

# **WEED MANAGEMENT AND REVETATION PLAN FOR**

## **WILDROOT SUBDIVISION**

### **1. Introduction**

Wildroot Subdivision is in Missoula County, Montana. The subdivision contains approximately 248 lots and is 106.57 acres in size. There are 226 single family lots, and 5 multifamily buildings with a total of 203 number of residences. There are several open spaces with a total area of 21.86 acres, see Figure 1 for more information. Park spaces, shown in Figure 1, total 7.78 acres. The management of the single family lots will be the responsibility of the respective owners. Until the lots are sold management will remain under the control of the developer, Pando Holdings. Park areas associated with the with subdivision will be dedicated to the City of Missoula, and the city parks department will assume responsibly for weed management. Until the City assumes ownership, weed management will remain under the control of the developer. Open spaces will be under the control of HOA, until the HOA is established, weeds in the open spaces will be managed by the developer. Funds needed to manage weeds in the open spaces will come from HOA dues. Fees for the HOA will be discussed in the Wildroot Subdivision Covenants, Conditions, and Restriction documents.

### **1.2 Current Condition and Organization of the Site**

The current site has an existing home, which will be removed prior to construction of the subdivision lots. This weed management plan pertains to the revegetation and management of the invasive weeds before, during, and after construction within the proposed subdivision. Locations of current invasive species present on site, and the planned subdivision layout and shown in Figure 1.

The Multi-family portion of the project is in the process of Construction, it is assumed that weeds found on other portions of the site were present before the site was disturbed by the construction process. Management practices, and revegetation efforts are outlined below in Sections 1.4 & 1.5 of this plan.

#### **Current Vegetation:**

The most prevalent invasive/ noxious species on site are Leafy Spurge & Knapweed, there are smaller areas of Dalmatian Toadflax, and there are a few instances of Houndstongue and Field Bindweed. Invasive grasses present onsite include Cheatgrass, and Bulbous Bluegrass, with some minor instances of Japanese Brome. Weeds are plentiful along the existing driveway but are not listed as noxious.

- Non-noxious weeds on site include Common Vetch, Pennycress, Wild Chamomile, Bird's-foot trefoil, and Mustard.
- Native Species present on site include, native wheat grasses and fescues, and native forbs including Silvery Lupine, Blue Flax, Yarrow, Arrowleaf Balsamroot, Pussytoes and Meadow Death Camas.

### **1.3 Management Plan Goals:**

#### Noxious Weed Management Goals:

Minimize weed populations and re-establish healthy plant communities. It is important to emphasize that the rehabilitation of any disturbed land is a long-term process, without quick fixes or simple prescriptions. The Missoula County Weed District is a great resource for the evaluation on any vegetation questions.

A combination of herbicide treatments, hand pulling, and mowing are recommended for the noxious weeds present on site. Where numbers are small, hand pulling can be used to control and even eliminate some species. Hand pulling weeds can be done in spring during the rainy season when the ground is soft, and herbicides are less effective. Hand pulling can be done throughout the summer, but the roots may be left behind and regrow. Mowing can be used to aid in the control of the spread of noxious species but will not eradicate any species as a standalone practice. Herbicides can be used to control large numbers of noxious weeds and may be needed to eliminate species with rhizomatous roots, or deep taproots where hand pulling can be less effective. Herbicides should be applied in summer or early to mid- fall.

See more on control options in section 1.4 Control Actions.

#### Revelation Goals:

Establish healthy and appropriate communities of vegetation that will minimize weed invasions after disturbance. Revegetation will be done using several grass mixes depending on location and use. Revegetation goals for this property include the following:

- Re-establish vegetation in disturbed areas as soon as possible to minimize erosion, decrease competition from weeds and improve survival of grasses.
- Restore healthy plant communities

### **1.4 Control Actions**

There are several actions that can be used in an integrated approach to weed management, and each must be considered on an area-by-area basis dependent

on the species to be managed, the soil/water characteristics of the site and intended use of the area. Implementation of any of these activities should be coordinated with the Missoula County Weed District.

## **FORBS**

### **1. Leafy Spurge, *Euphorbia virgata*:**

Hand Pulling: Hand pulling is not an effective method of control for leafy spurge because of its extensive root system. Even seedlings that are a few weeks old have vegetative buds capable of producing new shoots when disturbed by pulling.

Mowing: Mowing is not an effective method of control for leafy spurge.

Herbicides: Tordon was recommended as the primary herbicide to provide effective control of leafy spurge. The following table lists the rate and pertinent comments regarding broadcast application. Always consult labels and read them carefully to ensure correct species/land management usage and chemical application.

#### **Herbicides for Leafy Spurge, *Euphorbia virgata***

Trade Name	Active Ingredient	Rate	Efficacy	Comments
E2	2,4-d, Fluroxypyr, Dicamba	2-5 pints per acre	Most effective when timed between full leaf (spring) and dormancy (fall)	Do not apply directly to water or to areas where surface water is present. Avoid drift of spray mist to any area containing vegetables, flowers, ornamental plants, shrubs, trees and other desirable plants.

### **2. Spotted knapweed, *Centaurea stoebe***

Hand pulling: Hand pulling is an extremely effective method on small scale infestations of spotted knapweed. Pulling is easiest when soil is moist, allowing you to remove most of the taproot and kill the plant. Any stage from flowering on should be bagged and removed from the site to minimize seeds at the site.

Mowing: Mowing will help reduce seed production of spotted knapweed. however, repeated mowing will result in knapweed plants flowering and setting

seed below the blades of the mower. Mowing should occur during the bud stages but before flower to prevent cut plants from producing viable seed. Knapweed usually reaches full bloom in the first week of August; mowing from mid-July into early August is the most effective way to minimize seed production, which is critical in controlling knapweed.

Herbicide: There are a number of herbicides that provide effective control of spotted knapweed. The following herbicides are recommended for control of spotted knapweed. Always consult labels and read them carefully to ensure correct species/land management usage and chemical application.

#### **Herbicides for Spotted knapweed, *Centaurea stoebe***

Trade Name	Active Ingredient	Rate	Efficacy	Comments
Tordon 22k	Picloram	1 pint per acre	Most effective in actively growing plants, spring or fall	Cannot use near surface water, shallow ground water, landscaped areas and current or future vegetable gardens.
Milestone	Aminopyralid	4-7 oz. per acre	Most effective in actively growing plants, spring or fall	Can be applied to water's edge; cannot be used in landscaped areas and current or future vegetable gardens.
ForeFront	Aminopyralid +2,4-D	2 pints per acre	Most effective in actively growing plants, spring or fall	Can be applied to water's edge; cannot be used in landscaped areas and current or future vegetable gardens
Curtail	Clopyralid +2,4-D	2 quarts per acre	Most effective in rosette to bud stages	
2,4-D amine	2,4-D	2 quarts per acre	Least effective herbicide listed	

### **3. Dalmation Toadflax, *Linaria dalmatica***

Hand Pulling: Hand pulling may only be effective on extremely small infestations that have not yet established an extensive root system. For all other infestations, hand pulling is not an effective method of control.

Mowing: Due to the extensive root system, mowing is not a recommended method of control, though it will reduce seed production if repeated often enough to prevent flowering.

Herbicide: Herbicide treatments for Dalmatian toadflax are highly variable due to a thick, waxy covering on the leaves, creeping rhizomes and long-lived seeds. Timing of herbicide application may also play a large part in successful herbicide control. The herbicide chart on the back lists approved controls for Dalmatian toadflax. Always consult product labels and read them carefully to ensure correct species/land management usage and chemical application.

Trade Name	Active Ingredient	Rate	Efficacy	Comments
Telar	Chlorosulfuron	2-3 oz/acre	Apply to actively growing plants in bud or bloom stage	Foliar best on seedlings and saplings. Habitat is okay for riparian use. Though non-target species may be killed or injured through root transfer.
Plateau	Imazapic	8-12 Oz per acre	Apply in fall after a hard frost (top 25% of plant is necrotic)	Add methylated seed oil to mix. Note crop rotations
Banvel, Clarity, other	Dicamba	1-3 quart per acre	Apply in early spring before toadflax reaches bloom stage	Avoid drift to sensitive crops. Dicamba severely injures or kills most broadleaf plants. Repeated applications may be necessary.
Tordon, Grazon, Pathway	Picloram	1 pint per acre	Apply to growing toadflax in spring before full bloom or in late summer or fall	Do not apply to shallow groundwater areas. Avoid desirable broadleaf plants and diversified crop areas.

#### 4. Houndstongue, *Cynoglossum officinale*

Hand pulling: Hand pulling, especially with the aid of a shovel, can be a very effective method of control on patches of both rosettes and flowering houndstongue plants

at any time during the growing season. Pulled plants that are in or past the flowering stage should be placed in plastic bags and removed from the site to prevent seed dispersal.

Mowing: Mowing can be an effective method of control for bolting individuals if done before flower but will not affect rosettes of houndstongue.

Herbicide: The use of herbicides on houndstongue should focus on individuals that are in the rosette or bolting stages, as flowering individuals will already die at the end of the season (houndstongue is a biennial). The following herbicides are recommended for control of houndstongue. Always consult product labels and read them carefully to ensure correct species/land management usage and chemical application.

Trade Name	Active Ingredient	Rate	Efficacy	Comments
Escort	Metsulfuron	.5-1oz per acre	Most effective if applied at rosette to late bud stage	Cannot be used near wells, surface water, or shallow ground water
Telar	Chlorsulfuron	.5-1oz per acre	Most effective if applied at rosette to late bud stages	
2,4-D	2,4-D	2 quarts per acre	Most effective if applied at rosette stage	

##### 5. Field Bindweed, *Convolvulus arvensis*

Hand Pulling: Hand pulling is not an effective method of control for field bindweed because of its extensive, rhizomatous root system.

Mowing: Mowing may reduce the amount of seeds produced by the infestation, but usually grows below the level of most mower blades. Mowing is not an effective method of control for field bindweed.

Herbicide: The following herbicides are recommended for control of field bindweed. Though chemicals may temporarily suppress bindweed, other management approaches such as cultivation and re-vegetation with competitive plants are necessary. Always consult product labels and read them carefully to ensure correct species/land management usage and chemical application.

Trade Name	Active Ingredient	Rate	Efficacy	Comments

Telar	2,4-D	2-3 lbs per acre	Apply at bud growth or early August	For suppression apply at least once a year as broadcast. Avoid drift to sensitive crops
Perspective	Aminocyclopyrachlor + chlorosulfuron	1.8-3.2 oz/a Amino + 0.7-1.3 oz/a Chloro = 4.5-8 oz/a product	Apply in spring adjuvant, nonionic surfactant, or crop oil concentrate Invert emulsion > water	Avoid application within a distance equal to the tree height of sensitive species. Low rates can kill non target species.
Banvel, Clarity, other	Dicamba	0.5 – 2 lb per acre	Apply while plants are actively growing. Fall or late summer before killing frost	Refer to label for crop rotation recommendation. Avoid drift to sensitive crops.
Plateau	Imazapic	0.125-0.188 lb ai/a	Apply through fall and on actively growing plants	Add methylated seed oil for best application. Note crop rotations before using.
Escort	Metsulfuron	1-2 oz per acre	Apply while blooming in spring Nonionic surfactant will improve control	Use this rate only on non-crop sites due to risk of drift.
Tordon, Gazon, Pathway	Picloram	1 quart per acre	Best when used when there is 12 in of growth, Early bud/full bloom	Do not use near surface water, shallow ground water, landscaped areas, or future vegetable gardens
QuinPro Herbicide, others	Quinclorac	8 per acre	Apply in fall to actively growing bindweed, 4 inch long stems, and before first frost	Methylated seed oil recommended. Note crop restrictions before use.

## **GRASSES**

### **1. CHEATGRASS, *Bromus tectorum***

Hand Pulling: Hand pulling can be very effective on small scale infestations if the plants are removed and burned before seed set. Cheatgrass is an annual species that relies on its seed for dispersal. Its seeds do not persist for very long in the soil, so preventing plants from going to seed will allow you to deplete the seed bank.

Continued hand pulling is needed for multiple years to deplete the seed bank and eliminate small patches.

Mowing: Similar to hand pulling, mowing at the appropriate time will help prevent plants from producing seed and will allow you to deplete the seed bank. Mowing will allow you to control seed production over a larger area but will need to be carried out multiple times in the late spring/early summer depending on rainfall. Mowing when cheatgrass has begun to turn purple will not prevent seed production. Planting crop in late spring as part of a rotational crop system is the most effective control method for cheatgrass.

Herbicide: There are several herbicides that have worked well for cheatgrass, but also cause damage to desirable species. Care should be taken to prevent damage to desirable species by applying herbicide when they are dormant in the early spring or late summer/early fall. The following herbicides are recommended for control of cheatgrass. Always consult product labels and read them carefully to ensure correct species/land management usage and chemical application.

Trade Name	Active Ingredient	Rate	Efficacy	Comments
Plateau	Imazapic + glyphosate	16-20 oz per acre	Fall or Spring	Broad spectrum weed control for roadsides wildlife habitat and non-crop areas.
Plateau	Imazapic	8-12 oz per acre	Fall or Spring	Yearly treatments twice a year, all in one wetting agent shown to improve effectiveness. Broad-spectrum herbicide will cause harm to non-target. Reduces submerged and emergent leaves, do not apply to water with high turbidity.
Rimsulfuron 25DF, TranXit GTA 25DG Matrix, Titus	Rimsulfuron	3-4 oz/acre	Late fall on emerged seedlings	Labeled for roadsides and bare ground sites not for rangeland. Preemergence or early postemergence timing will control several grass and broadleaf species.
Oust 75DG, Spyder 75DG, SFM G-Pro 75EG	Sulfometuron methyl + chlorsulfuron	1-1.5 oz per acre	War/moist conditions following application accelerates herbicide activity	Noncrop situations only. Care should be exercised in the vicinity of desired plants. Has a 12 month grazing restriction.



Departure, Roundup Pro 4L, Roundup ProDry, + Others	Glyphosate	0.5-1 pint per acre	Early spring before native seedlings emerge. Narrow window	Glyphosate is nonselective and will kill any vegetation it encounters. Spray for uniform coverage, not for runoff.
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## 2. Bulbus Bluegrass, *Poa bulbosa*

Hand Pulling: Due to its shallow roots, hand pulling can control bulbous bluegrass; however, it is very difficult to remove all the basal bulbs.

Herbicide: There are several herbicides that can be used to effectively control bulbous bluegrass. Always consult product labels and read them carefully to ensure correct species/land management usage and chemical application. If there is a heavy infestation, it is important to re-seed after herbicide application.

Trade Name	Active Ingredient	Rate	Efficacy	Comments
Departure, Roundup Pro 4L, Roundup ProDry, Accord 4L, Gly-Flo, others	Glyphosate	0.33-1.0 qt product/acre	Post-emergence in early spring before the active growth of desired perennials	This is a non-selective herbicide with no soil activity. Ensure application prior to the growth of desired perennial species, as it will kill any actively growing plant.
Plateau 70DG, Panoramic 2SL, Impose 2L	Imazapic	4-12 oz product/acre	Pre-emergence or early emergence (fall to early spring)	Has long soil residual activity. Effectiveness can depend on soil texture and organic matter, with heavier soils requiring higher concentration. Efficacy is reduced with heavy litter and thick thatch on soil surface. In the case of post-emergent application, use a spray adjuvant.
Arsenal 2S, Arsenal	Imazapyr	2-3 pt product/acre	Pre-emergence or postemergence	This is a non-selective herbicide with long soil residual activity

Powerline 2L, others				
Rimsulfuron 25DF, TranXit GTA 25DG Matrix, Titus	Rimsulfuron	2-4 pt product/acre	Preemergence (fall) or postemergence (early spring)	If applying post-emergence, add a surfactant. Also controls some other annual grasses and broadleaf weeds. Application to irrigated perennial grasses can cause death. In cool climates it can have residual soil control.
	Sulfometuron	1 oz product/acre	Early post-emergence in spring	At high use this product will likely cause bare ground which can be used to revegetate. Lower rates are recommended for arid areas
	Sulfometuron + chlorsulfuron	0.75 oz product/acre	Pre-emergence in fall or spring (as soon as soil thaws)	At high use this product will likely cause bare ground which can be used to revegetate. Lower rates are recommended for arid areas.
Certainty 75WDG, Outrider 75WDG, Monitor, Maverick	Sulfosulfuron	0.75-2 oz product/acre	Early post-emergence (when bulbous bluegrass rapidly growing and desirable plants are dormant)	Use a non-ionic surfactant. Fairly safe to use on wheatgrasses and other perennial grasses. Can be applied sequentially leaving 21 days between application as long as annual use is not greater than 2.66 z/acre.

## 1.5 Revegetation

Appropriate Revegetation with Desired Species The establishment of healthy, use/type appropriate vegetation is the most effective way to minimize weed invasion in the long term. Revegetation will be done with the following mixes.

**\*Species listed below were selected for Multifamily Landscape Areas, species may be modified for use in subdivision areas.**

ROW seeding:

“Developed area mix” listed in city of Missoula parks and recreation design manual:

10 lbs/ acre drill seed or broadcast

50% Idaho Fescue (*Festuca idahoensis*) (12-24 in)

28% Sheep Fescue (*Festuca ovina*) (6-12 in)

10% Sandberg’s Bluegrass (*Poa secunda*) (12 in)

3% Blanket flower (*Gaillardia aristata*)

3% Fringed sage (*Artemesia frigida*)

3% Short penstemon (*Penstemon procerus*)

3% Hairy golden aster (*Heterotheca villosa*)

Recreation grass:

10 lbs/ acre- drill seed

35% Sheep Fescue (*Festuca ovina*) (6-12 in)

35% Sandberg’s Bluegrass (*Poa secunda*) (12 in)

10% Prairie June Grass (*Koeleria macrantha*) (10-18 in)

10 % Blue Grama (*Bouteloua gracilis*) (12 in)

Dryland grass:

“Drysite mix” listed city of missoula parks and recreation design manual:

10 lbs/ arce- drill seed-

38% Bluebunch Wheatgrass variety goldar (*Pesudoroegneria spicata*)

25% Western Wheatgrass (*Agropyron smithii*)

15% Idaho Fescue (*Festuca idahoensis*)

5% Prairie June Grass (*Koeleria macrantha*)

5% Sandberg’s Bluegrass (*Poa secunda*)

3% Blanket Flower (*Gaillardia aristata*)

3% Fringed Sage (*Artemesia frigida*)

3% Short Penstemon (*Penstemon procerus*)

3% Hairy Golden Aster (*Heterotheca villosa*)

Meadow grass:

8 lbs / acre- drill seed:

25% Indian Ricegrass-achnatherum (*Oryzopsis hymenoides*)

25% Idaho Fescue (*Festuca idahoensis*)

19% Sandberg's Bluegrass (*Poa sandbergii*)

21% Prairie June Grass (*Koeleria cristata*)

10% Blue flax (*Linum lewisii*)

Semi-wet grass:

15 lbs/ acre- broadcast:

30% Slender Wheatgrass (*Elymus trachycaulus*)

20 % Streambank Wheatgrass (*Elymus lanceolatus*)

10% Tufted Hairgrass (*Deschampsia cespitosa*)

40% Western Wheatgrass (*Agropyron smithii*)

FIGURE 1: Existing Conditions and Future Site Layout

