. Open Space signs (5)
5. Trail construction

MEDIUM PRIORITY (alphabetical order)

1. Construct overlooks (2)
2. Esthetic improvements to Farm House
3. Plant arboretum trees and shrubs
4. Underpass #1

LOWER PRIORITY (alphabetical order)

1. Brunner Reservoir
2. Picnic Areas (both primitive and developed)
3. Underpass #2

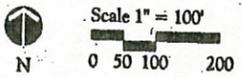
NEED TO BE ADDRESS BY ANOTHER COMMITTEE

1. Farm House Site
2. Developed Picnic Area



LEGEND

-  BOARDWALK
-  PAVED PATHWAY
-  SOFT SURFACE PATHWAY
-  TREES AND SHRUBS



OPEN SPACE AND TRAILS ADVISORY
 COMMITTEE RECOMMENDED PLAN
 THE FIELD/ BRUNNER RESERVOIR
 MASTER PLAN

The City of Broomfield

DATE: MARCH 16, 2000

WINSTON ASSOCIATES INC.
 LANDSCAPE ARCHITECTURE URBAN DESIGN
 2299 Pearl Street, Suite 100 Boulder, CO 80502

Appendix III

Photos of the Southwest Quadrant of The Field Open Space

Oct 15, 2024



Photo 1: SW corner looking NE



Photo 2: NW corner looking SE



Photo 3: NE corner looking SW



Photo 4: SE Corner looking NW