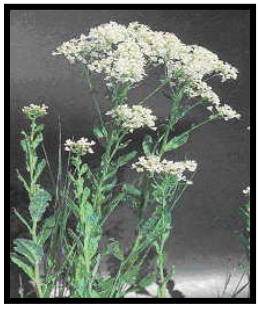
Twentymile Coal, LLC
Administrative Permit for Coal Exploration

Weed Management Plan






August 2024

Noxious Weed Management Program - Noxious weed infestations may occur on areas disturbed from site disturbance activities. In order to minimize potential adverse resource impacts that may result from noxious weed infestations; optimize revegetation success for the reclaimed areas; and fulfill sound land management objectives, Twentymile Coal, LLC (TC) will incorporate the following integrated noxious weed management program (weed program) from the approved CDRMS (Colorado Division of Reclamation, Mining, and Safety) permit.

TC's weed program is designed to effect full compliance with applicable provisions of CDRMS Rule 4.15.1(5), and was developed with reference to the Colorado Weed Management Act (CRS 35-5.5-115), the CDRMS's "Guideline for the Management of Noxious Weeds on Coal Mine Permit Areas", and in consultation with the local office of the Colorado State University Cooperative Extension Service (CSU-Extension Service, also the Routt County Weed Control agency). TC's weed program focuses on those noxious weed species listed by the Colorado Department of Agriculture, and will be modified, as appropriate to address any changes to this list. TC's integrated weed program consists of five interrelated components, as detailed in the following sections: Prevention, Identification and Mapping, Management Planning and Scheduling, Application of Selected Control Method(s), and Evaluation of Control Effectiveness.

Prevention **-** Prevention is the most important component of TC's weed program and includes the following items.

- Re-seed disturbed areas in a timely manner following site grading and soil material replacement using the methods outlined in Section 2.05.4, Reclamation Plan
- Develop and use seed mixtures which replicate native plant communities and encourage rapid vegetative reestablishment
- Plant only certified weed-free seed for the approved seed mixes
- Assess the need for any supplemental management measures. (ie: fertilization, reseeding, weed control, protection from wildlife, etc.) to assure effective vegetative reestablishment
- Wash off-road vehicles that are moving between different areas to minimize unintentional transport of noxious weed seed
- Minimize noxious weed propagation by treating any noxious weed infestations prior to seed-head maturation using mechanical, chemical, or biological controls, or a combination of these methods
- Monitor and evaluate weed control efforts on an annual basis as described in the following sections

Identification and Mapping **-** TC will utilize a range of resources to identify and map any noxious weed infestations within the TC Permit Area. Mine Environmental Staff is trained in noxious weed identification and, as a matter of practice, note any noxious weed occurrences observed any time they are in the field. In addition, Mine Environmental Staff, assisted by contracted weed management contactors, will conduct spring and fall Environmental Management surveys of active areas, specifically to assess the condition of mine drainage structures, identify any new noxious weed occurrences, assess the effectiveness of weed management activities, and note any other environmental concerns that may require attention. TC maintains a working weed program map and records both observed noxious weed occurrences (from all sources, by weed species, location, and extent of infestation) and treatment activities.

Management Planning and Scheduling **-** Effective management and planning are key elements in assuring the effectiveness of TC's noxious weed control program. Any new information collected through the ongoing noxious weed identification and mapping efforts, along with treatment information from prior years is reviewed and evaluated. Based on this information, treatment strategies and schedules are developed during the early spring for the annual weed management program using the following steps:

- For mapped weed infestations, treatment methods are determined based on the weed species present using recommendations provided by the CSU Extension Service. Selection of treatment method(s) takes into consideration proximity to flowing water or water bodies, croplands, any livestock use, and historical response of identified weed species to prior treatment(s), based on review of control effectiveness. Treatment methods may include mechanical controls (tillage, mowing, burning, cutting/pulling), chemical controls (selective herbicides), biological controls (weed-specific insects or pathogens), or combinations of these methods. In general, treatment method(s) will be selected to achieve the most effective control with the resources available. As an example, where multiple weed species are present, the most effective overall control(s) will be applied, although the method(s) may not be optimal for each individual species.

- Scheduling of weed management treatments will also be based on the CSU Extension Service recommendations for specific weed species. For most species, control effectiveness can be significant enhanced by scheduling treatment at specific stages of vegetative growth (typically spring and/or fall). To the extent possible, based on staff and contractor availability, treatment will be scheduled to optimize effectiveness.

- Priority and responsibilities for weed control are determined based on weed species present and the location and extent of weed infestations. Certain weed species are extremely aggressive, and first priority will be given to their control to prevent establishment and spread. Previously treated areas are second in priority, in order to maximize control effectiveness. Third in priority are any new weed infestations and areas where the weed infestation covers a large area, to prevent further spread. Lowest priority is given to isolated weed infestations of non-aggressive species which have not been previously treated, since these may be addressed by natural vegetative succession and pose a reduced risk of spread. Generally, grazing lessees are responsible for weed control on their lease areas, with TC sharing control costs and providing oversight, under the terms of the lease agreements. TC is responsible for weed control on remaining areas. All weed management activities (both TC and grazing lessee) follow the general priorities, as outlined above.

Designated Noxious Weeds – Below are lists identifying noxious weeds that are recognized by the County as well as the A and B listed species by the state of Colorado.

Table 1: Routt County Noxious Weed List w/ control requirements

	Species	Routt County	State	Seed Longevity (Years)
1	**Bighead knapweed**	**Eradication**	N/A	unknown
2	**Black henbane**	**Eradication**	Containment	4
3	Bulbous bluegrass	Containment	Suppression	2 to 3
4	Bull thistle	Containment	Containment	3
5	Canada thistle	Containment	Containment	20-22
6	Chamomile (Anthemis cotula andTripleurospermum inodorum)	Containment	Containment	15
7	Common mullein (*Verbascum thapsus*)	Containment	Suppression	90
8	**Common tansy**	**Eradication**	Containment	3
9	Curly dock (Rumex crispus)	Containment	N/A	50-80
10	Dalmatian toadflax *(Linaria dalmatica& L.genistifolia)*	Containment	Containment	10
11	**Diffuse knapweed (*Centaurea diffusa*)**	**Eradication**	Containment	5 to 10
12	Field Bindweed (*Convolvulus arvensis*)	Containment	Supression	20+
13	**Garlic mustard**	**Eradication**	Watchlist	10
14	**Hoary alyssum**	**Eradication**	Watchlist	9
15	Houndstongue *(Cynoglossum officinale)*	Containment	Containment	3
16	Leafy spurge (*Euphorbia esula*)	Containment	Containment	8
17	**Meadow knapweed (*Centaurea pratensis*)**	**Eradication**	Eradication	7
18	Musk thistle	Containment	Containment	14
19	**Myrtle spurge (*Euphorbia myrsinites*)**	**Eradication**	Eradication	8
20	**Orange hawkweed (*Hieracium aurantiacum*)**	**Eradication**	Eradication	8
21	Oxeye daisy	Containment	Containment	38
22	Russian knapweed *(Centaurea repens)*	Containment	Containment	3
23	**Scotch thistle**	**Eradication**	Containment	13
24	Spotted knapweed *(Centaurea maculosa)*	Containment	Containment	8
25	Sulfur cinquefoil	Containment	Containment	4
26	**Whitetop/Hoary cress (*Lepidium draba)***	**Eradication**	Containment	3
27	Yellow toadflax *(Linaria vulgaris)*	Containment	Containment	10
	***BOLD species indicated Eradication and highest priority species**			

Species listed above will take priority in TC weed management approaches. Per the "Colorado Noxious Weed Act" the designations of management by Routt County are defined as follows:

"Eradication"-reducing the reproductive success of a noxious weed species or specified noxious weed population in largely uninfested regions to zero and permanently eliminating the species or population within a specified period of time. Once all specified weed populations are eliminated or prevented from reproducing, intensive efforts continue until the existing seed bank is exhausted.

"Containment" – maintaining an intensively managed buffer zone that separates infested regions, where suppression activities prevail, from largely uninfested regions, where eradication activities prevail.

Colorado State Noxious Weed A Listings:

African rue (Peganum harmala)
Bohemian knotweed (Fallopia x bohemmicum)
Camelthorn (Alhagi pseudalhagi)
Common crupina (Crupina vulgaris)
Cypress spurge (Euphorbia cyparissias)
Dyer's woad (Isatis tinctoria)
Elongated mstard (Bassica elongate)
Flowering Rush (Butomus Umbellatus)
Giant knotweed (Fallopia sachalinensis)
Giant reed (Arundo donax)
Giant salvinia (Salvinia molesta)
Hairy willow-herb (Epilobium hirsutum)
Hydrilla (Hydrilla verticillata)
Japanese knotweed (Fallopia japonica)
Meadow knapweed (Centaurea pratensis)
Mediterranean sage (Salvia aethiopis)
Medusahead (Taeniatherum caput-medusae)
Myrtle spurge (Euphorbia myrsinites)
Orange Hawkweed (Hieracium aurantiacum)
Parrotfeather (Myriophyllum aquaticum)
Purple loosestrife (Lythrum salicaria)
Rush skeltonweed (Chondrilla juncea)
Squarrose knapweed (Centaurea virgata)
Tansy ragwort (Senecio jacobaea)
Yellow starthistle (Centaurea solstitialis)
Yellow flag iris (Iris pseudacoru)

Colorado State Noxious Weed B Listings:

Absinth wormwood (Artemisia absinthium)
Black henbane (Hyoscyamus niger)
Bouncingbet (Saponaria officinalis)
Bull thistle (Cirsium vulgare)
Canada thistle (Cirsium arvense)
Chinese clematis (Clematis orientalis)
Common Tansy (Tanacetum vulgare)
Common Teasel (Dipsacus fullonum)
Cutleaf teasel (Dipsacus laciniatus)
Dalmatian toadflax (Linaria dalmatica)
Dalmatian toadflax (Linaria genistifolia)
Dame's rocket (Hesperis matronalis)
Diffuse knapweed (Centaurea diffusa)
Eurasian watermilfoil (Myriophyllum spicatum)
Glossy Buckthorn (Rhamnus frangula)
Hoary cress (Cardaria draba)
Houndstongue (Cynoglossum officinale)
Leafy spurge (Euphorbia esula)
Mayweed chamomile (Anthemis cotula)
Moth mullein (Verbascum blattaria)
Musk thistle (Carduus nutans)
Oxeye daisy (Chrysanthemum leucanthemum)
Perennial pepperweed (Lepidium latifolium)
Plumeless thistle (Carduus acanthoides)
Russian knapweed (Acroptilon repens)
Russian olive (Elaeagnus angustifolia)
Salt cedar (Tamarix ramosissima)
Scentless chamomile (Matricaria perforata)
Scotch thistle (Onopordum acanthium)
Scotch thistle (Onopordum tauricum)
Spotted knapweed (Centaurea maculosa)
Sulfur cinquefoil (Potentilla recta)
Wild caraway (Carum carvi)
Yellow nutsedge (Cyperus esculentus)
Yellow toadflax (Linaria vulgaris)

***Application of Selected Control Method(s*) -** The following summarizes the proposed treatment methods for listed noxious weed species known to occur within the TC permit area. If treatment extends over a longer time period, or if control effectiveness is determined to be lower than anticipated, treatment methods or chemicals may be adjusted to improve long-term effectiveness. Approved or more effective chemicals for targeted weeds may change over time and these modifications will be incorporated, as appropriate.

TABLE 1 – CHEMICAL CONTROL METHODS

SPECIES	HERBICIDE	RATE	TIMING
Black henbane	2,4-D Amine/ Low Vol Ester 6 Banvel	½ pt./ac ½ pt./ac	Spring Fall
Bull thistle	2,4-D, Tordon Banvel	½ pt/ac ½ pt./ac	Spring* Fall
Canada thistle	2,4-D, Tordon Banvel Escort	½ pt/ac ½ pt./ac 2 oz./ac	Spring Fall Spring *
Common cockleburr	Grazon P&D 2,4,D	2 pt./ac ½ pt./ac	Spring*
Common mullein	Grazon P&D Escort 2 oz/A	4 pt./ac + surfactant**	Spring
Curly cup gum weed	Grazon P&D 2,4D LV 6	2 pt./ac 1 lb. /ac	Spring
Curly dock	Grazon P&D Tordon	2 pt./ac + surfactant**	Spring
Dalmatian toadflax	Tordon 2,4-D Escort	2 qt./ac 1 lb./ac + surfactant**	Spring
Field bindweed	2,4, D	1 lb./ac	Spring
Kochia	2,4-D	½ pt./ac	Spring
Leafy spurge	Tordon	2 qt./ac	Spring
Perennial pepperweed	Escort	2 oz./ac	Spring
Russian olive	Garlon 4	5%	Stump treatment spring
Russian thistle	2,4 D	½ pt./ac	Spring
Scotch thistle	2,4-D Tordon Banvel	½ pt./ac ½ pt./ac	Spring Fall
Tamarisk, Salt Cedar	Garlon 4	5%	Stump treatment
Yellow toadflax	Tordon 2,4-D	2 qt./ac 1 lb./ac + surfactant**	Spring
Whitetop, Hoary Cress	Escort 2,4-D	2 oz/ac ½ pt./ac	Spring
Bare ground treatment substations and explosive storage	Arsenal	20 lb/ac Pellets	Spring for total vegetation control per safety regulations.

SPOT TREATMENT MIXING (see label instructions for specific species)

- 1% Solution in 100 Gallons = 1 gallon of Chemical
- 1% Solution if 3 Gallons = 3.8 oz = 11.5 Tbsp = 114 ml
- 1% Solution in 1 Gallon = 1.3 oz = 4 Tbsp = 39 ml
- 2% solution in 1 Gallon = 2.5 oz. 8 Tbsp = 75 ml
- Escort package contains a measuring funnel. Use a ¼% mixture for spot spraying.

For mining impacted areas or significant weed infestations, TC utilizes a weed-control contractor to achieve overall control (typically over several years). Where control of extensive weed infestations results in limited vegetative cover or bare-ground, the affected area will either be inter-seeded or ripped and seeded, dependent on site-specific conditions. Certain areas where there may be a flammability hazard or where specific Mine Safety and Health Administration (MSHA) regulations apply may be treated with a long-lasting broad-spectrum herbicide such as Arsenal, Roundup, Sahara, or Throttle.

Surrounding rangeland is leased to graze livestock. Weed control on these lands are conducted and controlled by the lessee.

Evaluation of Control Effectiveness **-** Generally, in conjunction with the spring Environmental Management surveys, areas of previously identified and treated noxious weed infestations are inspected and the effectiveness of control measures is evaluated based on reduction or elimination of weed infestations. TC's grazing lessees and any weed-control contractors also provide similar information, based on their field observations. This information is utilized in the management planning process to determine the need for continued treatment and to modify treatment method(s), if indicated, to improve their effectiveness.

TC will provide Routt County Weed and Pest with documentation on weed control efforts and weed surveys conducted during the year by December 1st of that year. TC will also submit any significant changes to specific weed control plans (chemicals, rates, and timing) to the Routt County Weed Supervisor for review prior to weed control activities. TC will review Routt County's weed list annually and adapt any changes that may have been made over the prior year.