

## **Prairie Dog Barriers: An Overview**

Prepared by Pam Wanek

The use of barriers for non-lethal control of prairie dogs has been at the forefront of best management practices for at least two decades. Non-lethal control is a paradigm shift towards stressing co-existence with wildlife rather than extermination. For over 100 years humans have relied on the use of highly toxic chemicals to indiscriminately resolve wildlife conflicts. These toxicants come with risks to humans, the environment, and non-target wildlife, and most are considered inhumane. Their economic sustainability is also questionable, particularly where taxpayers are seeking alternatives that humanely manage wildlife through habitat modification rather than repeated extermination of animals.

We offer suggestions for barriers, but this document is not exhaustive. When selecting barriers, it is important to consider the specific site, costs, and maintenance. Environmental factors such as wind, the water table, and soil composition are also important. The occupancy history of the site is relevant because the longer prairie dogs have occupied an area, the more extensive their tunnel systems. More established tunnel systems may be difficult to block off, impacting where barriers should be placed (for example away from tunnels instead of splitting tunnels). In general, barriers to exclude prairie dogs are installed after prairie dogs are removed from a conflict zone. But in some cases, barriers can be installed in conjunction with other relocation methodologies such as active relocations. Barriers, like most outdoor installations, require maintenance, and many are not 100% effective; however the type of barrier and installation techniques can reduce maintenance and increase efficacy.

Aesthetics, multi-functionality, and zoning regulations are also important to consider. For example, existing fencing around a yard containing livestock or pets could potentially be modified to exclude prairie dogs. Barriers in urban areas are generally subject to more stringent regulations related to aesthetics. Rural areas may be less strict.

There are two types of barriers; physical and vegetative. Physical barriers are generally comprised of manmade fencing: masonry walls, metal, rock, PVC, or vinyl, for example. Tests of physical barriers suggest that they should stand at least 3 feet tall, be opaque, and include deterrents that discourage prairie dogs from climbing over or digging underneath the barrier. Prairie dogs are not necessarily inclined to climb, but they are great diggers, so light should not be allowed to penetrate underneath the barrier in order to discourage digging.

Creating an effective vegetative barrier requires a review of plant opaqueness, density, and whether the foliage is evergreen or deciduous; potentially using plants that are odiferous; and analyzing watering needs. The best vegetative barriers are opaque, dense, diverse plantings adapted to local conditions; contact the local county extension office for plants that are adapted to your community.

Vegetative barriers may include trees, shrubs, mid- to tall-height grasses, various forbs (flowering plants), or a combination. All vegetative barriers should include a heterogeneous variety of plants as protection against single species plant diseases and to ensure multi-season effectiveness. Some hardy shrubs to consider: dwarf and tall rabbitbrush, big western sage, four-wing salt brush, three-leaf sumac, spirea, and juniper varieties. Shrub planting width is dependent on the species selected but generally 10- to 20-foot wide dense swaths are adequate if there is good plant composition.

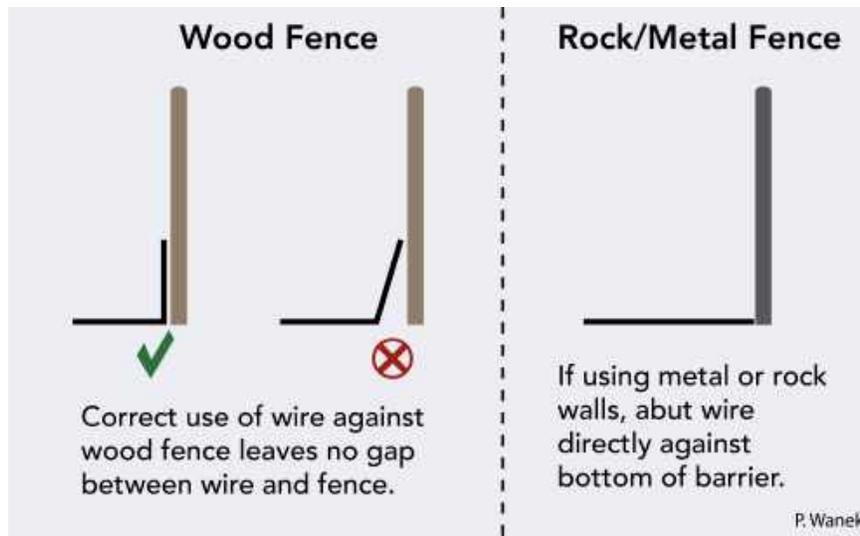
Grassy barriers should include an assortment of cool and warm season species where growth patterns vary over spring, summer, and fall seasons. Suggested width is 200 to 300 feet.

Finally, combining vegetative with physical barriers can be aesthetically pleasing and may increase the efficacy of both barrier types.

## Physical Barriers

### 1. Skirting

Skirting is used to fortify physical barriers. Skirting inhibits prairie dogs from tunneling underneath or chewing directly through barriers. The application involves butting 4- to 5-foot-wide one-inch poultry (chicken) wire against the barrier horizontally with a one-foot lip that extends vertically against the barrier. The one foot vertical lip should be attached to the barrier, typically using a staple gun. Skirting should be adequately tacked down to the soil to discourage prairie dogs from tunneling under the wire; usually 6-inch sod staples suffice. Install pins in a zig-zag pattern, roughly 6- to 8-inches apart, along the edge of the poultry wire. Stagger another row of pins at roughly one-foot increments along the midline of the skirt parallel to the fence. In some applications, laying 6- to 8-inch diameter rock cobble or riprap on top of the skirting will help with aesthetics and fortify the skirt.



**A note about trenching:** trenching involves partially burying barriers in the ground. This technique provides a solid seal along the bottom of the barrier and adds strength to certain selected barrier materials. Trenching also has faults, as it creates a soft soil line and an opportunity for soil erosion along the barrier, which creates conditions where prairie dogs can easily dig. There have been quite a few situations where skirting was necessary to fix trenching problems.

It is important to understand that prairie dog tunnels can be very deep below the soil surface and that trenching will not necessarily resolve all problems with barrier breaching. Tunnel depth is variable and probably contingent upon: water tables, soil porosity, climate, and other factors. Some studies have suggested tunnels may go as deep as 16 feet, but they probably average around 3 to 6 feet below the soil surface. In some cases, trenching 3 to 6 inches is beneficial for a good seal but will not block all tunneling under the barrier and in other instances barriers have been trenched more than 2 feet underground and were still not 100% effective.

The point here is that trenching is not always necessary for prairie dog barriers and in some cases may needlessly drive up barrier construction costs. The choice of barriers is site specific and pros and cons of each application should be reviewed based on site conditions.

## 2. Metal Barriers



*Metal barrier at park separates human and prairie dog activities.*

Metal barriers are made from metal sheeting (for example Pro-panel) and are typically trenched 2 to 4 feet underground.

**Pros:** The slick surface is difficult for prairie dogs to climb. Metal is a strong material, significantly decreasing maintenance costs over long periods of time. These barriers create an opaque visual deterrent both from the horizon and beneath the barrier (no light penetration). It can withstand high winds, hail, flooding, and heavy snow loads. The metal is factory painted and offered in a variety of colors that resist color fade and chipping.

**Cons:** Requires some experience for installation and there may be few or no experienced contractors in your area. Materials may be difficult to find. Repair is expensive (for example, if damaged with landscape or snow removal equipment). Can prevent water drainage. Requires trenching. Soil erosion next to barrier can create gaps, allowing prairie dogs to circumvent the barrier by unearthing soft dirt caused by trenching. Gaps can be filled in with sand and skirting installed if needed.



*Non-prairie dog side of metal barrier.*



*Prairie dog side of barrier. Note safe caps on metal posts and elongated cap along top of metal fencing.*



*Self-closing swing gate for pedestrians (springs on each side of gate). Metal culvert pipe at threshold blocks light.*



*Gate for vehicle access. Culvert pipe blocks light.*

### 3. Fencing

Many types of fencing with modifications such as skirting can work well as prairie dog barriers.



*PVC fence*



*Rock wall*



*Wood fence*

**Wood fence:** commonly used for many yards. With modifications, wood fencing will work quite well for prairie dog exclusion. In one application (Figures A-D, below) a wood fence was installed to exclude prairie dogs from a large townhouse project that was built adjacent to a prairie dog colony. When the property added turf grass, prairie dogs were interested in taking up residency. After removing the prairie dogs using non-lethal passive relocation techniques, privacy fence was installed with skirting.

**Pros:** Contractors and materials are easy to find. Wood fence is more likely to be accepted by city or county code and be more aesthetically pleasing. Does not require trenching; wood fence should not be buried. If there are breaches by prairie dogs, single slats can be removed to encourage prairie dogs to move to the correct side of barrier. Incorporating cobble at the bottom of the fence will help with water drainage and fortifies a light-free bottom seam.

**Cons:** Wood can rot over time. Prairie dogs can chew through the bottom of the fence; however, this can be discouraged by attaching skirting. Too much light can show through bottom of the fence, especially where the fence does not align with contour of land.



A. Townhomes next to colony (prairie dog side).



B. Non-prairie dog side.



C. Skirting attached to prairie dog side of fence.



D. Long view.

**Wood fences with gates:** to inhibit light when the gate is closed, add 6-inch metal culvert pipe at the threshold and a vertical lip wood piece on gate.



Overlay board at edge of gate so when closed there is no light penetration.



Add 6-inch diameter steel culvert pipe to seal bottom of gate. Note chicken wire abutting culvert pipe on prairie dog side of barrier to discourage digging under the pipe.

**Large wood gates for heavy equipment access:** the choice of large gates for heavy vehicle access can make a big difference for prairie dog exclusion. Swing gates are easier to modify than those that slide into a pocket mechanism.

This swing gate was modified in three ways:



1. Buried 6" diameter culvert pipe;
2. Welded strip of metal at the bottom of metal gate frame (used as a light and physical barrier);
3. Skirting installed against threshold.

**Wide-spaced vertical wood slat fence with modifications:** prairie dogs circumvented wide slat openings into an incompatible area. After prairie dogs were passively relocated, the fence was modified by tacking black silt fence directly to the wood fence and then adding chicken wire skirting against the silt fence.

*Note: this is not a permanent solution but was used given limited funds and unknown future land use.*



*Existing fence before modifications.*



*Modified to exclude prairie dogs by adding black silt fence and skirting.*



*Exclusion area no longer prairie dog occupied.*

#### 4. Vinyl Barriers

Vinyl barriers were one of the first approaches used for prairie dog exclusion. The material is tough woven opaque vinyl that withstands weather for long periods of time if properly installed. It is commonly sold by Reef Industries in Texas. There are two heights, 36” or 42” (for trenching) with grommets positioned at 3-foot intervals along the top and bottom of the barrier. The barrier is sold in 300’ length rolls.

##### Example 1: Long-term construction project using a temporary vinyl

Vinyl was trenched into the ground and held up by T-posts and smooth wire running through the top grommets. This project involved using non-lethal passive relocation methods to move prairie dogs out of the way of a large concrete path and trail installation. Once the project was completed, the barrier was removed.



*Temporary vinyl barrier used during construction project.*

##### Example 2: Application of vinyl barrier to chain-link fence

On the prairie dog side of fence, use 5-foot wide one-inch netting poultry wire, Attach one foot of wire vertically to the chain-link and anchor remaining 4 feet to the ground using 6-inch sod pins. Using 36” wide vinyl barrier, attach top grommets to fence with clips or use smooth wire to weave grommets into fence links. Anchor bottom grommets by inserting two 11-inch edging pins per grommet into the ground.



*Prairie dogs non-lethally removed from developed park (non-prairie dog side).*



*Modified existing chain-link fence to inhibit movement back into park (prairie dog side).*

### Example 3: Vinyl barrier attached to T-posts

T-post and single strand wire (inserted through grommets to hold up the vinyl barrier) can sag without proper supports. Wooden “H” brackets are recommended every 100 feet to help with retightening (use as pull posts with wire tightener).

The illustration below has at least two flaws:

1. A slack line may cause too much wind pressure causing metal grommets to rip.
2. There is no protection along the bottom of the barrier to inhibit prairie dogs from chewing directly through the barrier or digging underneath.



*Flawed vinyl barrier installation.*

### Example 4: Post and rail with vinyl

This multifunctional fence is used in many situations (parks, open space trails, fences along residential homes, and for containment of domestic pets) and can be modified to exclude prairie dogs. Using wood rails as both structure and to attach grommets (with a screw and washer) creates a good long-term barrier for prairie dogs. However, there are a few problems with this particular application (see below).



*Non-prairie dog side*



*Screw and washer through grommet*

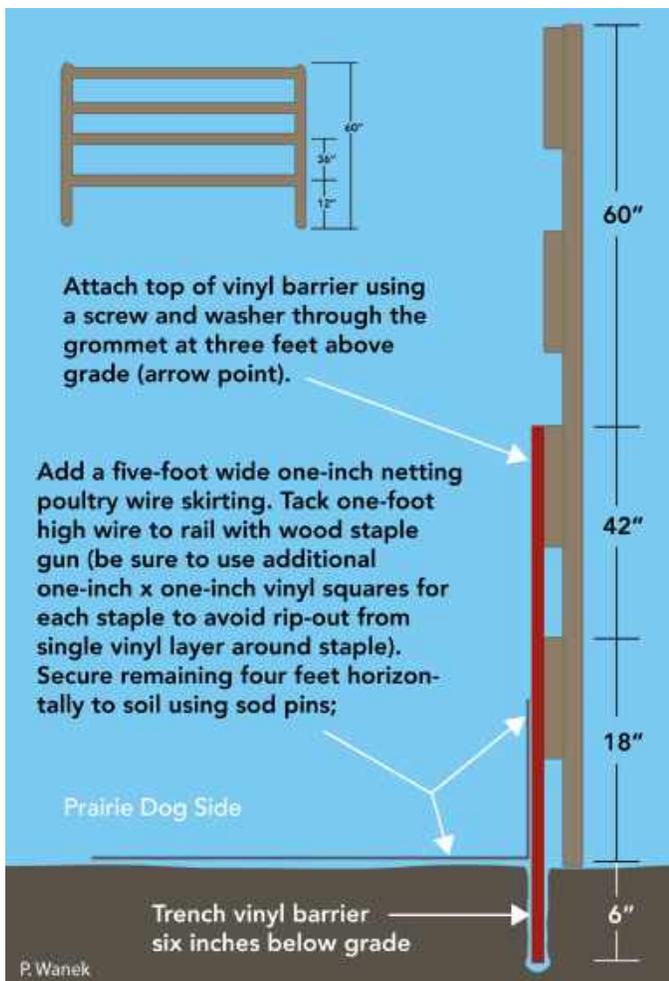
## What's wrong with this barrier?



Prairie dog side

1. The vinyl barrier is not tall enough to act as a visual deterrent (see black arrow indicating gap). Barrier height should be at least 3 feet.
2. Vertical skirting on prairie dog side of barrier is too tall; prairie dogs can grip and climb over the barrier.
3. There is no horizontal skirt on the ground to discourage digging under the barrier.

## Example 5: Modified livestock fence



5-foot high wood rail fence. Two options to secure vinyl: 1) Trench vinyl barrier 6-inches below grade (use 42-inch width vinyl so 36-inch will stand above grade); or 2) Use 36-inch wide vinyl and attach vinyl bottom into the ground using two 11-inch landscape edging pins per grommet.

**Example 6: Vinyl barrier backed with 4-foot-tall 2-inch by 1-inch welded wire**

A 42-inch-wide vinyl barrier was trenched 6” into the ground and attached to 2-inch by 1-inch by 4-foot-tall welded wire for structural support (attached to 5-foot T-posts every 10 to 15 feet). There is also 4- to 5-foot wide one-inch netting poultry skirting installed on the prairie dog side. Poultry wire was held up vertically by thin-gauge wire inserted through the vinyl and attached to the T-post.



*Prairie dog side*



*Non-prairie dog side*

**5. Silt Fence**

Silt fence is commonly used to control erosion on construction sites and is useful for short-term exclusion of prairie dogs. The fabric is 3 feet wide and pre-attached with staples to 3.5-foot-tall stakes at 10-foot intervals. The stakes protrude about 6 inches along the bottom of the fence for pounding into the soil. Silt fence is sold in 100’ lengths. DOT-grade silt fence should be used, as the stakes are stronger than cheaper grades.

There are pros and cons to silt fence and opportunities for modifications. Advantages: the fence is easy to find in most hardware stores and installation is not too difficult. Disadvantages: wind can rip the fabric out of the staples and over long periods of time prairie dogs may try to chew through the barrier. The modifications shown in the photos below will help with longevity.



*Silt fence with stakes and staples exposed.*



*Modification: twist fabric around stake for longevity.*



*Prairie dogs have chewed through the fence.*



*Modification: Using 2 foot-wide one-inch netting poultry wire, lip one foot vertically and use a staple gun to attach to wood posts. Anchor horizontal piece to ground with 6-inch pins.*

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*Silt fence used in large field.*



*Silt fence used for pending construction.*

## 6. Wood Slat Snow Fence

This fencing is commonly used for wind and snow breaks along highways and in conjunction with vegetation rows to aid in their establishment. As the name implies, it catches snow and captures moisture while breaking harsh winds, making it useful for inter-planting vegetation and vegetative windbreak rows. Fence segments are usually 4 feet high by 50 feet long with wood slats spaced about 1.5 inches apart, woven together by very strong wire.

**Pros:** Easy installation with 5-foot T-post (attach to post by intertwined wire on wire, not wood slat). Relatively easy to find. Because of the slats, there is a breezeway. Slats create a partial visual barrier and protects plants. Useful as a semi-opaque visual deterrent and could be used in conjunction with establishing vegetation barriers. This barrier should not be trenched.

**Cons:** Slat spacing may not be adequate for full visual deterrence. Prairie dogs could chew through bottom slats or between slats.

The area pictured below needed a temporary fence that could withstand winds. To prevent prairie dogs from breaching the fence, poultry wire skirting was added with an unsecured one-foot “flop” at the top edge to discourage prairie dogs from climbing over.



*Prairie dog side*



*Non-prairie dog side*

## 7. Straw Bale Barrier



Straw bales may be effective in limited situations. Pictured below are large bales that are 7' long by 4' tall. Advantage: the bales provide an immediate visual obstruction. Disadvantages: the bales are held together with nylon twine that degrades, causing the bales to quickly fall apart; prairie dogs can climb or dig through bales; and they can create a mouse haven. Avoid near residential areas.

*Straw bales along prairie dog side of fencing.*

## 8. Other Manmade Barriers



**Example 1: Recycled mining conveyer belts.** Used against a horse arena fence, this barrier provides a good visual and physical deterrent. Arena kick boards could also be effective.



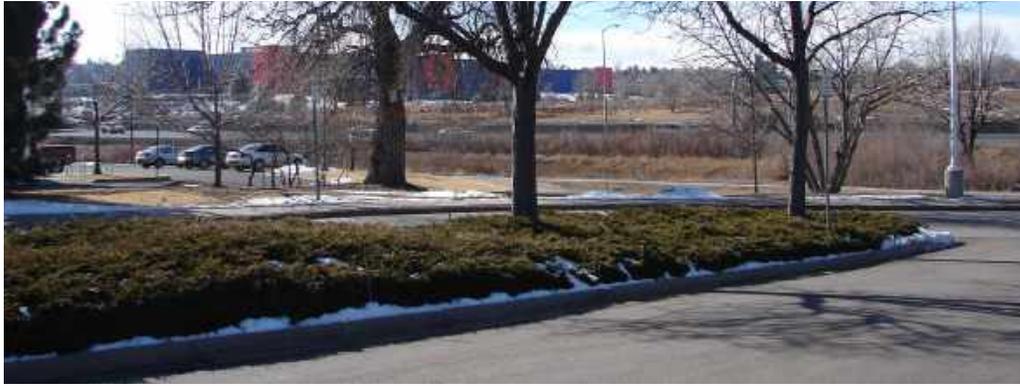
**Example 2: Electric weave fence.** Does not create a visual deterrent but will deter prairie dogs should they come against the fence. It is easy to install and is charged by solar power.

## 9. Landscaping with Hardscape Materials to Exclude Prairie Dogs

Materials such as concrete, pavement, pavers, and rock are effective in impeding prairie dogs from digging. Use in medians, next to pedestrian paths, next to building foundations, or to protect developed parks



## 10. Vegetative Barriers



*Juniper shrubs create a low dense mat uncomfortable for prairie dogs and can be used as low-maintenance plantings next to buildings and inside medians with other plantings.*

**Windbreak rows and bushy living barriers** provide a good option to inhibit prairie dog movement especially for large landscapes.



*Shrub row: includes tall green rabbitbrush, three-leaf sumac and mountain mahogany (*Cercocarpus ledifolius*).*



*Windbreak rows with a combination of evergreen trees (Rocky Mountain Juniper, Colorado Spruce, fir) on large open areas.*



*Grassy vegetation comprised of cool and warm season grasses with varying heights. (Photo: City of Boulder)*

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*Mixing forb species (such as sunflowers and Rocky Mountain bee plant (prairie dogs have a tendency to avoid both forb species)) with grasses increases plant diversity and lengthens the seasonal effectiveness of the vegetation barrier.*



*Using electric fence to prevent cattle grazing works well to create a vegetation buffer. (Photo: J. Proctor)*

Manipulation of vegetation can direct prairie dog expansion and contraction. During high precipitation years, when grasses and plants grow well, prairie dog colonies contract. Drought conditions create the opposite situation, causing prairie dog colonies to expand. If prairie dogs are not desired in an area, avoid clearing shrubs and mowing, at least through late spring and/or early summer (when the highest rate of prairie dog dispersal is likely to occur, depending on prairie dog species)



*In areas where prairie dog expansion is desired, controlled burns, increased livestock grazing, and mowing are effective in creating inviting habitat. (Photo: National Park Service)*

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City and county vegetation/weed ordinances should consider leniency on private lots next to occupied prairie dog sites. Overly stringent vegetation regulations could encourage prairie dog occupancy in conflict areas.

On landscapes where prairie dogs are allowed to exist in more natural areas, some managers deliberately reduce vegetation height to encourage expansion of prairie dog populations. Depending upon the type of vegetation involved, mowing in new areas where occupancy is desired and avoidance of mowing where prairie dogs are less desired can shift populations on the landscape over time.

A variety of plants can be effective deterrents. Use softscapes in large groupings or to soften a physical barrier. As with any vegetation component, incorporate varieties for interest and protection against single-species disease.

**Table 1.** Examples of plants that can be used in vegetative barriers.

Common name	Latin name	Height	Width	H <sub>2</sub> O needs*	Native/ Introduced	Plant type
Giant sacatoon	<i>Sporobolus wrightii</i>	3-6'	3-6'	XXX	Native	Warm
Switchgrass	<i>Panicum virgatum</i>	3-5'	18-24"	X	Native	Warm
Wheatgrasses	<i>Multiple varieties</i>	2'-4'		X-XX	Mixed	Cool grass
Juniper	<i>Multiple varieties</i>			XX-XXX	Mixed	Shrub-tree
Three-leaf sumac	<i>Rhus trilobata</i>	3-6'	3-6'	XXX	Native	Shrub
Gro-low sumac	<i>Rhus aromatica</i>	2-3'	6-8'	XXX	Mixed	Shrub
Big western sage	<i>Artemisia tridentata</i>	3'	3'	XXX	Native	Shrub
Four-winged salt brush	<i>Atriplex canescens</i>	3'	3'	XXX	Native	Shrub
Curl-leaf Mountain mahogany	<i>Cercocarpus ledifolius</i>	3'	6'	XX	Native	Shrub
Spirea	<i>Multiple varieties</i>	3'	3-5'	XX	Mixed	Shrub
New Mexico privet	<i>Forestiera pubescens</i>	8-12'	6-8'	XXX	Native	Shrub
Golden currant	<i>Ribes aureum</i>	4-6'	4-6'	XX	Native	Shrub
Alpine currant	<i>Ribes alpinum</i>	3-4'	3-4'	XX	Introduced	Shrub
Wax currant	<i>Ribes cereum</i>	3-4'	3-4'	XX	Native	Shrub
Potentilla	<i>Potentilla stp.</i>	3'	3'	XX	Mixed	Shrub
Shrub roses	<i>Multiple varieties</i>	5'	5'	XX	Mixed	Shrub
Coyote willow (or other varieties)	<i>Salix exigua</i>	6-12'	4-8'	X	Native	Shrub
Tall rubber rabbitbrush	<i>Chrysothamnus nauseosus (blue or</i>	2-6'	2-6'	XXX	Native	Open shrub
Dwarf rubber rabbitbrush	<i>Chrysothamnus nauseosus nauseosus</i>	2'	2'	XXX	Native	Open shrub
Maximilian sunflower	<i>Helianthus</i>	2.5-9'		X-XX	Native	Forb
Rocky Mountain bee plant	<i>Cleome serrulata</i>	3'-4'		X-XX	Native	Forb

\*X=moist, XXX=very dry

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