Great Western Operating Company, LLC
Weed Management Plan
Adams and Weld Counties

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1.0 INTRODUCTION

Great Western Operating Company, LLC (Great Western) currently has ongoing drilling, production, and reclamation operations in Adams and Weld Counties, Colorado. A weed management plan for this area will be managed in accordance with Colorado Oil and Gas Conservation Commission's (COGCC) Rules 1003.f. and 1004.e. According to COGCC Rule 1003.f, all disturbed areas shall be kept as free of all noxious weeds as practicable. All weed control measures will be conducted in accordance with the Colorado Noxious Weed Act (35-5.5).

Colorado Noxious Weed Act

The Colorado Noxious Weed Act (C.R.S. 35-5.5) describes a noxious weed "as an alien plant or parts of an alien plant that have been designated by rule as being noxious or has been declared a noxious weed by local advisory board" and meets one or more of the following criteria:

- Aggressively invades or is detrimental to economic crops or native plants:
- Is poisonous to livestock;
- Is a carrier of detrimental insects, diseases or parasites;
- The direct or indirect effect of the presence of this plant is detrimental to environmentally sound management of natural or agricultural ecosystems" (Colorado Noxious Weed Act, 35-5.5-103).

According the Noxious Weeds Act, management methods may include but are not limited to education, preventative measures, monitoring, biological control, chemical control, cultural control, mechanical control.

List A Species are uncommon noxious weeds that are found in Colorado in small populations (Colorado Noxious Weed Act 35-5.5-108; Table 1). Not all List A species are known to occur in Colorado but are found in surrounding states. Eradication is feasible for these species because current populations throughout the state are not extensive, allowing management practices to be effective if detected early. These species are mandated for eradication by the Colorado Noxious Weed Act (Doran et al. 2009).

List B Species include species designated by the Colorado commissioner of agriculture, whose continued spread should be stopped (Colorado Noxious Weed Act 35-5.5-108). List B species are found in different concentrations across the state (i.e. one portion of the state may require eradication while another might require containment) (Table 1).

List C Species are found throughout Colorado and are selected for recommended control measures (Table 1). Due to the widespread distribution of these weeds, "the goals of these programs will not be to stop the spread of these weed species but to provide additional educational, research and biological control resources to jurisdictions that choose to require management of list C species" (Doran et al. 2009).

2.0 WEED MANAGEMENT

Great Western is committed to controlling the spread of noxious weeds, as practicable, on lands where its drilling, production, and reclamation operations occur. If any List A species is discovered during an inspection, Great Western will utilize eradication methods to mitigate the noxious weeds found at the location. List B and C weeds will be controlled, as practicable, in the area of Great Western's drilling, production, and reclamation operations. Prevention of weed species will be a primary management option. If weeds become established, mowing or spraying of herbicides will be the preferred treatment methods (refer to Section 2.4).

The following goals have been identified in Great Western's Project Area: 1) prevent the spread of noxious weeds, 2) monitor and document noxious weeds pre-disturbance, and throughout the life of the project, 3) encourage native plant communities through reclamation of disturbed areas, and 4) treat any established noxious weed with approved and properly documented herbicides. Management strategies have been developed in order to help meet each goal.

2.1 PREVENTION

Preventing the spread of noxious and invasive weeds will be the most important component of weed management. Early detection will be encouraged through the reporting and prompt treatment of weed infestations, particularly List A species.

2.2 MONITORING

Monitoring of noxious weeds will occur on all development sites throughout the life of the project. This will contribute to prompt treatment of any new infestations, and will involve the following strategies:

- Noxious weeds will be documented on each project site prior to disturbance.
- Following ground-disturbance, noxious weed monitoring will be conducted at the frequency of the site's stormwater inspections. Monitoring may be conducted concurrently to treatment in areas where weed infestations are not significant.
- Invasive weeds will be documented when present in limited quantities. If large infestations occur, the extent of the population will be described during pre-disturbance surveys and monitoring.
- Following treatment, areas will be monitored the following year for the effectiveness of chemical or mechanical weed treatment. Depending on weed species, annual monitoring of treatment areas may be needed for the duration of the project.

2.3 RECLAMATION

Reclamation is an important component of weed management, as re-vegetation of disturbed areas with a native plant community will provide competition, and reduce the habitat available for early colonizers such as noxious weeds. The following best management practices will be employed:

- Reclamation activities will include certified weed free seed mixes, recommended or approved by COGCC, Natural Resource Conservation Service (NRCS) or surface owner.
- All materials used for reclamation (i.e. mulch, straw, etc.) should also be certified weed free.
- A reclamation plan will be referenced, which will detail strategies for interim and final reclamation.

2.4 TREATMENT

Noxious weeds will be treated promptly whenever they are located on a project site and in accordance with existing regulations and requirements. The treatment strategy will differ depending on the species, and the goals of treatment will vary depending on whether it is a List A, B, or C species.

- List A species will be treated promptly and eradicated whenever they are located. Chemical control will be the primary treatment method.

- List B and List C species will be treated whenever they are located, with the goal being control rather than eradication. Chemical and/or mechanical treatments may be used.

- Invasive species not listed as noxious will be monitored, and will be treated in areas where they are impeding reclamation. Chemical and/or mechanical treatments may be used.

- Chemical treatment refers to the use of Colorado Pesticide Applicator's Act – approved herbicides. Experienced certified herbicide applicators (licensed by Colorado Department of Agriculture) will be used or contracted for chemical treatment of weeds.

- Mechanical treatment refers to the use of mowing, trimming, dragging, tilling, or hand pulling weeds. Typically controls smaller infestations of some annual and biennial weed species. If timed properly, mowing can suppress seed production of some species.

- Biological control refers to the use of insects, bacteria, or other organisms specialized to kill or impede reproduction of weed species. This method will not be considered as an option unless requested by COGCC.

- Herbicide application best management practices:
    - Great Western retains licensed 3rd party contractors for the application of all herbicides.
    - Monitoring of treated areas will measure effectiveness of spray application. Reapplication may be needed in current or future years.
    - Labels would be followed precisely, and all chemicals will be stored appropriately.
    - Chemical application would be applied with the lowest recommended rates shown to be effective of controlling targeted species. A second application may be necessary.
    - Spot spraying would be used whenever possible. Broadcast spraying will only be used on large infestations where spot spraying would be ineffective.
    - All equipment will be monitored for leaks and fixed as quickly as possible.
    - Applicators will have spill kits while in the field.
    - All spills will be responded to immediately.

Table 1. List A, B and C noxious weeds listed by the state of Colorado.

	Common Name	**Scientific Name**
List A	African Rue	*Peganum harmala*
	Bohemian knotweed	*Fallopia x bohemicum*
	Camelthorn	*Alhagi maurorum*
	Common crupina	*Crupina vulgaris*
	Dyer's woad	*Isatis tinctoria*
	Elongated mustard	*Brassica elongata*
	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 x moncktonii*
	Mediterranean sage	*Salvia aethiopis*
	Medusahead	*Taeniatherum caput-medusae*
	Myrtle spurge	*Euphorbia myrsinites*
	Orange hawkweed	*Hieracium aurantiacum*
	Parrotfeather	*Myriophyllum aquaticum*
	Purple loosestrife	*Lythrum salicaria*
	Rush skeletonweed	*Chondrilla juncea*
	Squarrose knapweed	*Centaurea virgata*
	Tansy ragwort	*Senecio jacobaea*
	Yellow Starthistle	*Centaurea solstiltialis*
List B	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, broad-leaved	*Linaria dalmatica*
	Dalmatian toadflax, narrow-leaved	*Linaria genistifolia*
	Dame's rocket	*Hesperis matronalis*
	Diffuse knapweed	*Centaurea diffusa*
	Eurasian watermilfoil	*Myriophyllum spicatum*
	Hoary cress	*Lepidium draba*

	Houndstongue	*Cynoglossum officinale*
	Jointed goatgrass	*Aegilops cylindrica*
	Leafy spurge	*Euphorbia esula*
	Mayweed chamomile	*Anthemis cotula*
	Moth mullein	*Verbascum blattaria*
	Musk thistle	*Carduus nutans*
	Oxeye daisy	*Leucanthemum vulgare*
	Perennial pepperweed	*Lepidium latifolium*
	Plumeless thistle	*Carduus acanthoides*
	Russian knapweed	*Rhaponticum repens*
	Russian-olive	*Elaeagnus angustifolia*
	Salt cedar	*Tamarix. ramosissima*
	Salt cedar	*T. chinensis*
	Scentless chamomile	*Tripleurospermum inodorum*
	Scotch thistle	*Onopordum acanthium*
	Scotch thistle	*O. tauricum*
	Spotted knapweed	*Centaurea stoebe ssp. micranthos*
	Spotted x diffuse knapweed hybrid	*Centaurea x psammogena*
	Sulfur cinquefoil	*Potentilla recta*
	Wild caraway	*Carum carvi*
	Yellow nutsedge	*Cyperus esculentus*
	Yellow Toadflax	*Linaria vulgaris*
	Yellow x Dalmatian toadflax hybrid	*Linaria vulgaris x L. dalmatica*
List C	Bulbous bluegrass	*Poa bulbosa*
	Chicory	*Cichorium intybus*
	Common burdock	*Arctium minus*
	Common mullein	*Verbascum thapsus*
	Common St. Johnswort	*Hypericum perforatum*
	Downy brome, cheatgrass	*Bromus tectorum*
	Field bindweed	*Convolvulus arvensis*
	Halogeton	*Halogeton glomeratus*
	Johnsongrass	*Sorghum halepense*
	Perennial sowthistle	*Sonchus arvensis*
	Poison hemlock	*Conium maculatum*
	Puncturevine	*Tribulus terrestris*
	Quackgrass	*Elymus repens*
	Redstem filaree	*Erodium cicutarium*
	Velvetleaf	*Abutilon theophrasti*
	Wild proso millet	*Panicum miliaceum*

*****Data from Colorado Department of Agriculture

REFERENCES

Doran, A., S. Anthony, and C. Shelton. 2009. Noxious weeds of Colorado Tenth edition. Publisher: Colorado Weed Management Association.