LMS/RFS/S04512-4.0
Level 4
Issue Date: 1/3/2022
Effective Date: 1/3/2022

Rocky Flats Site, Colorado, Vegetation Management Plan

December 2021

U.S. DEPARTMENT OF ENERGY | Legacy Management

This page intentionally left blank

Contents

Figure

Tables

Abbreviations

CNWA	State of Colorado Noxious Weed Act
COU	Central Operable Unit
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
LM	Office of Legacy Management
LMS	Legacy Management Support
NPDES	National Pollutant Discharge Elimination System
PGP	Pesticide General Permit
POU	Peripheral Operable Unit
RFNWR	Rocky Flats National Wildlife Refuge
RFS	Rocky Flats Site
SWMP	State Weed Management Plan
USFWS	U.S. Fish and Wildlife Service

1.0 Introduction

The Rocky Flats Site, Colorado, is under the jurisdiction of the U.S. Department of Energy (DOE) Office of Legacy Management (LM). The Rocky Flats Site comprises the Central Operable Unit (COU) and Peripheral Operable Unit (POU) (Figure 1). Most of the POU was transferred to the U.S. Fish and Wildlife Service (USFWS) to become the Rocky Flats National Wildlife Refuge (RFNWR). Vegetation management is conducted as part of the surveillance and maintenance activities, which are conducted pursuant to the *Rocky Flats Legacy Management Agreement*. This agreement established the regulatory framework to implement the final response action selected and approved in the Rocky Flats Corrective Action Decision/Record of Decision under the Comprehensive Environmental Response, Compensation, and Liability Act; the Resource Conservation and Recovery Act; and the Colorado Hazardous Waste Act to ensure that the response action remains protective of human health and the environment. The activities described in this document apply to the COU lands and those POU locations that have not yet transferred to USFWS. The RFNWR has its own vegetation management protocols under the auspices of USFWS.

The vegetation management goal at the Rocky Flats Site is to exercise good stewardship for preservation of the natural resources while complying with applicable federal, state, and local regulations. The program incorporates an integrated ecosystem approach to natural resource management utilizing as many management techniques as possible. This Vegetation Management Plan uses an integrated framework of techniques to control excessive vegetation to reduce wildfire hazards, control present and future infestations of noxious weeds, and enhance the native plant communities and wildlife habitat.

Some vegetation management actions are regulated by law, but various levels of control are required depending upon the species to be controlled. Other vegetation management actions serve dual purposes of controlling the spread of invasive weeds and reducing the accumulation of fuels that can carry uncontrolled wildfires across the Rocky Flats Site and into nearby areas. Invasions of nonnative vegetation at the Rocky Flats Site are degrading existing habitat quality in the undisturbed areas and reducing the quality of the site's high-value vegetation communities. The lack of grazing, the long-term practice of suppressing wildfires, and past prohibition of prescribed burning at the Rocky Flats Site (including cessation of burning vegetation debris accumulated in fences) have allowed a heavy accumulation of fine fuels. This has increased the risk of uncontrolled wildfires.

Controlling excessive weed growth and mowing vegetation reduces fuel accumulation and enhances the sitewide noxious weed control effort. These vegetation control efforts also reduce the secondary seed source from noxious weeds that grow in disturbed areas of the Rocky Flats Site.

Although no single weed control strategy will completely remedy the noxious weed problems at the Rocky Flats Site, this plan seeks to integrate various techniques to provide effective weed control and enhanced wildfire protection while minimizing environmental damage and optimizing the use of available resources (Table 1). Some vegetation management actions are important from the standpoint of reduction of biomass that would otherwise provide fuel for wildfires; others are more important from a resource management perspective.

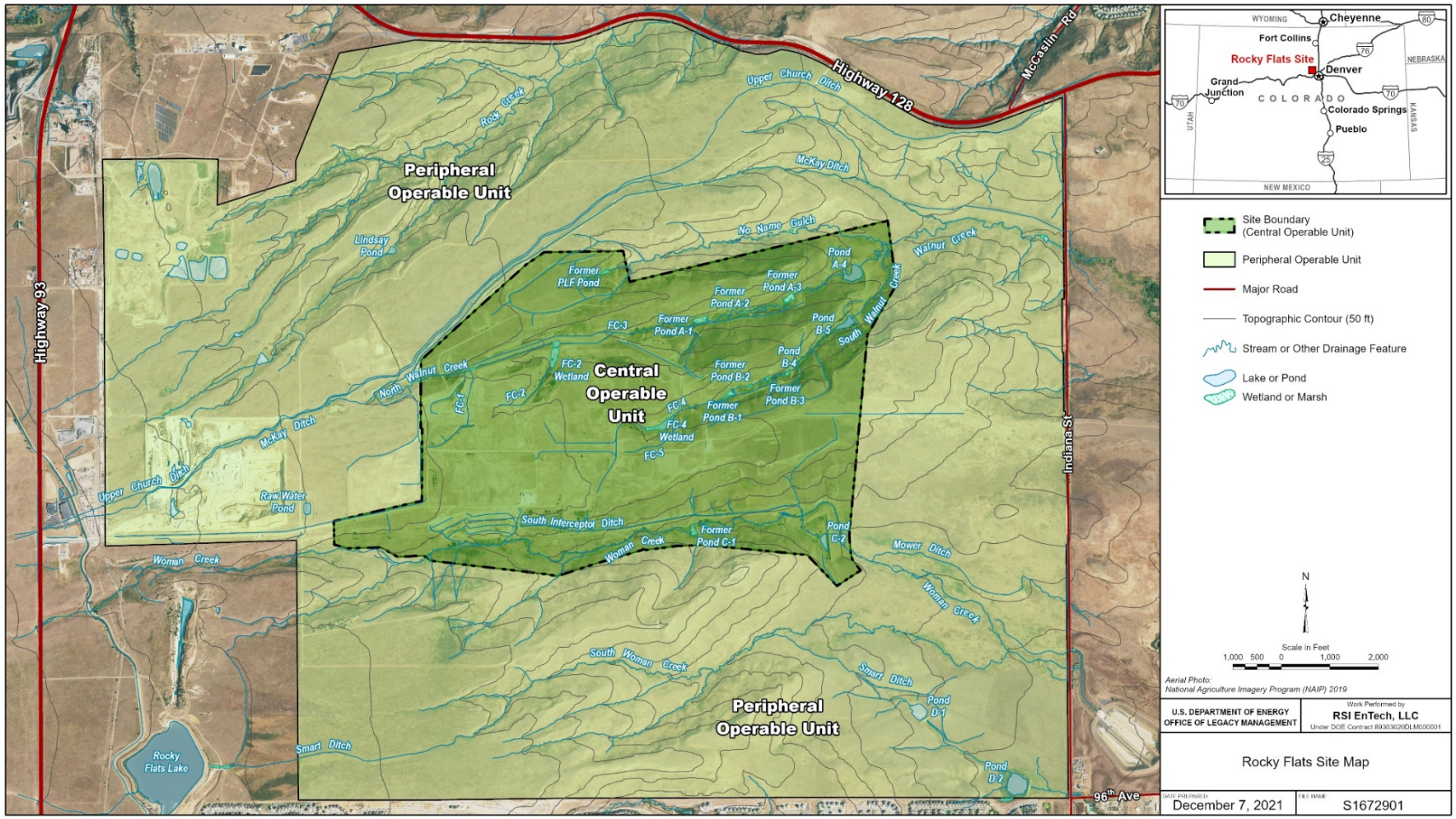

Figure 1. Rocky Flats Site Map

Table 1. Weed Control Methods for the Rocky Flats Site

Treatment Option	Control Method
Administrative controls	Administrative policies and procedures
Cultural controls	Revegetation requirements; maintain healthy native plant communities; interseeding
Physical or mechanical controls	Mowing
	Prescribed burns
	Hand-pulling, trimmers, chain saw
Biological controls	Biological control insects
	Grazing
Chemical controls	Herbicide applications

Weed problems on surrounding lands are also of concern. Without great expense, it is difficult or impossible in the long term to maintain a weed-free island surrounded by weed-covered lands. Establishing cooperative agreements and working with surrounding landowners can help address more regional weed issues that cannot be effectively controlled solely by individual landowners. When warranted by observations of noxious weeds, site staff may contact owners of adjacent properties, report observations, and request that actions be taken to address problem areas.

2.0 Weed Control Strategy

Vegetation management at the Rocky Flats Site includes integration of noxious weed control efforts with other means of vegetation control necessary for health and safety, resource conservation, and wildfire control. Most noxious weeds invade ecosystems because of disturbance, degradation, or changes in the natural system that alter resource availability, thus making the plant community more prone to invasions (Davis et al. 2000). Long-term control of these noxious weeds will ultimately depend on restoring the natural processes (e.g., fire, grazing) that originally kept the ecosystem healthy. However, weed control is a critical component of an integrated management approach because it focuses efforts directly on the undesired species.

The weed management strategy used at the Rocky Flats Site includes identification of the problem through inventory and mapping efforts, development of management goals, setting of priorities, development and evaluation of weed management techniques for selected species, and monitoring.

2.1 Inventory and Mapping

Inventory and mapping efforts for noxious weeds and other undesirable species have been ongoing at the Rocky Flats Site since the mid-1990s. Through fortuitous observations and targeted mapping efforts for selected species, site ecologists have a good working knowledge of which species are present onsite, most problematic, and in need of prioritization and control. Annual reports contain the weed maps for species mapped each year, maps and tables of annual control efforts, and other vegetation management activities (mowing, interseeding, etc.) conducted throughout the year.

2.2 Noxious Weeds and Management Goals

A total of 35 species of Colorado state-listed noxious weeds are known to occur or have historically occurred at the Rocky Flats Site (Table 2). Table 2 contains the Colorado state-listed noxious weed species and other species that are not on the state list but that are considered problematic at the Rocky Flats Site. The state ranks noxious weeds in four categories—"A," "B," "C," or "Watch List" species—based on their potential for invasiveness, whether they already occur in the state, their current distribution in the state, and other factors. A-list species are not yet in the state or have only recently been found there, and eradication is the management goal. B-list species are those for which management plans have been or will be developed to stop their spread. Depending on the geographic location in Colorado, control for the B-list species may be elimination or suppression. C-list species are those for which management plans will be developed to help jurisdictions that choose to control these species. Watch List species have potential to threaten the agricultural productivity and environmental values of Colorado lands. Additional information is needed on these species before they may be added to the state noxious weed list. Table 2 identifies the category for each species known to occur at the Rocky Flats Site, when applicable. The management goals developed by the state specific to the Rocky Flats geographic area are also listed for each species (when available). The species listed in Table 2 include all species known to occur on either the COU or POU lands. Not all species on the list are known to currently exist at the Rocky Flats Site because some species were found once, removed or treated at that time, and have never been found again. However, it is important to be watchful and aware of what might be found again.

Generally, species will be controlled pursuant to the State of Colorado's management goals; however, as a federal facility, professional judgment and knowledge of the site's resources may warrant changes to site-specific management goals. Species that are not on the noxious weed list but are considered problematic at the Rocky Flats Site will also be prioritized for control based on field observations and professional judgment.

2.3 Weed Control Methodology Evaluation

The effectiveness, feasibility of implementation, and costs of weed control techniques vary by target species. The biology of each species is different, and therefore different considerations affect development of an effective integrated weed control program. The size of an infestation may also influence what methods may be used.

In accordance with a 2009 U.S. Court of Appeals ruling (*National Cotton Council, et al. v. EPA*) discharges to Waters of the United States from the application of pesticides require National Pollutant Discharge Elimination System (NPDES) permits. In September 2021, the U.S. Environmental Protection Agency (EPA) published its most recent "Final National Pollutant Discharge Elimination System (NPDES) Pesticide General Permit for Point Source Discharges from the Application of Pesticides" (86 FR 51665–51669). The NPDES Pesticide General Permit (PGP) covers point source discharges to Waters of the United States from pesticide applications in the geographic areas where EPA is the NPDES permitting authority. EPA's final 2021 PGP became effective on October 31, 2021. This rule requires an evaluation of management techniques when herbicides might be used in or near Waters of the United States. Table 3 below contains an evaluation of management techniques for this purpose for each of the noxious or undesirable species known to occur, or known to have occurred, at the Rocky Flats Site. (All species included in Table 2 below are also evaluated in Table 3). While the evaluation

is specific to the NPDES PGP requirements, it might not be completely representative of upland herbicide applications or requirements. In some cases, the information is based on the knowledge that certain species either are not known to occur in or near Waters of the United States at the site or are in such small populations that nonchemical approaches would be effective to control the species under these conditions. However, in surrounding upland areas, infestations might be large enough that herbicides would be warranted and more cost-effective.

2.4 Monitoring

Pre- and post-control monitoring is conducted using a variety of techniques. Mapping of weed infestations is conducted for various selected species for use in developing annual control activities. Qualitative or quantitative vegetation monitoring may be conducted to provide data for specific informational needs. In other cases, a post-control walkdown of the treated area is conducted to visually observe the effectiveness of controls. Notes may be taken in a field notebook, or photographs may be used to document conditions for future reference.

Table 2. Noxious and Problematic Weeds That Occur or Have Occurred at the Rocky Flats Site

Common Name	Scientific Name	Colorado Noxious Weed List[a]	Colorado List[b] (A, B, C, or W)	Colorado State Management Plan Goal[c]	Rocky Flats Weed Problem[d]	Colorado Department of Agriculture Fact Sheet Available
Bouncingbet	*Saponaria officinalis*	Y	B	Elimination by 2024	Y	Yes
Bulbous bluegrass[e]	*Poa bulbosa*	Y	C	NA	N	No
Bull thistle	*Cirsium vulgare*	Y	B	Elimination by 2024	Y	Yes
Canada thistle	*Cirsium arvense*	Y	B	Suppression	Y	Yes
Chicory	*Cichorium intybus*	Y	C	NA	Y	Yes
Common burdock	*Arctium minus*	Y	C	NA	N	Yes
Common mullein	*Verbascum thapsus*	Y	C	NA	Y	Yes
Common reed[e]	*Phragmites australis*	Y	W	NA	N	No
Common St. Johnswort	*Hypericum perforatum*	Y	C	NA	Y	Yes
Common teasel	*Dipsacus fullonum*	Y	B	Elimination by 2022	Y	Yes
Dalmatian toadflax	*Linaria dalmatica*	Y	B	Suppression	Y	Yes
Dame's rocket	*Hesperis matronalis*	Y	B	Elimination by 2024	Y	Yes
Diffuse knapweed	*Centaurea diffusa*	Y	B	Suppression	Y	Yes
Downy brome	*Bromus tectorum*	Y	C	NA	Y	Yes
Field bindweed	*Convolvulus arvensis*	Y	C	NA	N	Yes
Hairy willow-herb	*Epilobium hirsutum*	Y	A	Eradication	Y	Yes
Hoary cress	*Cardaria draba*	Y	B	Elimination by 2026	Y	Yes
Houndstongue	*Cynoglossum officinale*	Y	B	Elimination by 2030	Y	Yes
Jointed goatgrass	*Aegilops cylindrica*	Y	B	Suppression	Y	Yes
Mayweed chamomile[e]	*Anthemis cotula*	Y	B	Elimination by 2024	N	Yes
Moth mullein	*Verbascum blattaria*	Y	B	Elimination by 2024	Y	Yes
Musk thistle	*Carduus nutans*	Y	B	Suppression	Y	Yes
Oxeye daisy[e]	*Chrysanthemum leucanthemum*	Y	B	Elimination by 2030	N	Yes
Perennial sowthistle	*Sonchus arvensis*	Y	C	NA	N	Yes
Poison hemlock	*Conium maculatum*	Y	C	NA	N	Yes
Puncturevine	*Terrestris tribulus*	Y	C	NA	N	Yes
Quackgrass	*Elytrigia repens*	Y	C	NA	N	Yes
Redstem filaree	*Erodium cicutarium*	Y	C	NA	N	Yes
Russian knapweed[e]	*Centaurea repens*	Y	B	Elimination by 2028	N	Yes
Russian olive	*Elaeagnus angustifolia*	Y	B	Suppression	Y	Yes
Saltcedar (tamarisk)	*Tamarix ramosissima*	Y	B	Elimination by 2028	Y	Yes
Siberian elm	*Ulmus Pumila*	Y	W	NA	N	No
Scotch thistle	*Onopordum acanthium*	Y	B	Suppression	Y	Yes
Yellow starthistle[e]	*Centaurea solstitialis*	Y	A	Eradication	N	Yes

Table 2. Noxious and Problematic Weeds That Occur or Have Occurred at the Rocky Flats Site (continued)

Common Name	Scientific Name	Colorado Noxious Weed List[a]	Colorado List[b] (A, B, C, or W)	Colorado State Management Plan Goal[c]	Rocky Flats Weed Problem[d]	Colorado Department of Agriculture Fact Sheet Available
Yellow toadflax[e]	*Linaria vulgaris*	Y	B	Suppression	N	Yes
Rocky Flats Site-Specific Problem Species						
Annual rye	*Secale cereale*	N	NA	NA	Y	No
Bird's-foot trefoil	*Lotus corniculatus*	N	NA	NA	Y	No
Leafy spurge[f]	*Euphorbia uralensis*	N	NA	NA	Y	No
Lens-padded hoary cress	*Cardaria chalepensis*	N	NA	NA	Y	No
Wild carrot	*Daucus carota*	N	NA	NA	Y	No

Notes:
This table provides general goals and information included in Volume 8 *Code of Colorado Regulations* Section 1206-02 (8 CCR 1206-02), "Rules Pertaining to the Administration and Enforcement of the Colorado Noxious Weed Act," also called the CNWA Rules. For more details, see the CNWA Rules.

Plant nomenclature follows that of GPFA (1986), Weber (1976), Weber (1990), and Ackerfield (2015), in that order of determination.

[a] This column lists noxious weeds known to occur at the Rocky Flats Site as listed by the CNWA Rules. The last five species in the list are not listed by the CNWA Rules, but they are considered problematic at the Rocky Flats Site.
[b] Noxious weeds in Colorado are ranked on different lists—A, B, C, or W (for "Watch List") —depending on how problematic they are. See the CNWA Rules for list descriptions. "NA" means the species is not on the CNWA Rules list but is considered problematic at the Rocky Flats Site.
[c] This column states what the State Weed Management Plan (SWMP) goal is for this species in the part of Jefferson County where the Rocky Flats Site is located. "NA" means that there is either no SWMP goal for this species or it is not applicable to the geographic location of the Rocky Flats Site in Jefferson County. The SWMP goals are outlined in the CNWA Rules.
[d] A species deemed to be a "Rocky Flats weed problem" in this column are not on the CNWA Rules lists but are problematic at the site. This column also identifies those species that are not problematic even though they are on the CNWA Rules lists for the Rocky Flats Site.
[e] This species was observed on the site in the past; however, it has not been observed in many years and is presumed to be eradicated.
[f] This species is not listed species on the noxious weed list. According to some authorities, *E. uralensis* is a variety of *E. esula*, a B-listed noxious weed with a goal of elimination by 2028. Due to its aggressive nature, the goal is to control it as if it were the listed species.

Abbreviation:
SWMP = State Weed Management Plan

This page intentionally left blank

Table 3. NPDES PGP Rocky Flats Site Pest Management Options Evaluation

NOTE: This evaluation is specific to herbicide applications in or near Waters of the United States at the Rocky Flats Site with respect to the NPDES PGP requirements. It is not necessarily representative of upland herbicide application needs or requirements.

Common Name	Scientific Name	Action Threshold	Pest Management Options[a]					Considerations[a]				
			Prevention	Cultural Methods	Mechanical/ Physical Methods	Biological Control Agents	Herbicides	Impacts to Water	Impacts to Non-Target Organisms	Feasibility (Herbicide Control)	Cost-Effectiveness for Control in or near Water	Relevant Past Pest Management Measures
Annual rye	*Secale cereale*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Not available	Necessary	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Mowing was not effective—more than anything, it spread seed—and made conditions worse. If only a couple of plants are present, they can be pulled, but if more plants are present, it is not feasible to hand pull them because the task is too labor-intensive. Herbicides have been used with success at RFS.
Bird's-foot trefoil	*Lotus corniculatus*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Somewhat effective	Not available	As needed	None	No unexpected impacts anticipated	NA	Non-herbicide methods are cost-effective at this point.	Hand pulling has been somewhat effective in the past for small infestations.
Bouncingbet	*Saponaria officinalis*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Not available	Necessary	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Hand pulling is not effective due to spreading by rhizomes. Herbicides have been used with success at RFS.
Bulbous bluegrass	*Poa bulbosa*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Effective	Not available	As needed	None	No unexpected impacts anticipated	NA	Non-herbicide methods are cost-effective at this point.	This species was hand-pulled many years ago when it was discovered at RFS. Presently, it is not known to occur onsite. Because this species is not much of a problem at RFS, it has not been specifically targeted for control.
Bull thistle	*Cirsium vulgare*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Somewhat effective	Released/ not effective	As needed	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Biocontrol insects were released several years ago. They were not effective for control. This species is not very common at the site. It is typically found in wetter locations. Herbicides have been used with success at RFS. This species is controlled, along with other target species, when herbicides are applied.
Canada thistle	*Cirsium arvense*	Mapping category of light or higher	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Released/ not effective	Necessary	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Mowing is not effective. Two biocontrols were released onsite to control the species, and neither has been successful. Pulling is not effective because of rhizomes. Herbicides have been used with success at RFS.
Chicory	*Cichorium intybus*	Mapping category of light or higher	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Not available	Necessary	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Herbicides have been used with success at RFS in the past.
Common burdock	*Arctium minus*	Mapping category of light or higher	Yes	Prevention/Maintain healthy stand of vegetation.	Effective	Not available	As needed	None	No unexpected impacts anticipated	NA	Non-herbicide methods are cost-effective at this point.	Because this species is not much of a problem at RFS, it has not been specifically targeted for control.
Common mullein	*Verbascum thapsus*	Mapping category of light or higher	Yes	Prevention/Maintain healthy stand of vegetation.	Somewhat effective	Not available	Necessary	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Mowing has been done, with minimal success because the plant flowers and sets seed at a shorter height. Mechanical control with a shovel (i.e., cutting off the stem below ground surface) does work, but that method is time-consuming and labor-intensive. Herbicides have been used with good success on this species at RFS in the past.
Common reed	*Phragmites australis*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Effective	Not available	As needed	None	No unexpected impacts anticipated	NA	Non-herbicide methods are cost-effective at this point.	This species was only found once along the old east access road on what is now the RFNWR. It was destroyed during site closure and has not been seen since. Should it return, hand control would be attempted first.
Common St. Johnswort	*Hypericum perforatum*	Mapping category of light or higher	Yes	Prevention/Maintain healthy stand of vegetation.	Somewhat effective	Released/ effective	As needed	None	No unexpected impacts anticipated	NA	Non-herbicide methods are cost-effective at this point.	Biocontrol insects were released many years ago for this species. It worked well in some years. The species has never been problematic at RFS although it is found throughout the site. Therefore, no specific efforts beyond the biocontrols are typically used.
Common teasel	*Dipsacus fullonum*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Somewhat effective	Not available	Necessary	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	This species is known to occur at only one location in the COU. It occurs in large areas in Rock Creek on the refuge. If the infestation is small, hand control of seed heads and cutting off stems with a shovel will be attempted first. If there are numerous plants, spraying is the only effective course of action.
Dalmatian toadflax	*Linaria dalmatica*	Mapping category of light or higher	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Released/ effective	As needed	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Mechanical control is ineffective. Biocontrols have been released. One species of moth was ineffective, but the stem-boring beetle has shown good results. Chemical control has been shown to be very effective in the past at RFS. Given the promising results of the biocontrol, no specific efforts to target the species with herbicides have been done along the streams in recent years. This species is controlled, along with other target species, when herbicides are applied.
Dame's rocket	*Hesperis matronalis*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Somewhat effective	Not available	As needed	None	No unexpected impacts anticipated	Only feasible option	Herbicides are most cost-effective method.	Hand control has been done with some success over the years. Herbicides have also been used successfully for the species at RFS and are most effective.
Diffuse knapweed	*Centaurea diffusa*	Mapping category of light or higher	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Released/ effective	Necessary	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Mechanical control is ineffective. Biocontrols have been released and are fairly effective at keeping populations reduced. Chemical control has been shown to be very effective in the past at RFS and continues to be required where densities of the species become too great for the biocontrol insects to deal with.

Table 3. NPDES PGP Rocky Flats Site Pest Management Options Evaluation (continued)

Common Name	Scientific Name	Action Threshold	Pest Management Options[a]					Considerations[a]				
			Prevention	Cultural Methods	Mechanical/ Physical Methods	Biological Control Agents	Herbicides	Impacts to Water	Impacts to Non-Target Organisms	Feasibility (Herbicide Control)	Cost-Effectiveness for Control in or near Water	Relevant Past Pest Management Measures
Downy brome	*Bromus tectorum*	Mapping category of light or higher	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Not available	Necessary	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Chemical control has been shown to be somewhat effective in the past. This species is not specifically targeted at this time. Interseeding additional native species to increase the density of desirable species helps to control this species.
Field bindweed	*Convolvulus arvensis*	Mapping category of light or higher	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Released/ not effective	Necessary	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Mechanical control is ineffective. Biocontrols (mites) work along roads or other areas where disturbance works to spread mite-infested plant parts to other live plants. However, on the grasslands where no disturbance occurs, the biocontrols do not spread. Therefore, herbicides are the only effective control measure.
Hairy willow-herb	*Epilobium hirsutum*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Not available	Necessary	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Digging or mowing is not a feasible option for this perennial species. Deadheading (before seed set) and chemical controls are the only options to eradicate this species.
Hoary cress	*Cardaria draba*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Somewhat effective	Not available	Necessary	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Mechanical control works for a few plants. However, previously when the infestations were larger, hand control was ineffective or not feasible, and herbicides were used with good success.
Houndstongue	*Cynoglossum officinale*	Mapping category of light or higher	Yes	Prevention/Maintain healthy stand of vegetation.	Somewhat effective	Not available	As needed	None	No unexpected impacts anticipated	Only feasible option	Non-herbicide methods are cost-effective at this point.	This species is controlled, along with other target species, when herbicides are applied.
Jointed goatgrass	*Aegilops cylindrica*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Not available	Necessary	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Mechanical control is ineffective. Mowing was attempted years ago, but instead of controlling the species it spread the seed. Only herbicides are effective for controlling this species.
Leafy spurge	*Euphorbia uralensis*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Available/not warranted	Necessary	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Mechanical control is ineffective. Hand control has been attempted but does not eradicate the plants because of their root system. Weed population on RFS too small to support a biocontrol release. Only herbicides are effective for controlling this species.
Lens-padded hoary cress	*Cardaria chalepensis*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Not available	Necessary	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Mechanical control has been attempted at RFS and is not effective. Herbicides are the only effective means to control this species.
Mayweed chamomile	*Anthemis cotula*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Effective	Not available	As needed	None	No unexpected impacts anticipated	NA	Non-herbicide methods are cost-effective at this point.	This species was found only a couple of times at a newly revegetated area. It was hand pulled and never returned. Should it return, hand control would be attempted first.
Moth mullein	*Verbascum blattaria*	Mapping category of light or higher	Yes	Prevention/Maintain healthy stand of vegetation.	Somewhat effective	Not available	As needed	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	The species has never been problematic at RFS although it is found throughout the site. Therefore, in the past, no specific control efforts have targeted this species. Herbicides are effective in controlling it; herbicides used to control common mullein will control this species as well.
Musk thistle	*Carduus nutans*	Mapping category of light or higher	Yes	Prevention/Maintain healthy stand of vegetation.	Somewhat effective	Released/ effective	As needed	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Mechanical control is effective on small infestations. Biocontrols were released at RFS for this species several decades ago. They were only partially effective. As a result, typically herbicide applications are needed to control large infestations.
Oxeye daisy	*Chrysanthemum leucanthemum*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Effective	Not available	As needed	None	No unexpected impacts anticipated	NA	Non-herbicide methods are cost-effective at this point.	This species was only found at a couple of locations in Woman Creek many years ago. It was hand pulled and never returned. Should it return, hand control would be attempted first.
Perennial sowthistle	*Sonchus arvensis*	Mapping category of light or higher	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Not available	As needed	None	No unexpected impacts anticipated	NA	Non-herbicide methods are cost-effective at this point.	Because this species is not much of a problem at RFS, it has not been specifically targeted for control.
Poison hemlock	*Conium maculatum*	Mapping category of light or higher	Yes	Prevention/Maintain healthy stand of vegetation.	Effective	Not available	As needed	None	No unexpected impacts anticipated	NA	Non-herbicide methods are cost-effective at this point.	Because this species is not much of a problem at RFS, it has not been specifically targeted for control.
Puncturevine	*Terrestris tribulus*	Mapping category of light or higher	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Available/not warranted	As needed	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Because this species is not much of a problem at RFS, it has not been specifically targeted for control. If in the future the species increases in population/density, the use of biocontrols will be evaluated.
Quackgrass	*Elytrigia repens*	Mapping category of light or higher	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Not available	As needed	None	No unexpected impacts anticipated	NA	Non-herbicide methods are cost-effective at this point.	Because this species is not much of a problem at RFS, it has not been specifically targeted for control.
Redstem filaree	*Erodium cicutarium*	Mapping category of light or higher	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Not available	As needed	None	No unexpected impacts anticipated	NA	Non-herbicide methods are cost-effective at this point.	Because this species is not much of a problem at RFS, it has not been specifically targeted for control.
Russian knapweed	*Centaurea repens*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Available/not warranted	Necessary	None	No unexpected impacts anticipated	NA	Herbicides are only cost-effective method.	Mechanical control (mowing) was attempted years ago but was ineffective. The species has not been recently noted at RFS. Should it be noted again, herbicides will be used. If in the future the species increases in population/density, the use of biocontrols will be evaluated.
Russian olive	*Elaeagnus angustifolia*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Not available	Necessary	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Mechanical control alone does not typically kill the plants. They resprout. Herbicide applications must be used on the cut stump, or foliar applications must be used on small plants, to control this species effectively.

Table 3. NPDES PGP Rocky Flats Site Pest Management Options Evaluation (continued)

Common Name	Scientific Name	Action Threshold	Pest Management Options[a]					Considerations[a]				
			Prevention	Cultural Methods	Mechanical/ Physical Methods	Biological Control Agents	Herbicides	Impacts to Water	Impacts to Non-Target Organisms	Feasibility (Herbicide Control)	Cost-Effectiveness for Control in or near Water	Relevant Past Pest Management Measures
Saltcedar (tamarisk)	*Tamarix ramosissima*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Available/ not warranted	Necessary	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Mechanical control alone does not typically kill the plants. They resprout. Herbicide applications must be used on the cut stump, or foliar applications must be used on small plants, to control this species effectively. Populations are not large enough to warrant biocontrol releases.
Siberian elm	*Ulmus Pumila*	Mapping category of light or higher	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Not available	As needed	None	No unexpected impacts anticipated	NA	Herbicides are only cost-effective method.	Because this species is not much of a problem at RFS, it has not been specifically targeted for control.
Scotch thistle	*Onopordum acanthium*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Somewhat effective	Not available	As needed	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Hand control has been done with limited success over the years. Herbicides have also been used successfully for this species at RFS. Spot spraying with herbicides is very effective.
Wild carrot	*Daucus carota*	Mapping category of light or higher	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Not available	Necessary	None	No unexpected impacts anticipated	Only feasible option	Herbicides are only cost-effective method.	Mechanical control is ineffective. Mowing has been attempted but does not work for control. Hand pulling might work for an occasional plant if the entire taproot can be pulled out, but otherwise it is ineffective on an infestation of any size. Realistically, herbicides are the only effective means for controlling this species.
Yellow starthistle	*Centaurea solstitialis*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Effective	Available/ not effective	As needed	None	No unexpected impacts anticipated	NA	Non-herbicide methods are cost-effective at this point.	This species was hand pulled many years ago when it was discovered at RFS. Presently, it is not known to occur onsite.
Yellow toadflax	*Linaria vulgaris*	One or more individuals	Yes	Prevention/Maintain healthy stand of vegetation.	Not effective	Released/ effective	As needed	None	No unexpected impacts anticipated	NA	Non-herbicide methods are cost-effective at this point.	This species was found at a couple locations in the southern part of the RFNWR (former buffer zone) many years ago. Only small populations were noted, and recent attempts to find it again were not successful. Therefore, at this point, it is not a problem at the site.

Notes:
[a] See table definitions below for further information.

Abbreviations:
NA = not applicable. Other non-herbicide methods are effective at this time.
RFS = Rocky Flats Site

Pest Management Options Evaluation Table Definitions

Action Threshold	One or more individuals = Most of these species are rare or uncommon enough at RFS that immediate control is warranted to prevent further spread. Mapping category of light or higher = Based on the RFS weed mapping protocols. Infestation categories include scattered, light, medium, and high. If the infestation is mapped at a level of light or higher, control would be considered based on the location.
Pest Management Options	
Prevention	Yes = Requirements in place for weed-free straw and seed for use at RFS. This species not allowed in seed mixes for use at RFS. Recommendations on cleaning vehicles undercarriages/tires are in place. Other prevention methods will be used as they become available.
Cultural Methods	Prevention/Maintain healthy stand of vegetation.
Mechanical/Physical Methods	Effective = Mechanical or physical control efforts may be used on this species at RFS when they are feasible and will be effective. The effectiveness of mechanical or physical control efforts is largely dependent on the biology of the species, how it reproduces, the size of the infestation, and (in the case of woody plants) the size of the individual plant. For herbaceous plants at RFS, the size of the infestation is the primary determining factor for control effectiveness for these species. Somewhat effective = Mechanical/physical control efforts have some effectiveness on controlling the species. Typically, herbicides are more efficient and cost-effective, but mechanical/physical control may be employed for small infestations. Not effective = Not an effective control measure for this species.
Biological Control Agents	Released/effective = Biocontrol agents have been released at RFS for assistance in controlling this species and are effective. Released/not effective = Biocontrol agents have been released at RFS for control of this weed species, but they are not effective for control. Available/not effective = Biocontrol agents are available for this species but are not considered effective, are not allowed for control of the species by regulation in Colorado, or are not effective on the small infestations at the RFS. Available/not warranted = Biocontrol agents are available for this species, but they are not warranted to be released due to the small populations of weed species at RFS. Not available = No biocontrol agents are available for controlling this species.
Herbicides	Necessary = Herbicides are required for control of this species at this time. As needed = Effective control of this species with herbicides may be conducted on an as-needed basis.
Considerations	
Impacts to Water	None = When aquatic-labeled herbicides are used in or near Waters of the United States in compliance with the manufacturer's application rates and the manufacturer's label instructions, no unexpected impacts to water quality should occur because these products have been approved for use in water by EPA at these rates. When non-aquatic-labeled herbicides are used "near" water in compliance with the manufacturer's application rates and the manufacturer's label instructions, no unexpected impacts to water quality should occur because these products and their uses have been approved for use near water by EPA at these rates.
Impacts to Non-Target Organisms	No unexpected impacts anticipated = Selective broadleaf herbicides are not species-specific, but rather typically target either dicots (forbs/wildflowers/shrubs/trees) or monocots (grasses/rushes). Within the dicot realm, many herbicides tend to be more effective on plants within certain plant families (i.e., composites, mustards). However, because they are still somewhat broad-spectrum herbicides (not species-specific), there will be impacts to other dicots that are non-target species. This is, however, *expected* and is taken into consideration when spraying is planned and conducted. Unexpected impacts to nonplant species are not anticipated because these herbicides are approved for use in and around water by EPA when used in compliance with the manufacturer's application rates and the manufacturer's label instructions.
Feasibility (Herbicide Control)	Only feasible option = The use of herbicides is the last choice in the toolbox for controlling undesirable species. On the basis of the biology of the target species, if other methods are ineffective at controlling the species, it is the only option. When control is necessary to meet a regulatory requirement or to prevent ecological degradation of the habitat, the use of herbicides is appropriate. NA = not applicable.
Cost-Effectiveness for Control in or near Water	Indicates whether herbicides or non-herbicide control methods are effective or not for control in or near water.
Relevant Past Pest Management Measures	A description of measures previously applied or attempted at RFS or other locations (from literature) and their effectiveness.

Abbreviations:
EPA = U.S. Environmental Protection Agency
RFS = Rocky Flats Site
SWMP = State Weed Management Plan

3.0 Vegetation Management Techniques

Table 1 lists the weed and vegetation control methods currently in use at the Rocky Flats Site. The weed control measures in this section are listed in the order they should be considered from an integrated weed management viewpoint, starting with the least toxic, nonchemical measures.

3.1 Administrative and Cultural Weed Management Actions (Prevention)

Administrative and cultural weed management actions are incorporated into this plan with the intention of preventing the introduction and spread of weeds at the Rocky Flats Site. The preventive actions incorporated into this Vegetation Management Plan are listed in Table 4.

Table 4. Preventive Actions for Weed Control

Type of Action	Explanation
Weed-free materials	All revegetation projects at the site will use weed-free seed, mulch, and erosion control sources. Seed mixes will be composed of native species appropriate for the locations.
Approved seed mixtures only	All seed mixtures for site revegetation projects must be approved by the Rocky Flats ecologist. The use of native species will be required in all cases, except when specific, written prior approval has been obtained from the Rocky Flats ecologist.
Sterile mulch	All straw and other mulch materials used on the site will be weed-free.
Follow-up weed control	Weed control and reseeding should be a part of all revegetation efforts for a minimum of 2 years after their initiation.
Immediate eradication of new species	Any new noxious weed species found on the site will be controlled immediately to eradicate them, reduce their populations, and prevent their future increase.

Revegetated areas will be monitored to evaluate the success of the revegetation, and monitoring results will be used to determine if future management actions are needed. When warranted, weed control and reseeding of these areas will be conducted to establish the desired native plant species.

The following graminoid species shall not be used in seed mixtures for revegetation projects onsite:

- Annual rye *Secale cereale*
- Bulbous bluegrass *Poa bulbosa*
- Crested wheatgrass *Agropyron desertorum* or *Agropyron cristatum*
- Intermediate wheatgrass *Agropyron intermedium*
- Johnsongrass *Sorghum halepense*
- Orchardgrass *Dactylis glomerata*
- Quackgrass *Agropyron repens*
- Sheep fescue *Festuca ovina*
- Smooth brome *Bromus inermis*

- Timothy *Phleum pratense*
- Wild proso millet *Panicum milaceum*

The use of a sterile hybrid of wheat known as ReGreen is allowed under certain conditions at the Rocky Flats Site; however, prior approval from the Rocky Flats ecologist is required.

3.2 Physical or Mechanical Control

3.2.1 Mowing

Some areas along Rocky Flats roads or other prairie locations may be mowed to keep the weeds cut back. Mowing has several purposes. Properly timed mowing can stress weeds and impact seed set of these undesirable plants, which aids in the control of noxious weeds. It may also be used to stimulate additional growth and vigor of desirable graminoid species by mimicking some of the effects of grazing. For practical travel safety reasons, keeping roadside vegetation cut low in some areas is also needed. Mowing road edges increases the visibility of wildlife crossing the roads and can help reduce collisions between wildlife and vehicles; mowing also provides better visibility at intersections. Reduction of roadside vegetation height also reduces the amount of fuel available at the margins of the firebreak and gravel roads, functionally enhancing their ability to impede the spread of wildfires and aiding firefighters in extinguishing fires in these lower-fuel buffer areas.

3.2.2 Prescribed Burning

The use of prescribed burns on Rocky Flats grasslands is highly recommended as a management tool to help control weeds, reduce plant litter, recycle nutrients, and improve the health and vigor of native plant communities. Weed control strategies that focus solely on the weed species and not on enhancing conditions for desired native species will provide only limited success. If desired native species are not able to fill in the openings created in the native plant communities after target weed species are eliminated, then other undesirable weeds often will take the place of the target species. Site policies currently limit the tools available for resource management at the site. This is especially true with regard to grassland resource management, where the natural process of fire is essential for prairie health. Prescribed burns, if permitted on the Rocky Flats Site, will conform to policies outlined in DOE Order 420.1C Chg 3, *Facility Safety*. This order requires an approved integrated sitewide wildland fire management plan, consistent with the Federal Wildland Fire Management Policy, established and implemented in accordance with NFPA 1143, *Standard for Wildland Fire Management* (NFPA 2018). Additional state or local permits will be obtained as required, and a prescribed burn will be coordinated with site subcontractors and surrounding landowners as needed.

3.2.3 Hand Pulling/Trimmers/Chain-Saw Control

Hand pulling and the use of trimmers (gas, battery, or manually powered trimmers) to control small infestations may be conducted where practical and effective. If weed species that are being hand pulled have already set seed, then they shall be disposed of in appropriate waste containers destined for offsite landfill disposal. Chain saws are used to control some woody species such as Russian olive. As part of a cut-and-spray treatment that has shown to be effective, a chain saw is often used in conjunction with a spot herbicide application on a cut trunk. Girdling of woody

species along with herbicide applications in the cut may also be conducted, as this method of control has also been shown to be effective on some species.

In addition to the fuel reduction actions already discussed, weeds and debris that have accumulated in fences may be removed as needed or feasible. This removal may include physical removal or prescribed burning of such debris out of fences in situ. Fuel reduction shall occur as needed. Vegetation debris *shall not* be tossed loose or disposed of *anywhere* except in appropriate waste containers destined for offsite landfill disposal. Prescribed burns, if permitted onsite, will conform to policies outlined in DOE Order 420.1C Chg 3, *Facility Safety*, and the additional requirements stated in Section 3.2.2.

3.3 Biological Controls

3.3.1 Biological Control Insects

Biological control agents (i.e., insects) are being used at the Rocky Flats Site to assist in the control of the species listed in Table 5. The insects have been provided to the site by the Colorado Department of Agriculture and USFWS through an agreement with Texas A&M University to target specific weed infestations. Table 5 lists the biological controls that have been released at the Rocky Flats Site.

Table 5. Biological Control Agents Released at the Rocky Flats Site

Target Species	Beneficial Organism	Effect
Diffuse knapweed (*Centaurea diffusa*)	*Urophora quadrifasciata*	Attacks knapweed flowers, producing galls that reduce seed production.
	Urophora affinis	Attacks knapweed flowers, producing galls that reduce seed production.
	Sphenoptera jugoslavica	Beetle larvae bore into root crown and upper roots of knapweed, retarding plant development and stunting growth.
	Larinus minutus	A seedhead weevil.
	Cyphocleonus achates	A root-boring weevil.
Musk thistle (*Carduus nutans*)	*Rhinocyllus conicus*	A weevil that eats the seeds in the musk flower heads.
	Trichosirocalus horridus	Weevil that attacks the crown of musk thistle, thus killing the apical meristem and reducing the potential of the plant to flower.
Bull thistle (*Cirsium vulgare*)	*Urophora stylata*	A gall fly that attacks flower heads and reduces seed set.
Canada thistle (*Cirsium arvense*)	*Urophora carduii*	A gall fly that attacks flower heads and reduces seed set.
	Cassida rubiginosa	A defoliating beetle.
St. Johnswort (*Hypericum perforatum*)	*Chrysolina quadrigemina*	A foliage-feeding beetle.
Dalmatian toadflax (*Linaria dalmatica*)	*Calophasia lunula*	Larvae of this moth feed on the leaves and flowers of the plant.
	Mecinus janthinus	A stem-mining beetle.
Field bindweed (*Convolvulus arvensis*)	*Aceria malherbae*	A gall mite.

It is recommended that the release of biological control agents for weed control at the Rocky Flats Site be continued as new agents become available. Additional releases of insects and other biological control agents for the above-listed and other species could increase the effectiveness of the weed control efforts while potentially reducing costs. Communication with local researchers who are evaluating the use of biocontrols on nearby open space properties is recommended to keep abreast of any new findings and techniques.

3.3.2 Grazing

Similar to the use of prescribed burning, grazing is highly recommended as a management tool to help control weeds, reduce plant litter, recycle nutrients, and improve the health and vigor of the native plant communities. As stated earlier, weed control strategies that focus solely on the weed species and not on enhancing conditions for desired native species will provide only limited success. Grazing is a management tool that has not been and is currently not allowed at the Rocky Flats Site. Grazing may be proposed to become part of the management toolbox at the Rocky Flats Site in the future. USFWS may graze cattle on the RFNWR in the future.

Another issue related to grazing is that the site has a herd of approximately 250 elk. Similar to grazing by cattle, overgrazing can be a problem if cattle or elk are allowed to spend too much time in specific locations. Observations of some habitat locations within the COU suggest that some type of management of the elk may be required in the future to reduce potential negative impacts where the elk like to spend much of their time. DOE will work with USFWS on potential management options to address these impacts on both the COU and refuge lands.

3.3.3 Interseeding

Interseeding is defined as seeding additional species into an already established plant community. With respect to weed control, this may be done to help establish new desirable vegetation more quickly so that it can fill the voids and empty spaces created by the removal of weed species. Interseeding has been used effectively and may continue to be used to introduce native forbs into the revegetation areas at the Rocky Flats Site.

3.4 Chemical Controls

Table 6 lists the herbicides approved for use on the site. Herbicides *not* on the current list *may not* be used until they are approved pursuant to the Rocky Flats Chemical Management Plan. Many of these chemicals are restricted-use herbicides and must be applied only by a licensed (certified) applicator. All commercial herbicide applications made at the Rocky Flats Site shall be made by an applicator licensed by the State of Colorado with the appropriate pesticide applicator category. Empty containers may not be washed onsite, and used containers must be removed by the applicator at the end of the work shift. Disposal of restricted-use herbicides is strictly the responsibility of the applicator. The selected herbicides and application rates are based on the best available information, herbicide labels, and recommendations from experts (Beck 2013a, Beck 2013b, Beck 2013c, Beck 2013d, Beck 2013e, Beck 2014, CNAP 2000).

Contractor-applied herbicide applications may be conducted by field personnel who are trained as field technicians under the supervision of a licensed Legacy Management Support (LMS) applicator with a supervisor license or by a licensed LMS applicator. LMS-contractor-applied

herbicide applications shall follow the *Procedure for Handling Herbicides at Western Legacy Management Sites* (LMS/PRO/S12853).

The following compounds were removed from the approved list in 2007 based on recommendations from the herbicide subcontractor: Arsenal (Imazapyr), Barricade (Prodiamine), Buctril (Bromoxyni), Gallery (Isoxaben), Sahara (Diuron; Imazapyr), and Surflan (Oryzalin). These compounds were used prior to and throughout site closure but have limited use given the current resource management objectives. These compounds could be added back to the list if they were needed.

Chemical controls have been used effectively in the past at the Rocky Flats Site to control various noxious weed species. Proposed herbicide application locations will be developed on the basis of noxious-weed-mapping results or field observations. As discussed earlier, the NPDES PGP requirements must be considered for all applications in or near Waters of the United States.

Table 6. Herbicides Approved for Use at the Rocky Flats Site (Last Updated 5/5/2008)

Herbicide Name	Active Ingredient
Aquatic 2,4-D	2,4-Dichlorophenoxyacetic acid
Banvel	Dicamba
Clarity	Diglycolamine
Escort	Metsulfuron
Garlon 3A	Triclopyr
Habitat	Imazapyr
Karmex	Diuron
Milestone	Aminopyralid
Navigate	2,4-Dichlorophenoxyacetic acid
Oust	Sulfometuron
Plateau	Imazapic
Redeem	Clopyralid TEA + triclopyr TEA
Rodeo	Glyphosate
Roundup	Glyphosate
Telar	Chlorsulfuron
Transline	Clopyralid
Tordon 22K	Picloram
Vanquish	Diglycolamine

3.5 Vegetation Management and the Preble's Mouse

The Preble's meadow jumping mouse (Preble's mouse) (*Zapus hudsonius preblei*) is a listed threatened species under the Endangered Species Act. On December 15, 2010, USFWS finalized a ruling that designated critical habitat for the Preble's mouse at the site (75 FR 78430–78483). USFWS must be consulted before weed control activities are conducted in Preble's mouse habitat (in both Preble's Protection Areas and critical habitat) at the Rocky Flats Site. In 2006, LM received concurrence to conduct weed control activities in Preble's mouse habitat as

outlined in the *Biological Evaluation for Weed Control in Preble's Mouse Habitat at the Rocky Flats, Colorado, Site* (DOE 2006; USFWS 2006). In 2007, LM received concurrence to continue weed control activities in Preble's mouse habitat according to the guidance outlined in the *Amendment to the Biological Evaluation for Weed Control in Preble's Mouse Habitat at the Rocky Flats, Colorado, Site* (DOE 2007; USFWS 2007). In 2008, LM received concurrence to use a helicopter for weed control activities in Preble's mouse habitat should that be necessary (DOE 2008; USFWS 2008). In 2009, LM received concurrence for additional changes requested for weed control activities in Preble's mouse habitat according to the guidance outlined in *Amendment II to the Biological Evaluation for Weed Control in Preble's Mouse Habitat at the Rocky Flats, Colorado, Site* (DOE 2009; USFWS 2009). All weed control activities at the site that take place in Preble's mouse habitat are required to follow the guidance provided in these documents. USFWS must be consulted before any changes or modifications can be made to the weed control activities outlined in these documents.

4.0 References

75 FR 78430–78483. U.S. Fish and Wildlife Service, "Endangered and Threatened Wildlife and Plants; Revised Critical Habitat for the Preble's Meadow Jumping Mouse in Colorado; Final Rule," Final Rule, *Federal Register,* December 15, 2010.

8 CCR 1206-02. "Rules Pertaining to the Administration and Enforcement of the Colorado Noxious Weed Act," *Code of Colorado Regulations.*

86 FR 51665–51669. U.S. Environmental Protection Agency, "Final National Pollutant Discharge Elimination System (NPDES) Pesticide General Permit for Point Source Discharges from the Application of Pesticides," *Federal Register,* September 16, 2021.

Ackerfield, J. 2015. Flora of Colorado. Botanical. Research Institute of Texas, Fort Worth, Texas.

Beck, K.G., 2013a. *Weed Management for Small Rural Acreage Owners*, Colorado State University Cooperative Extension, No. 3.106, Ft. Collins, Colorado.

Beck, K.G., 2013b. *Russian Knapweed*, Colorado State University Cooperative Extension, No. 3.111, Ft. Collins, Colorado.

Beck, K.G., 2013c. *Canada Thistle*, Colorado State University Cooperative Extension, No. 3.108, Ft. Collins, Colorado.

Beck, K.G. 2013d. *Diffuse and Spotted Knapweed*, Colorado State University Cooperative Extension, No. 3.110, Ft. Collins, Colorado.

Beck, K.G., 2013e. *Musk Thistle*, Colorado State University Cooperative Extension, No. 3.102, Ft. Collins, Colorado.

Beck, K.G., 2014. *Biology and Management of the Toadflaxes*, Colorado State University Cooperative Extension, No. 3.114, Ft. Collins, Colorado.

CNAP (Colorado Natural Areas Program), 2000. *Creating an Integrated Weed Management Plan: A Handbook for Owners and Managers of Lands with Natural Value,* Caring for the Land Series, Vol. 4, State of Colorado, Denver, March.

Davis, M.A., J.P. Grime, and K. Thompson, 2000. "Fluctuating resources in plant communities: a general theory of invisibility," *Journal of Ecology*, 88:528–534.

DOE Order 420.1C Chg 3, *Facility Safety*, U.S. Department of Energy, November 14, 2019.

DOE (U.S. Department of Energy), 2006. *Biological Evaluation for Weed Control in Preble's Mouse Habitat at the Rocky Flats, Colorado, Site,* Office of Legacy Management, Grand Junction, Colorado, April.

DOE (U.S. Department of Energy), 2007. *Amendment to the Biological Evaluation for Weed Control in Preble's Mouse Habitat at the Rocky Flats, Colorado, Site,* Office of Legacy Management, Grand Junction, Colorado, February.

DOE (U.S. Department of Energy), 2008. *Use of Helicopter for Weed Control Activities at the Rocky Flats Site*, Office of Legacy Management, Westminster, Colorado, December.

DOE (U.S. Department of Energy), 2009. *Amendment II to the Biological Evaluation for Weed Control in Preble's Mouse Habitat at the Rocky Flats, Colorado, Site,* Office of Legacy Management, Westminster, Colorado, October.

GPFA (Great Plains Flora Association), 1986. *Flora of the Great Plains*, 2nd printing with 1991 supplement, University Press of Kansas, Lawrence, Kansas.

NFPA (National Fire Protection Association), 2018. *NFPA 1148: Standard for Wildland Fire Management*.

Procedure for Handling Herbicides at Western Legacy Management Sites, LMS/PRO/S12853, continually updated, prepared by the LMS contractor for the U.S. Department of Energy Office of Legacy Management.

USFWS (U.S. Fish and Wildlife Service), 2006. Concurrence letter for the *Biological Evaluation for Weed Control in Preble's Mouse Habitat at the Rocky Flats, Colorado, Site,* USFWS Letter ES/CO: T&E/Rocky Flats MS 65412 LK, Ecological Services, Colorado Field Office, Lakewood, Colorado, April 25.

USFWS (U.S. Fish and Wildlife Service), 2007. Concurrence letter for the *Amendment to the Biological Evaluation for Weed Control in Preble's Mouse Habitat at the Rocky Flats, Colorado, Site,* USFWS Letter ES/CO: T&E/Rocky Flats TAILS: 65412-2006-I-0031, Ecological Services, Colorado Field Office, Lakewood, Colorado, April 4.

USFWS (U.S. Fish and Wildlife Service), 2008. Concurrence letter for the *Use of Helicopter for Weed Control Activities at the Rocky Flats Site,* USFWS Letter ES/CO: T&E/Rocky Flats TAILS: 65412-2009-I-0127, Ecological Services, Colorado Field Office, Lakewood, Colorado, December 15.

USFWS (U.S. Fish and Wildlife Service), 2009. Concurrence letter for the *Amendment II to the Biological Evaluation for Weed Control in Preble's Mouse Habitat at the Rocky Flats, Colorado, Site,* USFWS Letter ES/CO: T&E/Rocky Flats TAILS: 65412-2010-I-0043, Ecological Services, Colorado Field Office, Lakewood, Colorado, November 12.

Weber, W.A, 1976. *Rocky Mountain Flora*, Colorado Associated University Press, Boulder, Colorado.

Weber, W.A, 1990. *Colorado Flora: Eastern Slope*, University Press of Colorado, Niwot, Colorado.