APPENDIX N: REVEGETATION AND NOXIOUS WEED CONTROL PLAN

Revegetation and Noxious Weed Management Plan

Horse Heaven Wind Farm

Benton County, Washington

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19803 North Creek Parkway
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ACRONYMS AND ABBREVIATIONS

°F	degree Fahrenheit
Applicant	Horse Heaven Wind Farm, LLC
ASC	Application for Site Certification
EFSEC or Council	Energy Facility Site Evaluation Council
Micrositing Corridor	Wind Energy Micrositing Corridor
O&M	operation and maintenance
Plan	Revegetation and Noxious Weed Management Plan
Project	Horse Heaven Wind Farm
Turbine	wind turbine generator

1 INTRODUCTION

Horse Heaven Wind Farm, LLC (the Applicant) is proposing to develop a renewable energy generation facility within the Horse Heaven Hills area in unincorporated Benton County, Washington (Figure 1). Much of the Horse Heaven Wind Farm's (Project) Lease Boundary is privately owned and actively managed for dryland agriculture and livestock grazing; portions of this area may also be enrolled in the U.S. Department of Agriculture's Conservation Reserve Program. In addition, the Project Lease Boundary also encompasses lands managed by the Washington Department of Natural Resources.

This Revegetation and Noxious Weed Management Plan (Plan) describes methods, success criteria, monitoring, and reporting for revegetation of areas temporarily disturbed during construction of the Project. This Plan also provides methods, monitoring, and reporting associated with the prevention and control of the introduction and spread of noxious weeds from construction and operation of the Project. This Plan was developed to support the requirements of the Energy Facility Site Evaluation Council (EFSEC, or Council) Application for Site Certification (ASC), of which this is a part.

2 BACKGROUND

2.1 Project Area Existing Conditions

Benton County is located within a rain shadow created by the Cascade Mountains, which causes a decrease in precipitation to their east. In this region of Washington, the summers are short, hot, and mostly clear; winters are very cold and partly cloudy; and it is dry year-round. In winter, temperatures in Kennewick average a high of 43 degrees Fahrenheit (°F) and a low of 29.6°F, with extreme lows below 10°F. In summer, temperatures average a high of 87.1°F and a low of 59.6°F, with extreme highs above 100°F.

The Project is located within the Columbia Plateau Ecoregion (Clarke and Bryce 1997), within the big sagebrush (*Artemisia tridentata*)/bluebunch wheatgrass (*Pseudoroegneria spicata* [*Agropyron spicatum*]) vegetation zone (Franklin and Dyrness 1988). The elevation within the Project Lease Boundary ranges from 604 to 2,051 feet above mean sea level (msl). The topography in the Project Lease Boundary is defined by gently rolling hills, bisected by meandering canyons, some of which contain ephemeral or intermittent drainages.

Based on information from the Natural Resources Conservation Service, the majority (i.e., 77 percent) of soils within the Project Lease Boundary are Ritzville silt loam. In general, the remainder of soils in the Project Lease Boundary are silt loams, fine sandy loams, very fine sandy loams, stony fine sandy loams, and very stony silt loams, all with an approximate thickness of 7 feet (see Section 3.1 of the EFSEC ASC).

Nine habitat types and subtypes occur within the Project Lease Boundary (Section 3.4 of the ASC; Tetra Tech 2021; Chatfield and Brown 2018a, 2018b, USGS 2016; Yang et al. 2018). These include:

- Agricultural land
- Developed/disturbed
- Dwarf shrub-steppe
- Non-native grassland
- Planted grassland

- Rabbitbrush shrubland
- Sagebrush shrub-steppe
- Unclassified Grassland
- Unclassified Shrubland

In general, native vegetation within the majority of the Project Lease Boundary has been heavily modified due to historic and current agriculture and grazing activity. Agricultural land comprises approximately 74 percent of the existing vegetation within the Project Lease Boundary. In addition, non-native invasive grasses and forbs are prevalent throughout the Project Lease Boundary due to historic and current farming and grazing activity and other development.

2.2 Project Description

The Project would have a nameplate energy generating capacity of up to 1,150 megawatts from a combination of wind and solar facilities as well as battery energy storage systems. Within the approximately 72,428-acre Project Lease Boundary, the Applicant established a Wind Energy Micrositing Corridor (Micrositing Corridor) and three Solar Siting Areas within which Project facilities would be constructed. The Micrositing Corridor consists of the area in which the wind turbine generator (Turbines) and supporting facilities would be constructed. The three Solar Siting Areas include the areas under consideration for construction of solar energy generation facilities. This approach allows some flexibility with specific component locations and design in response to site-specific conditions and engineering requirements that would be determined prior to construction.

The Applicant is currently considering a range of Turbine options and the two layouts described in Section 2.3 of the ASC (i.e., Turbine Layout Option 1 and Turbine Layout Option 2) represent the range of potential impacts. Turbine Layout Option 1, which represents the estimated maximum acreage of impact, would include up to 244 Turbines. The solar arrays would occupy up to a maximum of 6,570 acres. In addition, a new 230 kilovolt single-circuit transmission line would be constructed to connect the Project's substations to the grid. Six possible transmission line routes are currently being considered. Proposed facilities and options are described in greater detail in Section 2.3 of the ASC. The number of Turbines and extent of solar arrays would depend on the final Turbine models and/or solar modules selected, as well as the final solar array layout options selected.

2.3 Description of Temporary Impacts and Habitat Modification

Temporary impacts would occur in areas proposed to be disturbed during construction activities, but which would not be occupied by permanent facilities (e.g., temporary laydown areas); habitat modification would occur in areas within the solar array fencelines but outside areas of permanent disturbance (e.g., graveled interior access roads, inverter pads, and tracker system support posts). Table 1 presents the estimated maximum acreages of impact to habitat subtypes from construction of the Project based on the range of Project options and layouts described above.

Horse Heaven Wind Farm

SCOUT CLEAN ENERGY

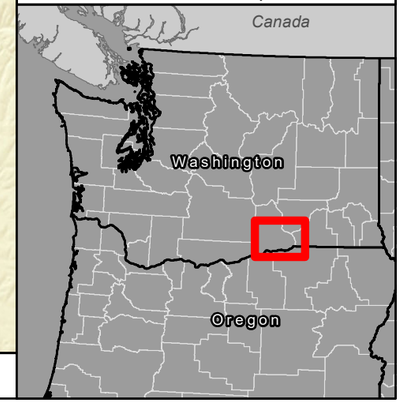
Figure 1
Project Location

BENTON COUNTY, WA

Project Lease Boundary

TETRA TECH

Reference Map



1:250,000 WGS 1984 UTM Zone 11N

0 1 2 4 6 8 Miles

NOT FOR CONSTRUCTION

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Table 1. Maximum Temporary Impacts and Habitat Modification to Habitat Types and Subtypes

Habitat Type	Habitat Subtype	Micrositing Corridor	Solar Siting Areas	
		Temporary Impact (Acres)	Temporary Impact - Fenceline (Acres)[1]	Modified Habitat Impact – Solar Array (Acres)[2]
Agricultural land	Agricultural land	2,309	53	5,382
Developed/disturbed	Developed/disturbed	20	3	3
Grassland	Non-native grassland	47	0.1	3
	Planted grassland	199	3	100
	Unclassified grassland[3]	135	9	333
Shrubland	Dwarf shrub-steppe	9	--	--
	Rabbitbrush shrubland	119	6	393
	Sagebrush shrub-steppe	17	--	--
	Unclassified shrubland[3]	25	1	63
Total[4]		**2,881**	**76**	**6,276**

Notes:
[1] Temporary impacts associated with solar facilities include a 10-foot construction buffer along the outside of the solar fenceline.
[2] Modified impacts include those areas associated with the solar arrays. Following construction, low growing vegetation would be planted under the solar panels; therefore, these impacts would be considered a modification of habitat versus a temporary or permanent impact.
[3] Surveys conducted in 2020 (Tetra Tech 2021) within portions of the Project Lease Boundary classified grassland and shrubland habitats into habitat subtypes. Unclassified grassland and unclassified shrubland habitat subtypes include those areas mapped during surveys conducted in 2018 (Chatfield and Brown 2018a, 2018b) or using NLCD data (USGS 2016; Yang et al. 2018) that were not further classified into subtypes (e.g., planted grassland, sagebrush shrub-steppe). Acres of impacts to each of these "unclassified" habitat subtypes may be revised following habitat surveys of the Solar Siting Areas and Micrositing Corridor that are planned to occur prior to construction.
[4] Numbers may not sum exactly due to rounding.

Following completion of construction, temporarily disturbed areas and areas under the solar arrays would be revegetated, as described in Section 3.0. This Plan addresses revegetation of areas temporarily disturbed for construction of Project facilities, including revegetation of low-growing vegetation located underneath the solar arrays.

2.4 Restoration of Agricultural Lands

Restoration of agricultural lands would occur in consultation with the landowner or farm operator. This Plan focuses on the restoration of non-agricultural lands; therefore, restoration of agricultural lands is not further discussed in this document.

3 REVEGETATION METHODS

Revegetation would begin as soon as feasible following completion of construction. Seeding would be done in a timely manner and within the appropriate season to facilitate germination. Site preparation, seeding techniques, and example seed mixes are described below.

3.1 Site Preparation

The Applicant would restore temporarily disturbed areas by re-establishing slope, surface stability, and drainage features, as needed. The intensity of the construction impact would vary based on the intensity of the construction activity taking place at that location as well as the final intended use of the affected area. In some areas, the impact would be relatively light (e.g., where minimal vegetation clearing and ground disturbance would occur); while in other areas, construction activity would remove all vegetation, remove topsoil, and potentially compact the remaining subsoil. Some areas of temporary disturbance (such as staging areas) would be graveled during construction; these areas would be reclaimed by removing the gravel surface, regrading to match adjacent contours, and reseeding.

In areas where soil is removed during construction, the topsoil would be stockpiled separately from the subsurface soils, where possible. The stockpiled soils would be put back in place prior to revegetation activities. Prior to seeding of revegetation areas, soils would be prepared to facilitate revegetation success. Soil preparation would include standard, commonly used methods, and would take into account relevant site-specific factors, including slope, size of area, and erosion potential. In general, the soil needs to be prepared into a firm, fine-textured seedbed that is relatively free of debris before seeding or planting. Shallow tilling with a disc, followed by a harrow or drag if necessary and where feasible, can be effective at achieving this. If replaced soil is too soft, then seeds may be buried too deep to properly germinate; therefore, a roller or cultipacker would be used where necessary to pack the soil to the appropriate conditions. The Applicant would use mulching and other appropriate practices to control erosion and sediment during revegetation work.

3.2 Seeding Methods

Following soil preparation, revegetation areas would be seeded with 1) a mix of native or non-invasive, non-persistent non-native grasses and forbs or 2) a mix of native or non-invasive, non-persistent non-native grasses, forbs, and shrubs. The Applicant would choose seeding methods based on site-specific factors such as slope, erosion potential, and the size of the area in need of revegetation. Two common seed application methods that may be used are described below.

3.2.1 Broadcast Seeding

Broadcast seeding is the application of seed directly on the ground surface. This method may be chosen for areas with shallow and rocky soils, and the type of broadcast spreader would depend on the size of the area to be seeded as well as the terrain.

In this method, the seed mix would be applied at the application rates specified by the seed supplier for broadcast seeding. Where feasible, half of the total mix would be applied in one direction and the second half of the mix would be applied in the perpendicular direction. A tracking dye may be added to facilitate uniform seed application. Immediately following seed application, certified weed-free straw would be applied at a rate of 2 tons per acre. Straw would be crimped into the ground to a depth of 2 inches using a crimping disc or similar device. As an alternative to crimping (where crimping is not feasible), a tackifier may be applied using hydroseed equipment. Prior to mixing the tackifier, the tank would be visually inspected for cleanliness and, if remnants from previous applications exist, the tank would be washed. Broadcast seeding would not be employed if winds exceed 5 miles per hour.

3.2.2 Drill Seeding

The drill seeding method may be chosen for larger areas with deeper soils and moderate to gentle terrain to accommodate mechanical equipment. This method provides the advantage of planting the seed at a uniform depth and provides better soil to seed contact.

Using an agricultural or range seed drill, seeds would be sown according to the application rates recommended by the seed supplier. Where feasible, half of the total mix would be applied in one direction and the second half of mix in the perpendicular direction. If mulch has been previously applied, seed may be drilled through the mulch provided the drill can penetrate the straw resulting in seed-to-soil contact conducive for germination.

3.3 Seed Mixes

Four seed mixes are proposed for revegetation efforts. Tables 2 through 5 present example seed mixes that would be considered for revegetation. However, the number of seed mixes and composition of the final seed mixes would be determined based on pre-construction conditions and the availability of seed at the time of procurement.

Grassland Seed Mix #1 would be appropriate for use to revegetate temporarily disturbed areas outside the solar arrays, with the exception of temporarily disturbed shrub-steppe habitat subtypes and areas that would be returned to agricultural production following construction (as noted in Section 2.4). The example seed mix is presented in Table 2 and contains a mixture of grasses and forbs.

Table 2. Example Grassland Seed Mix #1

Growth Habit	Scientific Name	Common Name	Percent of Mix
Grasses	*Pseudoroegneria spicata*	Bluebunch wheatgrass	44
	Poa secunda	Sandberg bluegrass	24
	Elymus elymoides	Bottlebrush squirreltail	15
	Hesperostipa comata	Needle-and-thread grass	10
Forbs	*Agoseris grandiflora*	Large-flowered agoseris	3
	Achillea millefolium	Yarrow	2
	Erigeron pumilus	Shaggy fleabane	2

A second grassland seed mix, Grassland Seed Mix #2, is suggested for revegetation under the solar arrays, including areas that previously consisted of agricultural lands. The example seed mix presented in Table 3 contains a mixture of low-growing grasses and forbs which would be compatible with desired vegetation conditions under the solar arrays (i.e., species whose mature height would not interfere with or shade the solar array).

Table 3. Example Grassland Seed Mix #2

Growth Habit	Scientific Name	Common Name	Percent of Mix
Grasses	*Poa secunda*	Sandberg bluegrass	44
	Elymus elymoides	Bottlebrush squirreltail	30
	Koeleria macrantha	Prairie Junegrass	20
Forbs	*Astragalus* spp. (*A. caricinus, A. purshii, A. spaldingii*, or *A. succumbens*)	Milkvetch	2
	Erigeron pumilus	Shaggy fleabane	2
	Plantago patagonica	Woolly plantain	2

A Dwarf Shrub-steppe Seed Mix is suggested for the revegetation of temporarily disturbed areas that previously contained the dwarf shrub-steppe habitat subtype. The example seed mix presented in Table 4 contains a mixture of dwarf shrub/sub-shrub, grass, and forb species currently found within dwarf shrub-steppe habitat within the Project Lease Boundary.

Table 4. Example Dwarf Shrub-steppe Seed Mix

Growth Habit	Scientific Name	Common Name	Percent of Mix
Dwarf-shrub/sub-shrubs	*Eriogonum sphaerocephalum*	Rock buckwheat	40
	Nestotus stenophyllus	Narrowleaf goldenweed	10
Grasses	*Poa secunda*	Sandberg bluegrass	30
	Pseudoroegneria spicata	Bluebunch wheatgrass	10
	Elymus elymoides	Bottlebrush squirreltail	4
Forbs	*Achillea millefolium*	Yarrow	2
	Chaenactis douglasii	Douglas' dustymaidens	2
	Erigeron poliospermus	Cushion fleabane	2

A Sagebrush Shrub-steppe Seed Mix is proposed for revegetation of temporarily disturbed sagebrush shrub-steppe habitat. The example seed mix presented in Table 5 contains a mixture of shrub, grass, and forb species currently found within the sagebrush shrub-steppe habitat subtype within the Project Lease Boundary.

Table 5. Example Sagebrush Shrub-steppe Seed Mix

Growth Habit	Scientific Name	Common Name	Percent of Mix
Shrubs	*Artemisia tridentata*	Big sagebrush	40
	Ericameria nauseosa	Rubber rabbitbrush	5
	Chrysothamnus viscidiflorus	Green rabbitbrush	4
Grasses	*Poa secunda*	Sandberg bluegrass	20
	Pseudoroegneria spicata	Bluebunch wheatgrass	20
	Hesperostipa comata	Needle-and-thread grass	5
Forbs	*Achillea millefolium*	Yarrow	2

Growth Habit	Scientific Name	Common Name	Percent of Mix
	Chaenactis douglasii	Douglas' dustymaidens	2
	Erigeron poliospermus	Cushion fleabane	2

4 REVEGETATION DOCUMENTATION

Records would be kept of revegetation efforts and would include the following data:

- Date construction was completed in the area to be revegetated;
- Description of the affected area;
- Date revegetation work was initiated;
- Description of the revegetation work implemented; and
- Supporting figures representing the location and acres of each revegetation area.

The Applicant would update these records periodically as revegetation work occurs and would provide the Council with copies of these records.

5 REVEGETATION MONITORING

5.1 Monitoring Procedures

Following implementation of revegetation efforts, the Applicant would monitor the revegetation areas as described in this section, unless the landowner has converted the area to a use inconsistent with the success criteria (e.g., converted to agricultural land). Monitoring of the revegetation areas would be conducted by a qualified investigator annually for a minimum of 3 years, with the first monitoring period to occur during the first growing season following initial seeding.

During the annual monitoring, a representative cross section of the revegetated area would be inspected to determine if the area is meeting and/or on track to meeting the success criteria described in Section 5.2. The investigator would evaluate the following site conditions during annual monitoring:

- Species composition and percent cover of native forbs, grasses and shrubs;
- Species composition and percent cover of non-native forbs and grasses;
- Percent cover of bare soil;
- Degree of erosion;
- Percent cover of noxious weeds; and
- Qualitative assessment of overall vigor of vegetation within revegetated areas.

Following annual monitoring, a monitoring report would be prepared and would include the following:

- The results of annual monitoring;
- The investigator's assessment of whether the revegetated areas have or are trending toward meeting the success criteria;
- Assessment of factors impacting the ability of the revegetated area to trend towards meeting the success criteria; and

- Recommendations of remedial actions, if any.

The Applicant would submit the monitoring to EFSEC within 60 days of the annual monitoring inspection.

5.2 Success Criteria

In each monitoring report, the Applicant would include an assessment of whether the revegetated areas are meeting or trending toward meeting the success criteria. Revegetation areas would be deemed successfully revegetated when the success criteria outlined below are met. If the success criteria outlined in the sections below are not met by Year 3 for revegetated grassland habitat subtypes and Year 5 for revegetated shrub-steppe habitat subtypes, remedial action as discussed in Section 5.3 would be implemented.

5.2.1 Success Criteria for Revegetation within Micrositing Corridor

Success criteria for revegetation of areas temporarily disturbed for construction of wind energy facilities would be based on the existing conditions of the revegetated area prior to construction. An area would be deemed successfully revegetated when the following success criteria are met:

- Total cover of desirable vegetation (desirable vegetation includes those species included in the seed mix and any native species that have established voluntarily) within revegetated areas of grassland and rabbitbrush shrubland habitat subtypes, with the exception of revegetated non-native grassland habitat subtype, exceeds 50 percent and cover of state or county designated noxious weeds (as discussed in Section 6) is less than 5 percent.
- For revegetated areas of non-native grassland habitat subtype, total cover of desirable vegetation is equal to or greater than the adjacent habitat and the presence and density of state or county designated noxious weeds is equal to or less than the adjacent habitat.
- Total cover of shrub and dwarf shrub species within revegetated dwarf shrub-steppe and sagebrush shrub-steppe habitat subtypes exceeds 10 percent, cover of desirable grasses and forbs exceeds 25 percent, and cover of state or county designated noxious weeds is less than 5 percent.

5.2.2 Success Criteria for Revegetation within the Solar Siting Areas

Revegetated areas within the Solar Siting Areas would be deemed successfully revegetated when the following success criteria are met:

- Total cover of desirable vegetation within revegetated habitat exceeds 40 percent.
- Total cover of state or county designated noxious weeds is less than 5 percent.

5.3 Remedial Action

Remedial action options would be identified in cases where success criteria are not met by Year 3 (for revegetated grassland habitat subtypes) or Year 5 (for revegetated shrub-steppe habitat subtypes) of annual monitoring, whether due to wildfire subsequent to Project construction or because of lower than expected rates of germination or survival. Remedial actions may include reseeding the affected area, planting container plants, additional noxious weed control, or other measures as needed. In addition, if during annual monitoring in Years 1 and 2 for revegetated grassland habitat subtypes and Years 1 through 4 for revegetated shrub-steppe habitat subtypes it is determined that the revegetation area does not appear to be trending toward meeting the success criteria, the investigator would make recommendations for

remedial actions. The Applicant would include the investigator's recommendations for remedial actions and the measures taken in that year's monitoring report.

6 NOXIOUS WEED PREVENTION AND CONTROL

Noxious weeds are those invasive weed species that are of elevated economic or environmental concern to the State of Washington or local jurisdictions, and receive priority during management planning and operations. In Benton County, control of noxious weeds is overseen by the Benton County Noxious Weed Control Board.

Noxious weed species can adversely affect the structure, composition, and success of revegetation efforts. The intent of noxious weed management outlined in this Plan is to provide clear methods to prevent the introduction and spread of designated noxious weeds from the construction and operation of the Project, to control existing populations of noxious weeds within construction and revegetation areas, and to monitor the effectiveness of efforts to prevent and control noxious weeds.

6.1 Noxious Weeds Identified within the Project Lease Boundary

Six Washington State and Benton County designated noxious weeds were documented within the Project Lease Boundary during surveys conducted in 2020 (Tetra Tech 2021). These species and their state and county weed status are presented in Table 6. Surveys conducted in 2020 did not cover the entire Project Lease Boundary; therefore, other state- and/or county-designated noxious weeds may also occur within the Project Lease Boundary. The current lists of state and county designated noxious weeds are provided in Attachments A and B, respectively.

Table 6. Noxious Weeds Documented within the Project Lease Boundary

Scientific Name	Common Name	State and County Status[1]	Frequency[2]
Bassia (*Kochia*) *scoparia*	kochia	B	Observed in several locations scattered throughout survey area.
Centaurea sp.[3]	knapweed	B	Frequently observed in central portion of survey area.
Centaurea solstitialis	yellow starthistle	B	Observed in two locations in central portion of survey area.
Chondrilla juncea	rush skeletonweed	B	Abundant. Frequently observed throughout survey area.
Onopordum acanthium	Scotch thistle	B	Observed in two locations in south-central portion of survey area.
Secale cereale	cereal rye	C	Abundant. Frequently observed throughout survey area.

[1] **"Class B" weeds:** Non-native species presently limited to portions of the state. Species are designated for required control in regions where they are not yet widespread. Preventing new infestations in these areas is a high priority. In regions where a Class B species is already abundant, control is decided at the local level, with containment as the primary goal.
"Class C" weeds: Noxious weeds that are typically widespread in the state or are of special interest to the state's agricultural industry. These weeds are selected by the County Board of Directors. The Class C status allows county weed boards to require control if locally desired, or they may choose to provide education or technical consultation (BCNWCB 2020; WSNWCB 2020).
[2] Frequency based on Tetra Tech 2021.
[3] Individuals observed were not flowering at the time of surveys; therefore, positive identification was not possible. Based on observations of rosettes and leaves, individuals and populations are believed to be either diffuse knapweed (*Centaurea diffusa*) or spotted knapweed (*C. stoebe* ssp. *micranthos*).

6.2 Noxious Weed Management

The Applicant's primary objective in regards to weed management is to prevent the introduction of new noxious weed populations and control the spread of existing noxious weed populations. Early detection and management of small populations of noxious weeds before they expand into larger populations is extremely important for successful control of noxious weeds. Noxious weed prevention and control would occur during both construction and operation of the Project. Prevention and control methods are discussed in more detail below.

6.2.1 Education and Personnel Requirements

Prior to construction, all construction personnel would be instructed on the importance of controlling noxious weeds and would receive training regarding noxious weed identification and management. Operation and maintenance (O&M) personnel would be similarly trained. The importance of preventing the spread of noxious weeds in areas not currently infested, as well as controlling the proliferation of noxious weeds already present within or near the Project, would be emphasized. Information regarding noxious weed species would also be provided for reference at the O&M facilities.

6.2.2 Prevention

The following best management practices would be implemented to avoid and minimize the spread of noxious weeds during construction, revegetation efforts, and operation and maintenance activities.

- Areas of noxious weed infestations would be flagged, where practical, prior to construction to alert construction personnel to their presence and limit or prevent access to those areas.
- Vehicle access would be limited to designated routes, whether existing roads or newly constructed roads, and the outer limits of constructed-related disturbances.
- Vehicle traffic would be restricted or minimized in noxious weed-infested areas.
- Vehicles would be cleaned after performing work in noxious weed-infested areas.
- Topsoil and other soils that came from noxious weed–infested areas would be identified and placed next to the infested area so they are returned to their previous location during reclamation activities.
- Soils from infested areas would be treated with a pre-emergent herbicide prior to initiation of revegetation efforts, depending on site-specific conditions.
- Conditions favorable for noxious weed germination and spread would be minimized by revegetating temporarily disturbed areas as soon as practicable.
- Areas of disturbance would be monitored for noxious weeds after construction, during the normal course of revegetation of temporary workspaces, and control measures would be implemented as appropriate.
- The site would be revegetated with appropriate, local native seed or native plants; when these are not available, non-invasive and non-persistent non-native species may be used.
- Seed and straw mulch (used for site rehabilitation and revegetation) would be certified free of noxious weed seed and propagules, where possible.

6.2.3 Treatment

Noxious weed treatment would focus on control of existing populations of noxious weeds within areas proposed to be disturbed by construction, including revegetation areas. Additionally, if it is determined that noxious weeds have invaded areas immediately adjacent to disturbance areas as a result of

construction, the Applicant would contact the landowner and seek approval to treat those noxious weed populations as well. This would help minimize recolonization or spread of noxious weeds from adjacent areas into revegetation areas. New noxious weeds detected in the Project area during post-construction restoration and revegetation would also be considered a result of construction or revegetation activities and would be controlled and treated accordingly.

The Applicant would be responsible for hiring a qualified contractor to implement the treatment of noxious weeds. Treatment of target noxious weeds would differ, depending on the disturbed area, the proximity to biologically sensitive areas, size of infestation, and the specific noxious weed being controlled. Control of noxious weeds would be implemented through mechanical or chemical control measures, which are described further below.

6.2.3.1 Manual and Mechanical Treatment

Mechanical control methods rely on removing plants, removing seed heads, and/or cutting roots with a shovel or other hand tools or equipment that can be used to remove, mow, or disc noxious weed populations. Hand removal of plants is also included under this treatment method. Mechanical methods are useful for smaller, isolated populations of noxious weeds or in areas of sensitive habitats. Additionally, hand removal of small infestations can minimize soil disturbance, allowing desirable species to remain and limiting the development of conditions that are favorable for noxious weeds (e.g., disturbed soils or areas cleared of vegetation).

Some rhizomatous plants can spread when the soil is disced or tilled; therefore, the decision whether to implement discing would be species and site-specific. If such a method is used in areas to be revegetated, subsequent seeding would be conducted to reestablish desirable vegetative cover that would stabilize the soils and reduce the potential for re-invasion of noxious weeds.

6.2.3.2 Chemical Treatment

Chemical control can effectively remove noxious weeds through use of selective herbicides. The current recommended chemical treatment and timing of chemical application for noxious weeds that have been identified within the Project Lease Boundary are provided in Attachment C.

Only herbicides approved by the U.S. Environmental Protection Agency and Washington Department of Agriculture would be applied and appropriate best management practices would be implemented during application. Prior to construction and every fall season during Project operation, the Applicant or its contractor would consult with the Benton County Weed Control Coordinator on timing, method and application rates for each identified weed species of concern, to allow for adaptive weed management given changes in weed control effectiveness from noxious weed species tolerance to herbicide treatment over time.

7 NOXIOUS WEED MONITORING AND REPORTING

During construction, periodic monitoring for noxious weeds would be conducted by construction staff within and adjacent to areas disturbed by construction (the timing of these monitoring efforts are described below). Any signs of new noxious weed infestations, or of re-growth of existing noxious weeds in areas where treatment has previously occurred, would be addressed promptly with further herbicide or mechanical treatments or other best management practices.

Once construction has been completed and revegetation efforts have been initiated, a qualified investigator would be employed to assess noxious weed growth and to make recommendations on

noxious weed control measures (see Section 5). Monitoring would be conducted annually for a minimum of 3 years, with the first monitoring period to occur during the first growing season following initial seeding of revegetation areas. Noxious weed monitoring would consist of a site survey, conducted during the growing season, to identify noxious weed species that have established within and adjacent to the revegetation areas, as well as inspections of treated areas to assess the success of previous noxious weed treatments. These inspections would be used to inform ongoing noxious weed control efforts.

The results of the first annual monitoring would be summarized in a monitoring report that details the locations of all noxious weed species observed and identifies treatment protocols for these species. Subsequent monitoring would assess the success of noxious weed treatments and would document any new noxious weed infestations observed. These results would be summarized in short memoranda that describe the treatment success or failure, make recommendations to improve treatment success (if necessary), and note any new noxious weed species or emergence. The annual monitoring report and memorandums would be submitted to the Council and the Benton County Noxious Weed Control Board following each annual inspection.

8 REFERENCES

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ATTACHMENT A
2020 WASHINGTON STATE NOXIOUS WEED LIST

Class A Weeds: Non-native species whose distribution in Washington is still limited. Preventing new infestations and eradicating existing infestations are the highest priority. **Eradication of all Class A plants is required by law.**

Class B Weeds: Non-native species presently limited to portions of the State. Species are **designated** for required control in regions where they are not yet widespread. Preventing new infestations in these areas is a high priority. In regions where a Class B species is already abundant, control is decided at the local level, with containment as the primary goal. Please contact your County Noxious Weed Control Board to learn which species are designated for control in your area.

Class C Weeds: Noxious weeds that are typically widespread in WA or are of special interest to the state's agricultural industry. The Class C status allows county weed boards to require control if locally desired, or they may choose to provide education or technical consultation.

Class A Weeds
Eradication is required

Alliaria petiolata	garlic mustard
Brachypodium sylvaticum	false brome
Butomus umbellatus	flowering rush
Carduus pycnocephalus	thistle, Italian
Carduus tenuiflorus	thistle, slenderflower
Centaurea calcitrapa	purple starthistle
Centaurea macrocephala	knapweed, bighead
Centaurea nigrescens	knapweed, Vochin
Clematis orientalis	oriental clematis
Crupina vulgaris	common crupina
Euphorbia oblongata	eggleaf spurge
Galega officinalis	goatsrue
Genista monspessulana	French broom
Glyceria maxima	reed sweetgrass
Helianthus ciliaris	Texas blueweed
Heracleum mantegazzianum	giant hogweed
Hydrilla verticillata	hydrilla
Impatiens parviflora	small-flowered jewelweed
Isatis tinctoria	dyer's woad
Limnobium laevigatum	South American spongeplant
Ludwigia peploides	floating primrose-willow
Mirabilis nyctaginea	wild four-o'clock
Myriophyllum heterophyllum	variable-leaf milfoil
Pueraria montana var. *lobata*	kudzu
Salvia aethiopis	sage, Mediterranean
Salvia pratensis	meadow clary
Salvia sclarea	sage, clary
Schoenoplectus mucronatus	ricefield bulrush
Silybum marianum	thistle, milk
Solanum elaeagnifolium	silverleaf nightshade
Sorghum halepense	Johnsongrass
Spartina alterniflora	cordgrass, smooth
Spartina anglica	cordgrass, common
Spartina densiflora	cordgrass, dense-flowered
Spartina patens	cordgrass, saltmeadow
Spartium junceum	Spanish broom
Zygophyllum fabago	Syrian beancaper

Class B Weeds

Abutilon theophrasti	velvetleaf
Alhagi maurorum	camelthorn
Amorpha fruticosa	indigobush
Anchusa arvensis	bugloss, annual
Anchusa officinalis	bugloss, common
Anthriscus sylvestris	wild chervil
Bassia scoparia	kochia
Berteroa incana	hoary alyssum
Bryonia alba	white bryony
Buddleja davidii	butterfly bush
Cabomba caroliniana	fanwort
Carduus acanthoides	thistle, plumeless
Carduus nutans	thistle, musk
Centaurea diffusa	knapweed, diffuse
Centaurea jacea	knapweed, brown
Centaurea melitensis	Malta starthistle
Centaurea nigra	knapweed, black
Centaurea solstitialis	yellow starthistle
Centaurea stoebe	knapweed, spotted
Centaurea x *moncktonii*	knapweed, meadow
Chondrilla juncea	rush skeletonweed
Conium maculatum	poison hemlock
Cynoglossum officinale	houndstongue
Cyperus esculentus	yellow nutsedge
Cytisus scoparius	Scotch broom
Daphne laureola	spurge laurel
Echium vulgare	blueweed
Egeria densa	Brazilian elodea
Epilobium hirsutum	hairy willowherb
Euphorbia myrsinites	spurge, myrtle
Euphorbia virgata	spurge, leafy
Ficaria verna	lesser celandine
Foeniculum vulgare except *F. vulgare* var. *azoricum)*	common fennel, (except bulbing fennel)
Geranium lucidum	shiny geranium
Geranium robertianum	herb-Robert
Hieracium aurantiacum	hawkweed, orange
Hieracium, subgenus *Hieracium*	hawkweeds: All nonnative species and hybrids of the wall subgenus
Hieracium, subgenus *Pilosella*	hawkweeds: All nonnative species and hybrids of the meadow subgenus
Impatiens glandulifera	policeman's helmet
Jacobaea vulgaris	tansy ragwort
Lamiastrum galeobdolon	yellow archangel
Lepidium latifolium	perennial pepperweed
Linaria dalmatica ssp. *dalmatica*	Dalmatian toadflax
Ludwigia hexapetala	water primrose
Lysimachia vulgaris	loosestrife, garden
Lythrum salicaria	loosestrife, purple
Lythrum virgatum	loosestrife, wand
Myriophyllum aquaticum	parrotfeather
Myriophyllum spicatum	Eurasian watermilfoil
Nymphoides peltata	yellow floatingheart
Onopordum acanthium	thistle, Scotch
Persicaria wallichii	knotweed, Himalayan
Phragmites australis	common reed (nonnative genotypes only)
Picris hieracioides	hawkweed oxtongue
Polygonum cuspidatum	knotweed, Japanese
Polygonum sachalinense	knotweed, giant
Polygonum x *bohemicum*	knotweed, Bohemian
Potentilla recta	sulfur cinquefoil
Rhaponticum repens	knapweed, Russian
Saccharum ravennae	Ravenna grass
Sagittaria graminea	grass-leaved arrowhead
Tamarix ramosissima	saltcedar
Thymelaea passerina	spurge flax
Tribulus terrestris	puncturevine
Tussilago farfara	European coltsfoot
Ulex europaeus	gorse

Class C Weeds

Aegilops cylindrica	jointed goatgrass
Ailanthus altissima	tree-of-heaven
Alopecurus myosuroides	blackgrass
Artemisia absinthium	absinth wormwood
Arum italicum	Italian arum
Berberis vulgaris	common barberry
Cenchrus longispinus	longspine sandbur
Centromadia pungens	spikeweed
Cirsium arvense	thistle, Canada
Cirsium vulgare	thistle, bull
Clematis vitalba	old man's beard
Convolvulus arvensis	field bindweed
Cortaderia jubata	jubata grass
Cortaderia selloana	Pampas grass
Crataegus monogyna	English hawthorn
Cuscuta approximata	smoothseed alfalfa dodder
Daucus carota	wild carrot (except where commercially grown)
Dipsacus fullonum	common teasel
Elaeagnus angustifolia	Russian olive
Gypsophila paniculata	babysbreath
Hedera helix 'Baltica', 'Pittsburgh', and 'Star', and *H. hibernica 'Hibernica'*	English ivy - four cultivars only
Hyoscyamus niger	black henbane
Hypericum perforatum	common St. Johnswort
Hypochaeris radicata	common catsear
Impatiens capensis	spotted jewelweed
Iris pseudacorus	yellow flag iris
Lepidium appelianum	hairy whitetop
Lepidium draba	hoary cress
Leucanthemum vulgare	oxeye daisy
Linaria vulgaris	yellow toadflax
Matricaria perforata	scentless mayweed
Myriophyllum spicatum x *Myriophyllum sibiricum*	Eurasian watermilfoil hybrid
Nymphaea odorata	fragrant waterlily
Phalaris arundinacea	reed canarygrass
Potamogeton crispus	curlyleaf pondweed
Rorippa austriaca	Austrian fieldcress
Rubus armeniacus	Himalayan blackberry
Rubus laciniatus	evergreen blackberry
Secale cereale	cereal rye
Senecio vulgaris	common groundsel

Class C Weeds continued

Silene latifolia ssp. *alba*	white cockle
Solanum rostratum	buffalobur
Soliva sessilis	lawnweed
Sonchus arvensis	perennial sowthistle
Sphaerophysa salsula	Swainsonpea
Taeniatherum caput-medusae	medusahead
Tanacetum vulgare	common tansy
Typha species	nonnative cattail species and hybrids (reminder, does not include the native common cattail, *Typha latifolia*)
Ventenata dubia	ventenata
Xanthium spinosum	spiny cocklebur
Zostera japonica	Japanese eelgrass

To learn more about noxious weeds and noxious weed control in Washington State, please contact:

WA State Noxious Weed Control Board
P.O. Box 42560
Olympia, WA 98504-2560
(360)-725-5764

Email: noxiousweeds@agr.wa.gov
Website: www.nwcb.wa.gov

Or

WA State Department of Agriculture
21 North First Avenue #103
Yakima, WA 98902
(509) 249-6973

Or

Your County Noxious Weed Control Board

Please help protect Washington's economy and environment from noxious weeds!

Cover photos of South American spongeplant infestation and plant with female flower by Jenifer Parsons, WA Department of Ecology

2020
Washington State Noxious Weed List

South American spongeplant, *Limnobium laevigatum*, is a new Class A noxious weed for 2020. Eradication in Washington is now required of this floating, aquatic perennial plant.

List arranged alphabetically by:

SCIENTIFIC NAME

Washington State Noxious Weed Control Board

ATTACHMENT B
2020 BENTON COUNTY NOXIOUS WEED LIST

Benton County Noxious Weed Control Board

Philosophy and Weed Control Policy

The Benton County Noxious Weed Control Board (BCNWCB) was activated in 1991 pursuant to the Revised Code of Washington (RCW) 17010. The Weed Board is funded by the residents of Benton County at a rate of $5.00 per parcel and $0.005 per acre.

Philosophy

The Benton County Noxious Weed Control Board shall promote weed control by instituting a program which emphasizes education as a means to assist landowners in the in the identification of noxious weed and implementation of appropriate management practices necessary to control or prevent the spread of designated plants on the Benton County Noxious Weed List.

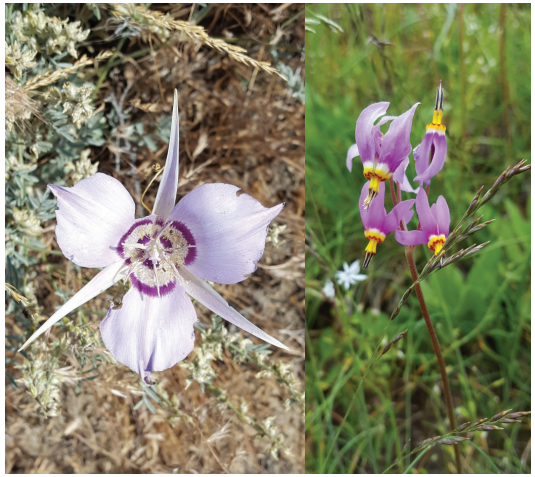
The Board will provide trained field staff to assist the land owners. The Field staff are regulatory inspectors and if needed, will require control of weeds on the control list. The weed board will promote weed control through public seminars, newsletters, displays and regularly scheduled board meetings. Landowners are responsible for the control of noxious weeds on their property.

Weed Control Policy

The policy of the Benton County Noxious Weed Control Board is to work with growers, land owners, local and state agencies to identify noxious weed populations and to develop plans for noxious weed control.

It is Benton County Noxious Weed Control Board's primary objective to educate and encourage landowners to control noxious weeds voluntarily. When BCNWCB staff identifies a weed that is listed on the Noxious Weed Control List they will send the landowner a letter identifying the weed(s), their location, control alternatives and timeline for successful control. If a landowner or entity does not comply with a notice of control the weed board will not hesitate to take enforcement action. Washington State RCW 16.750 allows monetary penalties to be assessed per parcel, per noxious weed species, day after expiration of the notice to control.

With the exception of the test plots it is not the job BCNWCB staff to remove or control noxious weeds from private or public lands. Staff's primary job is to identify and educate landowners and entities on the proper control of noxious weeds. There may be limited cases when the Benton County Noxious Weed Control Board will enter into an MOU with a local or state entity to control listed noxious weed species on a cost reimbursement basis.



Native Plants: Benton County is home to many native plants. The BCNWCB works toward protecting and reestablishing native landscapes. We work with land owners to determine the best practices to help remove noxious weeds, and encourage desirable plants to return to previously infested areas. With an abundance of noxious weeds, plants like the Mariposa Lilly (Top Left) Bonneville Shooting Star (Top Right) and Prickly Pare Cactus (Bottom) are out competed and may not return.

2020 Benton County Noxious Weed List

1841 Terminal Drive
Richland, WA 99354
Phone: 509-943-6005
E-mail: bcnwcb@frontier.com
Web: bentonweedboard.com

Class A Weeds: Non-native species whose distribution in Washington is still limited. Preventing new infestations and eradication is required by law.

flowering rush	*Butomus umbellatus*
common crupina	*Crupina vulgaris*
cordgrass, common	*Spartina anglica*
cordgrass, dense-flowered	*Spartina densiflora*
cordgrass, saltmeadow	*Spartina patens*
cordgrass, smooth	*Spartina alterniflora*
dyer's woad	*Isatis tinctoria*
eggleaf spurge	*Euphorbia oblongata*
false-brome	*Brachypodium sylvaticum*
floating primrose-willow	*Ludwigia peploides*
French broom	*Genista monspessulan*
garlic mustard	*Alliaria petiolata*
giant hogweed	*Heracleum mantegazzianum*
goatsrue	*Galega officinalis*
hydrilla	*Hydrilla verticillata*
Johnsongrass	*Sorghum halepense*
knapweed, bighead	*Centaurea macrocephala*
knapweed, Vochin	*Centaurea nigrescens*
kudzu	*Pueraria montana var. lobata*
meadow clary	*Salvia pratensis*
oriental clematis	*Clematis orientalis*
purple starthistle	*Centaurea calcitrapa*
reed sweetgrass	*Glyceria maxima*
ricefield bulrush	*Schoenoplectus mucronatus*
sage, clary	*Salvia sclarea*
sage, Mediterranean	*Salvia aethiopis*
silverleaf nightshade	*Solanum elaeagnifolium*
south American sponge-plant	*Limnbium laevigatum*
spanish broom	*Spartium junceum*
spurge flax	*Thymelaea passerina*
syrian beancaper	*Zygophyllum fabago*
tyexas blueweed	*Helianthus ciliaris*
thistle, Italian	*Carduus pycnocephalus*
thistle, milk	*Silybum marianum*
thistle, slenderflower	*Carduus tenuiflorus*
variable-leaf milfoil	*Myriophyllum heterophyllum*
wild four-o'clock	*Mirabilis nyctaginea*

Class B Weeds: Non-native species presently limited to portions of the State. Species are designated for control in regions where they are not yet wide spread. Preventing new infestations in these areas is a high priority.

Class B Weeds Found in Benton County

camelthorn	***Alhagi maurorum***
common reed (nonnative genotypes)	***Phragmites australis***
dalmatian toadflax	***Linaria dalmatica ssp.***
eurasian watermilfoil	***Myriophyllum spicatum***
hairy willowherb	***Epilobium hirsutum***
Houndstongue	***Cynoglossum officinale***
indigobush	***Amorpha fruticosa***
knapweed, diffuse	***Centaurea diffusa***
knapweed, Russian	***Rhaponticum repens***
knapweed, spotted	***Centaurea stoebe***
knotweed, Bohemian	***Polygonum x bohemicum***
knotweed, Japanese	***Polygonum cuspidatum***
kochia	***Bassia scoparia***
loosestrife, purple	***Lythrum salicaria***
perennial pepperweed	***Lepidium latifolium***
poison-hemlock	***Conium maculatum***
puncturevine	***Tribulus terrestris***
ravenna grass	***Saccharum ravennae***
rush skeletonweed	***Chondrilla juncea***
saltcedar	***Tamarix ramosissima***
spurge, myrtle	***Euphorbia myrsinites***
thistle, musk	***Carduus nutans***
thistle, Scotch	***Onopordum acanthium***
velvetleaf	***Abutilon theophrasti***
white bryony	***Bryonia alba***
yellow nutsedge	***Cyperus esculentus***
yellow starthistle	***Centaurea solstitialis***

Class B Weeds

blueweed	*Echium vulgare*
brazilian elodea	*Egeria densa*
bugloss, annual	*Anchusa arvensis*
bugloss, common	*Anchusa officinalis*
butterflybush	*Buddleja davidii*
common fennel (except bulbing fennel)	*Foeniculum vulgare (except F. vulgare var. azoricum)*
European coltsfoot	*Tussilago farfara*
fanwort	*Cabomba caroliniana*
gorse	*Ulex europaeus*
grass-leaved arrowhead	*Sagittaria graminea*
hawkweed oxtongue	*Picris hieracioides*
hawkweed, orange	*Hieracium aurantiacum*
Hawkweeds: all non-native species and hybrids	*Hieracium, subgenus Pilosella*
Hawkweeds: all nonnative species and hybrids	*Hieracium subgenus Hieracium*
herb-Robert	*Geranium robertianum*
hoary alyssum	*Berteroa incana*
knapweed, black	*Centaurea nigra*
knapweed, brown	*Centaurea jacea*
knapweed, meadow	*Centaurea x moncktonii*
knotweed, giant	*Polygonum sachalinense*
knotweed, Himalayan	*Persicaria wallichii*
lesser celandine	*Ficaria verna*
loosestrife, garden	*Lysimachia vulgaris*
loosestrife, wand	*Lythrum virgatum*
malta starthistle	*Centaurea melitensis*
parrotfeather	*Myriophyllum aquaticum*
policeman's helmet	*Impatiens glandulifera*
Scotch broom	*Cytisus scoparius*
spurge flax	*Tymelaea passerina*
shiny geranium	*Geranium lucidum*
spurge laurel	*Daphne laureola*
spurge, leafy	*Euphorbia Euphorbia*
sulfur cinquefoil	*Potentilla recta*
tansy ragwort	*Jacobaea vulgaris*
thistle, plumeless	*Carduus acanthoides*
water primrose	*Ludwigia hexapetala*
wild chervil	*Anthriscus sylvestris*
yellow archangel	*Lamiastrum galeobdolon*
yellow floatingheart	*Nymphoides peltata*

Class C Weeds: Are selected by the County Board of Directors. These weeds which are already widespread in WA or are of special interest to the state's agricultural industry.

babysbreath	***Gypsophila paniculata***
buffalobur	***Solanum rostratum***
cereal rye	***Secale cereale***
common St. johnswort	***Hypericum perforatum***
Common Teasel	***Dipsacus fullonum***
field bindweed	***Convolvulus arvensis***
fragrant waterlily	***Nymphaea odorata***
hairy whitetop	***Lepidium appelianum***
hoary cress	***Lepidium draba***
jointed goatgrass	***Aegilops cylindrica***
longspine sandbur	***Cenchrus longispinus***
Medusahead	***Taeniatherum caput-medusae***
pampas grass	***Cortaderia selloana***
reed canarygrass	***Phalaris arundinacea***
smoothseed alfalfa dodder	***Cuscuta approximata***
spikeweed	***Hemizonia pungens***
spiny cocklebur	***Xanthium spinosum***
Swansonpea	***Spherophysa salsula***
thistle, bull	***Cirsium vulgare***
thistle, Canada	***Cirsium arvense***
yellowflag iris	***Iris pseudacorus***

2020 Benton County Noxious Weed List

Controlling Noxious Weeds Is Everyone's Responsibility!

ATTACHMENT C
RECOMMENDED TIMING AND METHOD OF CHEMICAL CONTROL FOR NOXIOUS WEEDS WITHIN THE PROJECT LEASE BOUNDARY

Table C-1. Recommended Timing and Method of Chemical Control for Noxious Weeds Documented within the Project Lease Boundary

Noxious Weed Species	Chemical Methods and Timing of Control	Application Rate[1]
Bassia (*Kochia*) *scoparia* (kochia)	**Aminocyclopyrachlor + chlorsulfuron** – Apply either pre-emergence (late winter/early spring) or post-emergence. Postemergence is most effective on seedlings.	4.75 to 8 oz/a
	Chlorsulfuron – Apply pre-emergence (late winter/early spring), or post-emergence from seedling to bolting stage of growth.	0.75 oz ai/a (1 oz/a)
	Fluroxypyr – Apply in spring from seedling to bolting stage of growth.	2.1 to 7.7 oz ae/a (6 to 22 o/a)
	Glyphosate – Apply in spring from seedling to flowering stage of growth.	1.1 to 1.7 lb ae/a
	Hexazinone – Apply pre-emergence in the early spring.	0.5 to 1.5 lb ai/a (2 to 6 pints/a)
	Imazapyr – Apply pre-emergence (late winter/early spring) or post-emergence to actively growing kochia. • Rate:	0.5 to 1.5 lb ae/a (2 to 4 pints/a)
	Metsulfuron – Apply in spring from seedling to flowering stage of growth.	0.6 to 1.2 oz ai/a (1 to 2 oz/a)
	Rimsulfuron – Apply pre-emergence (late winter/early spring) or post-emergence to kochia seedlings.	1 oz ai/a (4 oz/a)[1]
Centaurea sp.[2] (knapweed)	**2,4-D** – Apply at the early stage of flower stem elongation (late April to early May).	1 to 2 lb ae/a
	Aminocyclopyrachlor + chlorsulfuron – Apply to actively growing plants in spring.	1.8 to 3.2 oz/a aminocyclopyrachlor + 0.7 to1.3 oz/a chlorsulfuron
	Aminopyralid – Consult label for optimum timing. Diffuse and spotted knapweed: apply to actively growing plants in fall or in spring from rosette to bolting growth stages.	1 to 1.75 oz ae/a
	Clopyralid – Apply up to the bud stage.	0.25 to 0.5 lb ae/a (0.66 to 1.33 pints/a)
	Clopyralid + 2,4-D amine (Curtail) – Apply after most rosettes emerge but before flower stem elongates.	2 to 4 quarts/a Curtail
	Glyphosate – Apply to actively growing knapweed when most plants are at bud stage.	3 lb ae/a
	Picloram – Apply in late spring before or during flower stem elongation.	0.25 to 0.5 lb ae/a
	Triclopyr + clopyralid – Apply from rosette to early bolt stage when weeds are actively growing.	1.5 to 2 pints/a

Noxious Weed Species	Chemical Methods and Timing of Control	Application Rate[1]
Centaurea solstitialis (yellow starthistle)	**2,4-D LV ester or 2,4-D amine** – Apply before flowering.	1 lb ae/a in 50 gallons of water
	Aminocyclopyrachlor + chlorsulfuron – Apply to actively growing plants.	1.2 to 1.8 oz/a aminocyclopyrachlor + 0.5 to 0.7 oz/a chlorsulfuron
	Aminopyralid (Milestone) – Apply to plants at the rosette through bolting stages.	0.75 to 1.25 oz ae/a (3 to 5 fluid oz/a Milestone)
	Chlorsulfuron – For best results apply to young, actively growing plants.	1.125 oz ai/a (1.5 oz/a)
	Clopyralid – After most rosettes have emerged but before bud formation.	0.09 to 0.375 lb ae/a (0.25 to 1 pint/a)
	Clopyralid + 2,4-D amine (Curtail) – Apply after most rosettes have emerged but before bud formation.	1 to 5 quarts/a Curtail
	Picloram – In spring, to plants still in rosette through bud formation.	0.25 to 0.375 lb ae/a
	Triclopyr + clopyralid – Apply from rosette to early bolt stage when starthistle is actively growing.	1.5 to 2.5 pints/a
Chondrilla juncea (rush skeletonweed)	**2,4-D or MCPA** – Apply to rosettes in the spring immediately before or during bolting.	2 lb ae/a
	Aminocyclopyrachlor + chlorsulfuron – Apply to actively growing plants in spring.	1.8 to 3.2 oz/a aminocyclopyrachlor + 0.7 to 1.3 oz/a chlorsulfuron
	Aminopyralid (Milestone) – Spring or fall when rosettes are present.	1.75 oz ae/a (7 fluid oz/a Milestone)
	Clopyralid – Apply to rosettes in fall or up to early bolting in spring.	0.25 to 0.375 lb ae/a (0.66 to 1 pint/a)
	Picloram – Apply from late fall to early spring. For best results, apply just before or during bolting.	1 lb ae/a
Onopordum acanthium (Scotch thistle)	**2,4-D** – spring or fall.	1.5 to 2 lb ae/a
	Aminocyclopyrachlor + chlorsulfuron (Perspective) – Apply to actively growing plants in spring.	1.8 to 3.2 oz/a aminocyclopyrachlor + 0.7 to 1.3 oz/a chlorsulfuron
	Aminopyralid (Milestone) – Apply in spring or early summer to rosettes or bolting plants or in fall to seedlings and rosettes.	0.75 to 1.25 oz ae/a (3 to 5 fl oz/a Milestone)
	Chlorsulfuron – Apply to young, actively growing plants.	0.75 oz ai/a (1 oz/a)
	Clopyralid + 2,4-D amine (Curtail) – Apply to actively growing thistle after most basal leaves emerge but before bud stage.	1 to 5 quarts/a Curtail

Noxious Weed Species	Chemical Methods and Timing of Control	Application Rate[1]
	Clopyralid – Apply up to the bud stage.	0.09 to 0.375 lb ae/a (0.25 to 1 pint/a)
	Glyphosate + 2,4-D – Apply to plants in rosette stage of growth in spring or before freezeup in fall.	Broadcast: 16 to 32 fl oz/a. Spot treatment: 1 to 2% solution.
	Metsulfuron (Escort and others) – Apply post-emergence to actively growing plants.	Escort: 0.6 oz ai/a (1 oz/a)
	Picloram – Apply in the fall before plants bolt.	0.25 lb ae/a
	Triclopyr + clopyralid – Apply to actively growing plants from rosette to early bolt stage.	1.5 to 2 pints/a
Secale cereale (cereal rye)	Consult with Benton County Weed Control Coordinator. Glyphosate can be applied post-emergence; does not provide residual weed control.	

Sources: DiTomaso e al. 2013; Kyser et al. 2014; Prather et al. 2019.

[1] a = acre; ae = acid equivalent; ai = active ingredient; lb= pound; oz = ounces

[2] Individuals observed were not flowering at the time of surveys; therefore, positive identification was not possible. Based on observations of rosettes and leaves, individuals and populations are believed to be either diffuse knapweed or spotted knapweed