



Weed Management Plan: Invicta 3-65-38 Pad

Location: Township 3 South, Range 65 West, 6th P.M.

Section 28: N/2

Invicta 3-65-28 Oil and Gas Application

City of Aurora

Energy & Environment Division

DA-2371-01

Case Number 2023-6050-01

WEED MANAGEMENT PLAN

A noxious weed survey will be conducted within the proposed drilling pad and access road areas. During the survey, common plant species and any noxious weeds observed will be noted.

NOXIOUS WEEDS

Noxious weeds are plants that are not native to an area and considered harmful to animals or the environment. Most noxious weed species in Colorado were introduced from Europe or Asia, either accidentally or as ornamental plants that have invaded an area. Once these non-natives are established in a new environment they tend to spread quickly because the insects, diseases, and animals that normally control them are absent. Noxious weeds are spread by man, animals, water, and wind. Prime locations for the establishment of noxious weeds include: roadsides, sites cleared for construction, areas that are overused by animals or humans, wetlands, and riparian corridors. Subsequent to soil disturbances, vegetation communities can be susceptible to infestations of invasive or exotic weed species. Vegetation removal and soil disturbance during construction can create optimal conditions for the establishment of invasive non-native species. Construction equipment traveling from weed infested areas into weed-free areas could disperse noxious or invasive weed seeds and propagates, resulting in the establishment of these weeds in previously weed-free areas.

The Colorado Noxious Weed Act (State of Colorado 2005) requires local governing

bodies to develop noxious weed management plans. The State of Colorado maintains a list of plants that are considered noxious weeds. The State of Colorado noxious weed list includes three categories: List A, List B, and List C. List A species must be eradicated whenever detected. List B species include weeds whose spread should be halted. List C species are widespread, and while control of List C species is not required by the State, the State will assist local jurisdictions which choose to manage those weeds.

INTEGRATED WEED MANAGEMENT

Control of invasive species is a difficult task and requires intensive ongoing control measures. Care must be taken to prevent damage to desirable plant species during treatments to avoid further infestations by other pioneer invaders. Weed management is best achieved through a variety of methods over a long period of time including inventory (surveys), direct treatments, prevention through best management practices, monitoring of treatment efficacy, and subsequent detection efforts. Weed management strategies are used primarily to control existing species and to prevent further infestations (existing and new species) rather than eradication. After successful and effective management, decreases in infestation size and density can be expected, and after several years of successful management practices, eradication is sometimes possible.

Prevention and Assessment of Noxious Weed Infestations

Weed management is costly and heavy infestations may exceed the economic threshold for practical treatment. Prevention is especially valuable in the case of noxious weed management. Several simple practices should be employed to prevent most weed infestations. The following practices should be adopted for any activity to reduce the costs of noxious weed control through prevention.

- Prior to delivery to the site, equipment will be thoroughly cleaned of soil remaining from previous construction sites which may be contaminated with noxious weeds.
- If working in sites with weed seed contaminated soil, equipment will be cleaned of potential seed-bearing soil and vegetative debris at the infested area prior to moving to uncontaminated terrain.
- All maintenance vehicles will be regularly cleaned of soil.
- If possible, avoid driving vehicles through areas where weed infestations exist.

Assessment of the existence and extent of noxious weeds for an area is essential for developing an integrated weed management plan. To continue effective management of noxious weeds, further inventory and analysis is necessary to 1) determine the effectiveness of past treatment strategies; 2) modify the treatment plan if necessary; and 3) detect new infestations early, resulting in more economical treatments.

TREATMENT AND CONTROL OF NOXIOUS WEED INFESTATIONS

If noxious weeds subsequently become established in the project area, there are several methods that are commonly used to treat noxious weed infestations. An overview of the use of herbicides, mechanical treatment, grazing, and alternative methods is presented below.

Herbicides

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

Professionals or landowners using herbicides must use the concentration specified on the label of the container in hand. Herbicides generally do not work better at higher concentrations. Most herbicide failures observed are related to incomplete control caused by high concentrations killing top growth before the active ingredient can be transported to the roots through the nutrient translocation process. Most herbicide applications should use a surfactant, if directed on the herbicide label, or other adjuvant as called for on the herbicide label. A certified commercial applicator is a good choice for herbicide control efforts. Restricted herbicides require a state licensed applicator. A licensed applicator has the full range of knowledge, skills, equipment, and experience desired when dealing with noxious weeds.

Mechanical Treatment

Small isolated infestations of weed species can often be controlled with cutting and digging by hand. For dense or more extensive infestations, mechanical treatments can be useful in combination with chemical control. Effectiveness of mechanical control can often be increased by severing the root just below the crown of noxious weeds. Weeds that easily re-sprout from rootstocks, such as Canada thistle and Russian knapweed, may increase rather than decrease if mechanical control is the only method used. Mechanical treatment will occur no less than annually, if needed.

Grazing

In the event grazing is allowed in the project area it will be deferred in reclaimed areas until the desired plant species that have been seeded are established.

There is a 8' high privacy fence planned for the facility. This will protect the above ground equipment from being damaged by keeping any animals out of the facility.

Alternative Methods

Biological control of noxious weeds may be feasible for some weed species if they are found in the disturbed area in the future. The musk thistle seed head weevil, *Rhinocyllus conicus*, for example, is a biological control agent for musk thistle (Roduner et al. 2003). This weevil may be useful for reducing musk thistle, but significant results may take several years.

Vesicular-Arbuscular Mycorrhizal Fungi

An alternative method to assist revegetation, particularly where there is poor or destroyed topsoil, is the application of vesicular-arbuscular mycorrhizal fungi, typically referred to as AMF. These fungi, mostly of the genus *Glomus*, are symbiotic with about 80% of all vegetation. Endo- mycorrhizal fungi are associated mostly with grasses and forbs and could be helpful when reclaiming the project area. In symbiosis, the fungi increase water and nutrient transfer capacity of the host root system by as much as several orders of magnitude (Barrow and McCaslin 1995).

Over-the-counter commercial AMF products, which are better adapted to coating seeds when reseeding and treating roots of live seedling trees and shrubs at time of planting, come in powder-form and are available from many different sources. Some come in granular form to be spread with seed from a broadcast spreader. The best AMF products should contain more than one species.

Humates

Compacted soil responds well to fossilized humic substances and by-products called humates. These humates, including humic and fulvic acids and humin were formed from pre-historic plant and animal deposits and work especially well on compacted soil when applied as directed.

RECOMMENDED TREATMENT STRATEGIES

Treatment strategies are different depending on plant type and are summarized below. It is important to know whether the target is an annual, biennial, or perennial to select strategies for effective control and eradication. Both biennial and perennial weeds are common in the vicinity of the project area.

In general, recommended treatment strategies for annual and biennial noxious weeds to prevent seed production include the following.

- Hand grub (pull), hoe, till, or cultivate in rosette stage and before flowering or seed maturity. If seeds develop, cut and bag seed heads.
 - Cut roots with a spade just below soil level.
 - Treat with herbicide in rosette or bolting stage, before flowering.
 - Mow biennials after bolting stage but before seed set. Mowing annuals will not prevent flowering but can reduce total seed production.

Treatment strategies for perennials to deplete nutrient reserves in the root system and prevent seed production include the following.

- Allow plants to expend as much energy from the root system as possible. Do not treat when first emerging in spring but allow growth to bud/bloom stage. If seeds develop cut and bag if possible.
- Herbicide treatment at bud to bloom stage or in the fall (recommended after August 15 when natural precipitation is present). In the fall, plants draw nutrients into the roots for winter storage. Herbicides will be drawn down to the roots more efficiently at this time due to translocation of nutrients to roots rather than leaves. If the weed patch has been present for a long period of time, another season of seed production is not as important as getting the herbicide into the root system. Spraying in the fall (after middle August) will kill the following year's shoots, which are being formed on the roots at this time.
- Mowing usually is not recommended because the plants will flower anyway, rather, seed production should be reduced. Many studies have shown that mowing perennials and spraying the regrowth is not as effective as spraying without mowing. The effect of mowing is species dependent therefore it is imperative to know the species and its basic biology. Timing of application must be done when biologically appropriate, which is not necessarily convenient.
- Tillage may or may not be effective. Most perennial roots can sprout from

pieces only 0.5-1.0 inches long. Clean machinery thoroughly before leaving the infested area.

- Hand pulling is generally not recommended for perennial species unless you know the plants are seedlings and not established plants. Hand pulling can be effective on small patches but is very labor intensive because it must be done repeatedly.

Note that herbicides should not always be the first treatment of choice when other methods can be effectively employed.

The designated weed application firm is listed in Attachment 1 with designated commercially available herbicides planned for use. Use of these herbicides or alternatives is subject to change based on conditions that may warrant alternative applications. The City of Aurora will be notified prior to use of herbicides not listed. Safety Data Sheets for the indicated herbicides are included in Attachment 2.

MONITORING

Areas where noxious weed infestations are identified and treated will be inspected over time to ensure that control methods are working to reduce and suppress the identified infestation. The sites will be monitored until the infestations are eliminated or reduced to acceptable levels. These inspections can then be used to prioritize future weed control efforts. Twice monthly weed growth inspections will be conducted to identify areas of concern that should be addressed prior to semiannual weed control applications. Detailed weed control inspections will be conducted semi-annually in spring and fall will include documentation and evaluation of recommended weed control measures. Weed control applications will be conducted as needed, typically applications for weed control will be implemented in spring and if necessary, additional application will be accomplished in the fall.

Attachments: Weed Control Management Provider and List of Herbicides; List of Native Species for Re-vegetation

ATTACHMENT 1

WEED CONTROL APPLICATION PROVIDER AND LIST OF HERBICIDES

Weed control company to be utilized:

Accuspray Solutions

Brison Bishop
970-213-7748

Brison@accusprayco.com

The common herbicides used per application are:

Ground Kill

- Portfolio 4-F
- Payload
- Frequency
- Round Up

Selective Broadleaf weed control

- E-2
- Five Star
- Milestone
- Vista

Mitigation of Runoff

- The amount and intensity of rainfall after a herbicide application is important in preventing runoff. Runoff from the first heavy rainfall after application can carry the herbicide directly into storm drains emptying into lakes, rivers or streams.
- GMT will watch the weather. Postemergence herbicide applications should be made at least 24 hours before a rain.
- If no rain is in the forecast, water the treated area with ½" of water to dissolve the herbicide and move it into the soil profile. Normal wetting and drying cycles generally will keep the herbicide in the top 1 to 6 inches of the soil profile. Water should not be applied to the point of runoff.

ATTACHMENT 2

List of Native Species for Re-Vegetation:

Western Wheatgrass

Fendler threeawn

Sideoats grama

Needlegrass

Prairie junegrass

Bottlebrush squirreltail

Blue Grama

Green needlegrass