

WEED CONTROL PLAN

LIBERTY MINING, LLC

LIBERTY MINE, MESA COUNTY, COLORADO

INTRODUCTION

Liberty Mining, LLC has requested Souder, Miller & Associates (SMA) to prepare a Weed Control Plan for the planned opening of the Liberty Mine, formerly known as the South October Mine, located on Public Lands administered by the United States Bureau of Land Management (BLM). The Liberty Mine, will remain within the related previously disturbed areas.

The mine site is accessed by traveling 0.15 miles east of Gateway Canyon Resort on Highway 141, Gateway, Colorado. Turn right onto Mesa County Road 4.4 (John Brown Road) and travel south-southwest 5.98 miles to Mesa County Road Z 2.4. Turn left onto Z 2.4 County Road and travel east-southeast for 3.91 miles to the Liberty Mine access road. Turn left and proceed southeast for 0.51 mile to the reclaimed waste rock dump and mine portal.

The portal and waste rock dump are located in the NW $\frac{1}{4}$ of the SE $\frac{1}{4}$ of Section PB-40 (10), T50N, R19W, of the NMPM, Mesa County, Colorado. Liberty Mine Portal Location: Latitude 38° 36' 36.63" N, Longitude 108° 58' 4.06" W.

Compliance Statement

As defined by Mesa Count and State law (CRS 35-5.5), noxious weeds on the property will be controlled in areas disturbed by the development of the mine, access road, soil stockpiles, and other areas disturbed by activities related to the development of the mine.

1 NOXIOUS WEEDS IN MESA COUNTY

Noxious weeds are plants that are aggressive non-native competitors with native vegetation. They tend to spread quickly due to a lack of natural controls in the environment. Noxious weeds readily become established in disturbed areas and thus warrant intentional control efforts. The list of noxious weeds of concern adopted by Mesa County follows in Table 1. The State list of weeds to be eradicated state-wide follows in Table 2, including an assessment for the presence of the species in Mesa County.

Table 1. Mesa County Noxious Weed List

Weed	County Management Goal	Geographical Areas	State List	Seed Viability (years)
Bull thistle (<i>Cirsium vulgare</i>)	1) CONTAINMENT/SUPPRESSION 2) ERADICATION	1) Above 7,000 feet 2) Below 7,000 feet	B	5
Canada thistle (<i>Cirsium arvense</i>)	CONTAINMENT/SUPPRESSION	All of Mesa County	B	Up to 30
Dalmatian toadflax – broad leaf (<i>Linaria dalmatica</i>)	1) CONTAINMENT/SUPPRESSION* 2) ERADICATION*	1) Mormon Mesa, Big Creek 2) Elsewhere in Mesa County	B	10
Diffuse knapweed (<i>Centaurea diffusa</i>)	ERADICATION*	All of Mesa County	B	Unknown
Dyer's woad (<i>Isatis tinctoria</i>)	ERADICATION *	All of Mesa County	A	8
Goatshead/Puncturevine (<i>Tribulus terrestris</i>)	1) CONTAINMENT/SUPPRESSION 2) ERADICATION	1) Below 7,000 feet 2) Above 7,000 feet	C	5
Hoary cress/Whitetop (<i>Cardaria draba</i>)	CONTAINMENT/SUPPRESSION*	All of Mesa County	B	3
Houndstongue (<i>Cynoglossum officinale</i>)	1) CONTAINMENT/SUPPRESSION* 2) ERADICATION*	1) Above 7,000 feet	B	Unknown
Leafy spurge (<i>Euphorbia esula</i>)	ERADICATION*	All of Mesa County	B	At least 8
Musk thistle (<i>Carduus nutans</i>)	1) CONTAINMENT/SUPPRESSION 2) ERADICATION	1) Above 7,000 feet 2) Below 7,000 feet	B	At least 15
Oxeye daisy (<i>Chrysanthemum leucanthemum</i>)	1) CONTAINMENT/SUPPRESSION* 2) ERADICATION*	1) Above 7,000 feet in Eastern Mesa County 2) Below 7,000 feet	B	Up to 40
Plumeless thistle (<i>Carduus acanthoides</i>)	ERADICATION *	All of Mesa County	B	Unknown
Purple loosestrife (<i>Lythrum salicaria</i>)	ERADICATION *	All of Mesa County	A	At least 10
Russian knapweed (<i>Acroptilon repens</i>) (L)	CONTAINMENT/SUPPRESSION*	All of Mesa County	B	3-5
Scotch thistle (<i>Onopordum acanthium</i>)	1) CONTAINMENT/SUPPRESSION 2) ERADICATION	1) Above 6,000 feet	B	Unknown
Spotted knapweed (<i>Centaurea maculosa</i>)	ERADICATION *	All of Mesa County	B	At least 15
Tamarisk (<i>Tamarix parviflora</i> , <i>T. ramosissima</i>)	USE BIOCONTROL TO SUPPRESS POPULATIONS (not <u>mandatory</u> for control in Mesa County)	All of Mesa County	B	Less than 1
Yellow starthistle (<i>Centaurea solstitialis</i>)	ERADICATION *	All of Mesa County	A	At least 10
Yellow toadflax (<i>Linaria vulgaris</i>)	ERADICATION*	All of Mesa County	B	10

TABLE 2: STATE LISTED NOXIOUS WEEDS TO BE ERADICATED STATEWIDE

Weed	State List	Seed Viability (years)	Status in Mesa County
African rue (<i>Peganum harmala</i>)	A	Unknown	Not known to be present
Absinth wormwood (<i>Artemisia absinthium</i>)	B	Unknown	Present in low numbers
Black Henbane (<i>Hysocyamus niger</i>)	B	4	Unknown
Camelthorn (<i>Alhagi pseudalhagi</i>)	A	Several years	Not known to be present
Chinese clematis (<i>Clematis orientalis</i>)	B	Unknown	Present in low numbers along Colorado River near Palisade
Common crupina (<i>Crupina vulgaris</i>)	A	3	Not known to be present
Cypress spurge (<i>Euphorbia cyparissias</i>)	A	8	Relatively common in ornamental landscapes
Giant salvinia (<i>Salvinia molesta</i>) AQUATIC	A	Negligible	Not known to be present
Hydrilla (<i>Hydrilla verticillata</i>) AQUATIC	A	Unknown	Not known to be present
Meadow knapweed (<i>Centaurea pratensis</i>)	A	7	Not known to be present
Mediterranean sage (<i>Salvia aethiopis</i>)	A	Unknown	Not known to be present
Medusahead rye (<i>Taeniatherum caput-medusae</i>)	A	2	Not known to be present
Myrtle spurge (<i>Euphorbia myrsinites</i>)	A	8	Relatively common in ornamental landscapes
Orange hawkweed (<i>Hieracium aurantiacum</i>)	A	8	Not known to be present
Perennial pepperweed (<i>Lepidium latifolium</i>)	B	10+	Along Colorado River from Fruita to Loma; scattered patches isolated patches elsewhere
Rush skeletonweed (<i>Chondrilla juncea</i>)	A	3	Not known to be present
Sericea lespedeza (<i>Lespedeza cuneata</i>)	A	20	Not known to be present
Spurred anoda (<i>Anoda cristata</i>)	B	Unknown	Not known to be present
Squarrose knapweed (<i>Centaurea virgata</i>)	A	3	Not known to be present
Sulfur cinquefoil (<i>Potentilla recta</i>)	A	3+	Present north and south of Collbran; unknown if present elsewhere in county
Tansy ragwort (<i>Senecio jacobaea</i>)	A	16	Not known to be present

2 WEED CONTROL

2.1 PREVENTION OF NOXIOUS WEED INFESTATIONS

Prevention of noxious weed establishment is the most economical and practical approach to weed control. Several practices should be employed to prevent weed infestation.

- Prior to delivery to the site, clean equipment to prevent transfer of weed seeds from other locations;
- Passenger and maintenance vehicles should be regularly cleaned of soil;
- Avoid driving vehicles through existing weed infestations.
- Eradicating single plants or small patches of weeds as soon as possible prevents their spread.

2.2 INTEGRATED WEED MANAGEMENT

Best management practices as specified in the Mesa County Noxious Weed Management Plan will be followed where feasible including:

- Prevention
- Cultural Practices
- Mechanical Control
- Biological Control
- Chemical Control

2.3 TREATMENT AND CONTROL OF NOXIOUS WEED INFESTATIONS

Control methods are most effective when based on the each weed species and its life cycle. Recommended control methods for weeds expected at the project site are listed in Table 3 below.

TABLE 3: Weed Treatment Methods

Common Name* Scientific Name	Type*	Recommended Control Methods
Bull Thistle <i>Cirsium vulgare</i>	B	Best management includes cultural control combined with mechanical and/or chemical control techniques. Herbicide with the active ingredient glyphosate and 2,4- D is an effective herbicide to use to control and stop the spread of bull thistle.
Downy Brome <i>Bromus ectorum</i>	A	Herbicide application in fall and following spring followed by seeding with competitive grasses where infestations are heavy.
Field Bindweed <i>C'onvolvulus arvensis</i>	p	Systemic herbicide treatment (2-4-D, etc) applied repeatedly, along with repeated mechanical control.
Musk Thistle <i>Carduus nutans</i>	B	Tillage or hand grubbing in the rosette to pre-flowering stages. Repeated mowing at bolting or early flowering. Seed head and rosette weevils, leaf feeding beetles. Herbicides in rosette stage.

Russian Knapweed <i>Acroptilon</i> <i>(Centaurea) repens</i>	p	Herbicides are the only method known that provides good control results. Repeated pulling or digging may work for very small or new infestations, but must be done over a long period. Tillage, other than that necessary for seeding competitive plants, spreads small root pieces that can then sprout into new plants, resulting in a denser infestation.
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2.4 BEST MANAGEMENT PRACTICES

Construction and Soil Disturbing Activities

The following practices should be adopted to reduce the costs of noxious weed control and aid in prevention efforts. Any grading or soil disturbance in a project area will be done in a manner to minimize the spread of weed seeds or propagative parts to uninfested locations. The practices include:

- Prior to delivery to the site, equipment should be cleaned of soils remaining from previous construction sites which may be contaminated with noxious weeds.
- Top soil, where present, will be segregated from deeper soils and added to the existing top soil stockpile for later use as top soil during reclamation.
- Stockpiled soil from noxious weed infested areas and stored for more than 90 days on site must be treated to control noxious weeds as outlined in the Noxious Weed Management Plan.
- Stockpiled soil left more than one year shall be planted with a competitive, desirable species to prevent weed infestation and erosion until ready for use during reclamation.
- In all cases, temporary disturbance should be kept to a minimum.
- Equipment and materials handling should be done on previously disturbed established sites to reduce area and extent of soil compaction.
- If working in sites with weed-seed contaminated soil, equipment should be cleaned prior to moving to uncontaminated areas.

Herbicides: Annual and biennial weeds are best controlled at the pre-bud stage after germination or in the spring of the second year. The species identified are susceptible to commercially available herbicides. Selective herbicides are recommended to minimize damage to desirable grass.

Grazing: Grazing should be deferred, in reclaimed areas, until the desired grass species are established.

Mechanical: Many of the current infestations occur on disturbed surfaces that could be easily accessed and are relatively void of vegetation. Mechanical control with a hand tool (shovel etc.) is recommended during infestation stages while numbers are relatively low and visibility is good.

Bio-control Agents: Any form of biological control proposed is subject to prior approval by the surface landowner, US Bureau of Land Management. Biological control, such as releasing insects that affect growth or reproduction of weeds, can be used to control thistles and tamarisk in particular. There can be issues with insects damaging desirable species, however. Insects for bio-control can be obtained locally through the Palisade Insectary.

Musk thistle can also be controlled by insects. Two species, the thistle head weevil, *Rhinocyl!us conicus* and the rosette weevil, *Trichosiroca!us horridus*, have been used to control musk thistle in the southeastern U.S., but there is concern that the insects may affect native thistles and bio-control for thistle on the property is not recommended.

Monitoring

Monitoring of weed conditions on the site should be performed routinely during spring green up and continuing through the growing season. Infestations should be treated accordingly.