# NOXIOUS WEED MANAGEMENT PLAN

## *GRAZING YAK SOLAR PROJECT*
## *El Paso County, CO*

**PREPARED FOR:**

NEXTERA ENERGY RESOURCES
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**PREPARED BY:**

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# TABLE OF CONTENTS



## APPENDICES

# 1.0 INTRODUCTION AND PROJECT LOCATION

NextEra Energy Resources (Client) retained CORE Consultants, Inc. (CORE) to prepare a Noxious Weed Management Plan (Plan) for the proposed Grazing Yak Solar Project (Project) located in El Paso County (County), Colorado. The proposed Project is a 35-megawatt (MW) ground-based solar facility consisting of a single-axis tracking system (solar array) and a one-mile underground collection line (collection line easement) that will tie in to the existing Golden West Wind Farm substation. Golden West Wind Farm surrounds the Project to the north, east, west, and south. The wind/solar energy overlay (WSE-O) would consist of approximately 1,224 acres consisting of six parcels, of which approximately 282 acres would be developed to construct the solar array and undergound collection line.

This Plan is a Project-specific document that has been designed to set forth Project-level regulations to prevent and control the spread of noxious weeds within the Project and vicinity. Noxious weeds are defined as those non-native plants that aggressively invade and are detrimental to native vegetation communities and ecosystems. The *Colorado State Noxious Weed Act* (Colorado Revised Statute 35-5.5-103) developed a list of plants considered noxious in the state of Colorado that should be targeted for control by various methods dependent on list category (A, B, or C). The Plan shall tier to the requirements set forth by the El Paso County (County) Noxious Weed Management Plan (2003, updated 2014), which contains guidelines for control and treatment of noxious weeds found in the County. County requires that commercial or industrial projects that include ground disturbing activities submit a project-specific noxious weed management plan. This Plan provides methods to prevent and control the spread of noxious weeds at pre-construction, construction, and post-construction phases of the Project.

The Project is located to the east of the intersection of McQueen Road and Washington Road, approximately four miles southeast of the Town of Calhan, Colorado on Section 29, Township 12S, Range 61W (Figure 1.1). The Project is situated on the U.S. Geological Survey (USGS) 7.5 minute Peoria, Colorado quadrangle (USGS 2010), (**Appendix I**: *Vicinity Map)*.

Topography of the Study Area consists of multiple grasslands within the Foothills Grasslands level IV ecoregion of the Great Plains level III ecoregion (Chapman et al. 2006). Dominant species within the Foothills Grasslands include little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), switch grass (*Panicum virgatum*), and yellow Indiangrass (*Sorghastrum nutans*).

# 2.0 NOXIOUS WEED MANAGEMENT BACKGROUND

The spread of invasive species roughly mirrors the rise in human travel and commerce (Mack *et al.* 2000 and Sheley *et al.* 1996). Many noxious weeds have been identified as aggressive, weather resistant, escaped ornamentals from residential landscapes (Westbrooks 1998). *The Federal Noxious Weed Act* (7 U.S.C. 2801 et seq.; 88 Stat. 2148) was enacted in 1975 in an effort to halt the spread of noxious weeds across the country. Following guidelines set forth by the *Federal Noxious Weed Act*, Colorado passed the *Colorado Noxious Weed Act* ("Act"; C.R.S. 35-5.5-103) in 1990. The Act identified noxious weeds particular to the landscape of Colorado. As defined in the Act, noxious weeds are any non-native plant that:

- aggressively invades or is detrimental to economic crops or native plant communities;
- is poisonous to livestock;
- is a carrier of detrimental insects, diseases, or parasites;

- or is detrimental, either by direct or indirect effects, to the environmentally sound management of natural or agricultural ecosystems.

The Act was amended in 2002 to require counties to establish individual management plans relevant to local municipalities. The County developed the *El Paso County Noxious Weed Management Plan* in 2003 (updated in 2014) to identify county-level noxious weed management practices that would preserve the economic and environmental value of County lands (County 2014).

Disturbed areas are vulnerable to infestation from noxious weeds due to the aggressive nature by which noxious weeds can spread. Construction activities including clearing, grading, and excavation promote the establishment of noxious weed species before native vegetation can reestablish within the cleared area. As such, the *County Noxious Weed Management Plan* requires integrated management plans for any activities requiring dirt moving activities within El Paso County (County 2014). Project-specific integrated management plans should include methods to prevent, control, and monitor the spread of noxious weeds and should take into account the multiple methods by which noxious weeds germinate. Annuals typically reproduce through seed which can easily attach to equipment during construction activities. Perennials often propagate through an extensive root system. Ground disturbing activities have the potential to redistribute root sections that could quickly propagate in other areas. Because of the multiple methods by which noxious weeds spread and propagate, integrated management plans should outline education and native revegetation methods, in addition to chemical control methods (County 2014).

# 3.0 NOXIOUS WEED MANAGEMENT PLAN

## 3.1 Purpose and Goals

Construction of the Project would occur over six to eight months. Upon completion of construction, the solar farm would produce energy for a minimum of 30 years. It is anticipated that ground disturbance would be minimized to grading and compacting associated with access driveway construction, terrace removal, and dirt-path construction. This integrated management plan includes preconstruction, construction, and maintenance methods to prevent, control, and monitor the spread of any identified noxious weeds to maintain a noxious weed-free site during the life of the Project. It is assumed that the site would be managed for noxious weeds throughout the life of the Project. Integrated management methods should include the following:

- Surveys to inventory and map established noxious weed populations;
- Sharing of data with the County to aid in County level inventory;
- Chemical treatment of all identified noxious weed populations;
- Periodic post-construction treatment as needed and as determined by the owner/operator.

Management methods identified within this Plan will comply with *Chapter 6: General Development Standards of the County Land Development Code* (County 2015), the *County Noxious Weed Management Plan* (County 2014) and the Act (Colorado Revised Statutes 35-5.5-103). Biological control methods are not included due to the prohibition of their use on plants targeted for eradication (Colorado Weed Management Association [CWMA] 2015). Noxious weed species targeted would be those identified in the Act, with special consideration for those species listed in the *County Noxious Weeds and Control Methods* (County 2008).

## 3.2 Regulated Species

The Act identifies three levels of priority for control of noxious weeds throughout the State of Colorado (State). The CWMA maintains an updated list of noxious weeds known to occur in the State. CWMA also maintains a "watch list" of noxious weeds that occur in proximity to State borders and/or those species with a distribution that is not yet understood (**Appendix II**: *Colorado State Noxious Weed List*). List A noxious weeds are those species targeted for eradication. List A noxious weed populations are typically isolated in nature or rare throughout much of the State (*Colorado Revised Statutes 35-5.5-103*). Eradication and reporting of List A populations is required by law (Colorado Department of Agriculture [CDA] 2006). List B species are discretely distributed throughout the State and must be eradicated, contained, or suppressed (*Colorado Revised Statutes 35-5.5-103*). The County requires control of all List B noxious weed populations located within the Project area (County 2014). List C noxious weed populations are widespread and well established. The County requires control of List C species through education of the public and/or chemical control (County 2014).

## 3.3 Pre-Construction

Pre-construction noxious weed management protocols would include prevention and treatment. Prevention and treatment would be accomplished through surveys of construction easements, followed by primary chemical treatment.

Noxious weed surveys would be conducted within all construction easements prior to construction; i.e., prior to any ground disturbing activities. Surveyors would use GPS units to collect population data. Data collected for List C populations would include species and coordinates of population. Data collected for List A and B populations would include species, coordinates for the approximate center of each identified population, approximate radius of infestation, and approximate density (measured in percent coverage within the estimated extent of a population). The County would receive a map of identified noxious weed populations within the Project. Should surveyors locate List A species, specific data collected would be sent to the County. Treatment type would be selected depending on the priority rank of the noxious weed species (List A, B, C), and the location and density of the infestation. Chemical treatment would include herbicide application. The suggested chemical treatment protocol is described below.

List A species must be eradicated by law (CDA 2006). Should surveyors identify List A species, a plant sample would be collected for positive identification through the County Environmental Division. Upon positive confirmation of a List A species, hand pulling of the population would be performed by qualified personnel to remove the mechanism for creation of a seed-bank. Chemical treatment would be applied to the area and would be selected in compliance with the *County Noxious Weeds and Control Methods* (County 2008). List B and List C species would be chemically treated with an herbicide selected in compliance with the *County Noxious Weeds and Control Methods.* Herbicide selection may vary depending upon time of year and life cycle of the plant. All herbicide application would occur a minimum of two weeks prior to scheduled ground disturbing activities. The herbicide applicator would treat noxious weed populations with County recommended chemicals (County 2014).

## 3.5 Construction

Construction phase noxious weed management protocols would include prevention and maintenance. Contractors would prevent the spread of noxious weeds through the use of clean equipment and through treatment of all noxious weed populations prior to ground disturbing activities. Noxious weed treatment would occur to areas slated for ground disturbance prior to construction. Doing so would ensure that active noxious weed populations would become inactive prior to construction.

It is anticipated that some top-soil could be salvaged from the site during grading activities. Salvaged top-soil piles would be maintained and protected from erosion and/or noxious weed establishment during construction through Best Management Practices (BMPs) identified in the Project Grading, Erosion, and Sediment Control (GESC) Plan. Native-site top-soil would be used during reestablishment of native seed mixes post-construction in disturbed areas.

### 3.5 Post-Construction

Post-construction noxious weed management protocols would be limited to maintenance treatment, as needed. It is anticipated that the owner/operator would monitor and for and treat noxious weed populations during the life of the Project. Typically, the owner/operator would contract a Colorado licensed herbicide applicator to treat noxious weeds on a seasonal basis.

## 4.0 CONCLUSIONS AND RECOMMENDATIONS

The Grazing Yak Solar Noxious Weed Management Plan was written to comply with guidelines in the Colorado Noxious Weed Act (Colorado Revised Statutes 35-5.5-103) and the County Noxious Weed Management Plan. CORE recommends that the Client survey for all noxious weed populations and treat any List A and List B noxious weed populations located on the Project. The owner/operator shall be responsible for maintaining a weed-free property following construction. Typically, chemical treatment is applied between late spring and early fall depending on the recommended treatment protocols for each noxious weed species (County 2014).

# 5.0 REFERENCES

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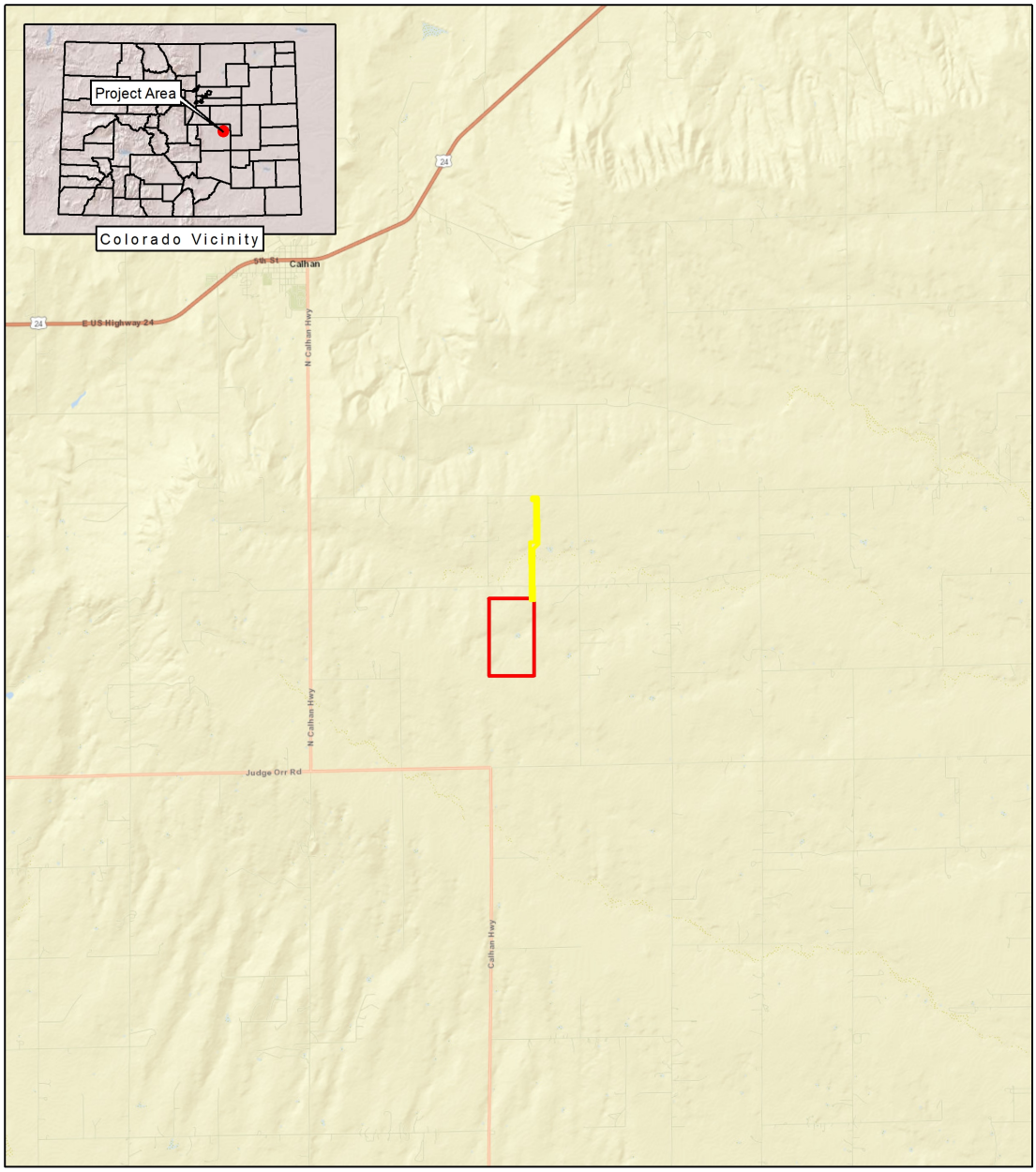
# APPENDIX I

*VICINITY MAP*




# Grazing Yak Solar Project

**Vicinity Map**

El Paso County, Colorado

Solar Array Boundary

Underground Collection Line Corridor

0 1 2
Miles

Date: 10/23/2018
CORE Project #: 18-082

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# APPENDIX II

*COLORADO STATE NOXIOUS WEED LIST*

Colorado Noxious Weeds (including Watch List), effective March 31, 2017

## *List A Species (25)*

| *Common* | *Scientific* |
|---|---|
| African rue | *(Peganum harmala)* |
| Bohemian knotweed | *(Polygonum x bohemicum)* |
| Camelthorn | *(Alhagi maurorum)* |
| Common crupina | *(Crupina vulgaris)* |
| Cypress spurge | *(Euphorbia cyparissias)* |
| Dyer's woad | *(Isatis tinctoria)* |
| Elongated mustard | *(Brassica elongata)* |
| Flowering rush | *(Butomus umbellatus)* |
| Giant knotweed | *(Polygonum sachalinense)* |
| Giant reed | *(Arundo donax)* |
| Giant salvinia | *(Salvinia molesta)* |
| Hairy willow-herb | *(Epilobium hirsutum)* |
| Hydrilla | *(Hydrilla verticillata)* |
| Japanese knotweed | *(Polygonum cuspidatum)* |
| Meadow knapweed | *(Centaurea nigrescens)* |
| 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 solstitialis)* |

## *List B Species (40)*

| *Common* | *Scientific* |
|---|---|
| Absinth wormwood | *(Artemisia absinthium)* |
| Black henbane | *(Hyoscyamus niger)* |
| Bull thistle | *(Cirsium vulgare)* |
| Bouncingbet | *(Saponaria officinalis)* |
| Canada thistle | *(Cirsium arvense)* |
| Chinese clematis | *(Clematis orientalis)* |
| Common tansy | *(Tanacetum vulgare)* |
| Common teasel | *(Dipsacus fullonum)* |
| Corn chamomile | *(Anthemis arvensis)* |
| 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)* |

## *List B Species (40) continued*

| *Common* | *Scientific* |
|---|---|
| Eurasian watermilfoil | *(Myriophyllum spicatum)* |
| Hoary cress | *(Cardaria 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 | *(Acroptilon repens)* |
| Russian-olive | *(Elaeagnus angustifolia)* |
| Salt cedar | *(Tamarix chinensis, T. parviflora, and T. ramosissima)* |
| Scentless chamomile | *(Tripleurospermum perforata)* |
| Scotch thistle | *(Onopordum acanthium, O. tauricum)* |
| Spotted knapweed | *(Centaurea stoebe)* |
| Spotted x diffuse knapweed hybrid | *(Centaurea x psammogena = C. stoebe x C. diffusa)* |
| 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 Species (16)*

| *Common* | *Scientific* |
|---|---|
| Bulbous bluegrass | *(Poa bulbosa)* |
| Chicory | *(Cichorium intybus)* |
| Common burdock | *(Arctium minus)* |
| Common mullein | *(Verbascum thapsus)* |
| Common St. Johnswort | *(Hypericum perforatum)* |
| Downy brome | *(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)* |

## *Watch List Species (24)*

| *Common* | *Scientific* |
|---|---|
| Asian mustard | *(Brassica tournefortii)* |
| Baby's breath | *(Gypsophila paniculata)* |
| Bathurst burr, Spiney cocklebur | *(Xanthium spinosum)* |
| Brazilian egeria, Brazilian elodea | *(Egeria densa)* |
| Common bugloss | *(Anchusa officinalis)* |
| Common reed | *(Phragmites australis)* |
| Garden loosestrife | *(Lysimachia vulgaris)* |
| Garlic mustard | *(Alliaria petiolata)* |
| Himalayan blackberry | *(Rubus armeniacus)* |
| Hoary alyssum | *(Berteroa incana L.)* |
| Japanese blood grass/cogongrass | *(Imperata cylindrica)* |
| Meadow hawkweed | *(Hieracium caespitosum)* |
| Onionweed | *(Asphodelus fistulosus)* |
| Purple pampas grass | *(Cortaderia jubata)* |
| Scotch broom | *(Cytisus scoparius)* |
| Sericea lespedeza | *(Lespedeza cuneata)* |
| Swainsonpea | *(Sphaerophysa salsula)* |
| Syrian beancaper | *(Zygophyllum fabago)* |
| Water hyacinth | *(Eichhornia crassipes)* |
| Water lettuce | *(Pistia stratiotes)* |
| White bryony | *(Bryonia alba)* |
| Woolly distaff thistle | *(Carthamus lanatus)* |
| Yellow flag iris | *(Iris pseudacorus)* |
| Yellow floatingheart | *(Nymphoides peltata)* |