
**Draft Environmental Assessment for
Cheatgrass (*Bromus tectorum*) and Weed Control
at Mountain Home Air Force Base, Idaho**

December 2017

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PRIVACY ADVISORY

This Draft EA is provided for public comment in accordance with the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality (CEQ) NEPA Regulations (40 CFR §§1500-1508), and 32 CFR §989, Environmental Impact Analysis Process (EIAP).

The EIAP provides an opportunity for public input on Air Force decision-making, allows the public to offer inputs on alternative ways for the Air Force to accomplish what it is proposing, and solicits comments on the Air Force's analysis of environmental effects.

Public commenting allows the Air Force to make better, informed decisions. Letters or other written or oral comments provided may be published in the EA. As required by law, comments provided will be addressed in the EA and made available to the public. Providing personal information is voluntary. Any personal information provided will be used only to identify your desire to make a statement during the public comment portion of any public meetings or hearings or to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of EA; however, only the names of the individuals making comments and specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the Final EA.

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COVER SHEET

ENVIRONMENTAL ASSESSMENT (EA) FOR CHEATGRASS (BROMUS TECTORUM) AND WEED CONTROL AT MOUNTAIN HOME AIR FORCE BASE (MHAFB), IDAHO

- a. *Responsible Agency:* United States Air Force (Air Force)
- b. *Cooperating Agency:* None

Proposals and Actions: Under the Proposed Action, the 366 Fighter Wing at MHAFB would continue to control cheatgrass and other invasive and noxious weeds using previously authorized techniques and herbicides; however, additional herbicides and bioherbicides are proposed in order to help minimize the development and spread of herbicide resistant weeds. The program would continue weed control in operational areas and portions of unimproved lands in support of the mission, reducing wildland fire, and improving native sagebrush-steppe habitat at MHAFB and the Mountain Home Range Complex (MHRC). The Proposed Action includes the treatment of noxious and invasive plant species at MHAFB and MHRC using a bioherbicide, *Pseudomonas fluorescens*, in addition to widely used herbicides to control invasive and noxious weeds. A strain of the naturally occurring soil bacterium *P. fluorescens*, strain D7 (PFD7), was developed by the United States Department of Agriculture Agricultural Research Center as an innovative means to manage persistent weeds. PFD7 is a United States Environmental Protection Agency-registered strain that selectively kills germinating cheatgrass, also called downy brome (*Bromus tectorum*), and other brome grass species.

This EA evaluates the potential environmental consequences of implementing the Proposed Action and No Action Alternative. The No Action Alternative consists of continuing annual weed control efforts as described under the current invasive and noxious weed control program.

- c. *For Additional Information:* Sheri Robertson, Chief Environmental Management, 366 CES/CEIE, 1030 Liberator Street, Mountain Home AFB Idaho 83648.
- d. *Designation:* Draft EA
- e. *Abstract:* This EA has been prepared pursuant to provisions of the National Environmental Policy Act (NEPA), Title 42 United States Code (U.S.C.) Sections 4321 to 4347, implemented by Council on Environmental Quality (CEQ) Regulations, Title 40, Code of Federal Regulations (CFR) §1500-1508, and 32 CFR §989, Environmental Impact Analysis Process. Potentially affected environmental resources were identified in coordination with local, state, and federal agencies and specific environmental resources with the potential for environmental consequences include air quality, land use, water resources, biological/natural resources, soils, hazardous materials/wastes, cultural resources, and health and safety.

The purpose of the Proposed Action is to improve efficacy of noxious and invasive plant species control and provide an alternate method of control for cheatgrass at MHAFB and associated training lands. The need for the action is to reduce mission and resource management impacts as a result of increasing fire, air quality, fugitive dust, and erosion. Continuing to introduce additional resources and cutting-edge tools to the noxious and invasive plant control program is essential to manage training lands that are a critical component of the Air Force mission.

The analysis of the affected environmental and environmental consequences of implementing the Proposed Action concluded that by implementing standing environmental protection measures and best management practices, there would be no significant adverse impacts on the following resources: air quality, land use, water resources, biological/natural resources, soils, hazardous materials/wastes, cultural resources, and health and safety. No significant cumulative impacts would result from activities associated with the Proposed Action when considered with past, present, or reasonably foreseeable future actions at any of the alternative basing locations.

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FINDING OF NO SIGNIFICANT IMPACT (FONSI)
FOR CHEATGRASS (BROMUS TECTORUM) AND WEED CONTROL
AT MOUNTAIN HOME AIR FORCE BASE, IDAHO

INTRODUCTION: Pursuant to provisions of the National Environmental Policy Act (NEPA), Title 42 United States Code Sections 4321 to 4347, implemented by Council on Environmental Quality (CEQ) Regulations, Title 40, Code of Federal Regulations (CFR) §1500-1508, and 32 CFR §989, Environmental Impact Analysis Process, the United States Air Force (Air Force) assessed the potential environmental consequences associated with the addition of herbicides and bioherbicides to the existing invasive and noxious weed control program.

PURPOSE: The purpose of the Proposed Action is to improve efficacy of noxious and invasive plant species control and provide an alternate method of control for cheatgrass at Mountain Home Air Force Base (MHAFB) the Mountain Home Range Complex (MHRC).

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES: Under the Proposed Action, the 366 Fighter Wing at MHAFB would continue to control cheatgrass and other invasive and noxious weeds using previously authorized techniques and herbicides; however, additional herbicides and bioherbicides are proposed in order to increase efficacy and help minimize the development and spread of herbicide-resistant weeds. The program would continue weed control in operational areas and portions of unimproved lands in support of the mission, reducing wildland fire, and improving native sagebrush-steppe habitat at MHAFB and MHRC. The Proposed Action includes the treatment of noxious and invasive plant species at MHAFB and MHRC using a bioherbicide, *Pseudomonas fluorescens*, in addition to widely used herbicides to control invasive and noxious weeds. A strain of the naturally occurring soil bacterium *P. fluorescens*, strain D7 (PFD7), was developed by the United States Department of Agriculture Agricultural Research Center as an innovative means to manage persistent weeds. PFD7 is a United States Environmental Protection Agency-registered strain that selectively kills germinating cheatgrass, also called downy brome (*Bromus tectorum*), and other brome grass species.

This Environmental Assessment (EA) evaluates the potential environmental consequences of implementing the Proposed Action and No Action Alternative. The No Action Alternative consists of continuing annual weed control efforts as described under the current invasive and noxious weed control program.

SUMMARY OF FINDINGS: The Air Force has concluded that implementation of the Proposed Action would not generate significant adverse impacts to the following resources: air quality, land use, water resources, biological/natural resources, soils, hazardous materials/wastes, cultural resources, and health and safety. No significant cumulative impacts would result from activities associated with the Proposed Action when considered with past, present, or reasonably foreseeable future actions at MHAFB and MHRC. The Air Force would adhere to all established environmental protection measures, best management practices, regulations, plans, and programs in the execution of the Proposed Action.

One federally listed threatened species, slickspot peppergrass (*Lepidium papilliferum*), has been documented on MHAFB and MHRC. This species is found on the Juniper Butte Range and along some Bureau of Land Management-administered rights-of-way permitted to MHAFB. No changes in current management of invasive and noxious weeds on these areas is proposed under the Proposed Action or No Action Alternative. A letter is being sent to the U.S. Fish and Wildlife Service concurrent with this EA requesting concurrence that no effect is anticipated and therefore no Endangered Species Act Section 7 will be required.

Federally recognized Native American Tribes were contacted in the preparation of the EA and no responses received identified significant impacts to cultural resources as a result of the Proposed Action.

Consistent with Section I.B (5) of the 2015 Programmatic Agreement between MHAFB and the Idaho State Historic Preservation Office, and 36 CFR 800.5(3) (B), MHAFB made a determination of *No Adverse Effect* for the undertaking.

FINDING OF NO SIGNIFICANT IMPACT: Based on my review of the facts and analysis in the EA, I conclude that the Proposed Action will not have a significant impact either by itself or considering cumulative impacts. Accordingly, the requirements of the NEPA, the CEQ and 32 CFR §989, et seq. have been fulfilled, and an Environmental Impact Statement is not necessary and will not be prepared. The signing of this FONSI completes the environmental impact analysis process.

NAME
RANK, USAF
LOCATION

DATE

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List of Acronyms and Abbreviations

°F	degree(s) Fahrenheit
µg/m ³	microgram(s) per cubic meter
366 FW	366th Fighter Wing
ac	acre(s)
ACAM	Air Conformity Applicability Model
ACC	Air Combat Command
ACM	asbestos-containing material
AFI	Air Force Instruction
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection, and Health
AFPD	Air Force Policy Directive
Air Force	United States Air Force
ALS	Acetolactate Synthase
APE	Area of Potential Effects
AQCR	Air Quality Control Region
AST	aboveground storage tank
ATV	all-terrain vehicle
AW	Airlift Wing
BACT	Best Available Control Technologies
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMC	bird of management concern
CAA	Clean Air Act
CEIE	Civil Engineering-Installation Management Flight, Environmental Element
CEQ	Council on Environmental Quality
CES	Civil Engineering Squadron
CFR	Code of Federal Regulations
CO	carbon monoxide
CO ₂	carbon dioxide
CO _{2e}	carbon dioxide equivalent
CPSC	Consumer Product Safety Commission
CRM	Cultural Resources Manager
DLA	Defense Logistics Agency
DoD	Department of Defense
DoDI	Department of Defense Instruction
EA	Environmental Assessment
EC	Electronic Combat
EO	Executive Order
EPSP	5-enolpyruvylshikimate-3-phosphate
ERP	Environmental Restoration Program
ES	Emitter Site
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency

FONSI	Finding of No Significant Impact
FR	Federal Register
ft	foot(feet)
gal	gallon(s)
GHG	greenhouse gas
GWP	global warming potential
HAZMAT	hazardous material
HHRA	human health risk assessment
HQ	Headquarters
ICP	Installation Contingency Plan
ICRMP	Integrated Cultural Resources Management Plan
IDEQ	Idaho Department of Environmental Quality
IDFG	Idaho Fish and Game
INRMP	Integrated Natural Resources Management Plan
IPaC	Information for Planning and Conservation
IPM	Integrated Pest Management
ISDA	Idaho State Department of Agriculture
JBR	Juniper Butte Range
LBP	lead-based paint
MBTA	Migratory Bird Treaty Act
mg/m ³	milligram(s) per cubic meter
MHAFB	Mountain Home Air Force Base
MHRC	Mountain Home Range Complex
mi	mile(s)
mph	mile(s) per hour
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
ND	no-drop
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act of 1966
NO ₂	nitrogen dioxide
NO _x	nitrogen oxides
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O ₃	ozone
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement
Pb	lead
PCB	polychlorinated biphenyl
pCi/L	picocurie(s) per liter
PEIS	programmatic environmental impact statement
PFD7	<i>Pseudomonas fluorescens</i> , strain D7
PLO	Public Land Order
PM _{2.5}	particulates equal to or less than 2.5 microns in diameter
PM ₁₀	particulates equal to or less than 10 microns in diameter
ppb	part(s) per billion
ppm	part(s) per million

PSD	Prevention of Signification Deterioration
PTE	potential to emit
RCRA	Resource Conservation and Recovery Act
ROW	right-of-way
SAC	Strategic Air Command
SAR	Small Arms Range
SARA	Superfund Amendments and Reauthorization Act
SCR	Saylor Creek Range
SDS	Safety Data Sheet
SER	Significant Emissions Rate
SGCN	species of greatest conservation need
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO ₂	sulfur dioxide
SOP	standard operating procedure
SWAP	State Wildlife Action Plan
SWDA	Safe Drinking Water Act
tpy	ton(s) per year
TSCA	Toxic Substances Control Act
U.S.C.	US Code
US	United States
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USSG	United States Surgeon General
UST	underground storage tank
VOC	volatile organic compound
WMA	Wildlife Management Area

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Chapter 1

Purpose of and Need for Action

1.0 PURPOSE OF AND NEED FOR ACTION

1.1 Introduction

The United States Air Force (Air Force) and 366th Fighter Wing (366 FW) at Mountain Home Air Force Base (MHAFB) prepared this Environmental Assessment (EA) to analyze the treatment of noxious and invasive plant species at MHAFB and the Mountain Home Range Complex (MHRC) using a bioherbicide, *Pseudomonas fluorescens*, in addition to widely used herbicides to control invasive and noxious weeds. A strain of the naturally occurring soil bacterium *P. fluorescens*, strain D7 (PFD7), was developed by the United States Department of Agriculture (USDA) Agricultural Research Center as an innovative means to manage persistent weeds. PFD7 is a United States Environmental Protection Agency (USEPA)-registered strain that selectively kills germinating cheatgrass, also called downy brome (*Bromus tectorum*), and other brome grass species.

In accordance with the National Environmental Policy Act (NEPA) of 1969; the regulations implementing NEPA (Title 40 Code of Federal Regulations [CFR] Parts 1500–1508); Department of Defense (DoD) Directive 6050.1, Environmental Considerations in DoD Actions; and the Air Force implementing regulation for NEPA, the Environmental Impact Analysis Process, (Title 32 CFR Part 989, as amended), the 366 FW has prepared this EA to evaluate the potential environmental consequences of implementing the Proposed Action. In addition to the Proposed Action, NEPA requires the federal agencies to analyze a No Action Alternative. Under the No Action Alternative, the Air Force would continue to perform invasive and noxious weed control as described in the MHAFB annual noxious weed survey and spray books (MHAFB 2015, 2016a) and the *Statement of Need for Aerial Dispersal of Herbicide for Saylor Creek Range Revision 1* (Robertson 2011).

This EA implements the tiering process outlined in 40 CFR 1502.20, which encourages agencies to tier environmental documents, eliminating repetitive discussions of the same issue (32 CFR 989.10). After a broad programmatic analysis has been prepared, any subsequent EA on an action included within the entire program or policy (particularly a site-specific action) need only summarize issues discussed in the broader statement and concentrate on the issues specific to the subsequent action.

This EA tiers to the MHAFB *Environmental Assessment, Saylor Creek Air Force Range Cheatgrass Reduction Plan Implementation* (MHAFB 2000) and two Bureau of Land Management (BLM) programmatic environmental impact statements (PEISs): *Final PEIS for Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States* (BLM 2007) and *Final PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Land Management Lands in 17 Western States* (BLM 2016a). These documents assessed the use of certain herbicides to treat undesirable vegetation on public lands administered by the Air Force and BLM, respectively.

The MHAFB EA (2000) analyzes potential direct and indirect impacts to natural, cultural, and historical resources of conducting a prescribed burn and aerial herbicide application on 2,000 acres (ac) to reduce cheatgrass at MHRC. A Finding of No Significant Impact (FONSI) was signed in October 2000 for this action. Subsequent cheatgrass treatments that are similar to the aerial spray operations qualify as Categorical Exclusions under the existing FONSI (Robertson 2011).

The BLM programmatic analyses contain broad regional descriptions of resources, provide a broad environmental impact analysis, including cumulative impacts, and provide BLM-wide decisions on herbicide use for vegetation management. An evaluation of 25 herbicide active ingredients was conducted in the 2007 PEIS, resulting in the approval of 18 for use on BLM lands with three additional herbicides being approved for use in the 2016 PEIS. The list of BLM-approved herbicides is in **Appendix A**. The decision to approve these herbicides was based on a detailed analysis of the risks to human health and non-target species from the use of these chemicals.

1.2 Background

MHAFB and associated training areas are located in southwestern Idaho in Elmore, Owyhee, and Twin Falls Counties. MHAFB encompasses 6,844 ac and is located approximately 50 miles (mi) southeast of Boise, Idaho, and 8 mi southwest of Mountain Home, Idaho, in Elmore County. MHAFB manages the Small Arms Range (SAR) (4,622 ac), Rattlesnake Radar Station (1 ac), Middle Marker (21 ac), C.J. Strike Dam Recreation Annex (3 ac), and the MHRC. The MHRC is composed of Saylor Creek Range (SCR) (109,466 ac), Juniper Butte Range (JBR) (12,141 ac), and the Grasmere Electronic Combat (EC) site (7 ac). In addition, there are twenty quarter-acre emitter sites, ten 1-ac emitter sites, and five no-drop (ND) target sites. ND-1 is a 640-ac site, ND-4, -5, and -7 are 5-ac sites, and ND-9 is a 3-ac site. The MHRC sites are primarily located in Owyhee County, though one facility is located in Twin Falls County (**Figure 1-1**).

MHAFB, including MHRC, is located in the geographically distinct region of the Snake River Plain (Mc Grath et al. 2002), which is part of the Intermountain Semidesert Province (Bailey 1995) and is dominated by sagebrush-steppe ecosystem. Although one of the largest ecosystems in the United States (US) (Wisdom and Rowland 2007), intact sagebrush-steppe is considered one of the most imperiled ecosystems (Noss 1995). The clearing of sagebrush to improve rangeland, overgrazing, and the encroachment of invasive annual grasses are the primary factors affecting the loss of this important ecosystem (Wisdom and Rowland 2007). Cheatgrass is the most significant invasive plant species in sagebrush-grassland communities and is recognized as the primary contributor to the type conversion of sagebrush-steppe to an exotic annual grass community (Burkett 2016; Zouhar 2003).

Cheatgrass was introduced to North America in the late 1800s (Mack 1981) and is now distributed throughout all of the continental US (USDA Natural Resources Conservation Service [NRCS] 2016). This winter annual grass has been able to successfully colonize such an extensive area because of characteristics such as early maturation, high seed productivity, and the ability to germinate in both spring and fall. Once cheatgrass has become established on a site and gone through two or more cycles of seed production and dispersal, the seed bank has been found to contain two or three times as many viable seeds as the established native vegetation (Zouhar 2003). In addition, associated changes in soil biota, nutrient cycles, and fire frequency and severity give cheatgrass a competitive advantage over native perennial grass and shrub species that make this aggressive annual grass especially difficult to control. Once cheatgrass and other non-native annual grasses, including Japanese brome (*Bromus japonicus*), rattlesnake brome (*Bromus briziformis*), field brome (*Bromus arvensis*), and medusahead rye (*Taeniatherum caput-medusae*) invade a site, they create a large amount of fine, dead fuel, which leads to the increased frequency and severity of wildfire when compared to historical averages and prevents the recovery of native perennial species. Prior to EuroAmerican settlement, fire-return intervals in the sagebrush-steppe were believed to vary between 60 and 110 years, but since the late 1980s,



Figure 1-1. Mountain Home Air Force Base Project Location.

much of the region burned at intervals of 3 to 5 years (Whisenant 1989). Most of the land area at MHAFB has been impacted by wildfire in the past with approximately 355 ac at MHAFB, 588 ac at SAR, 66,373 ac at SCR, and 941 ac at JBR having burned since 2000 (BLM 2015a). Training activities are potential ignition sources at SAR, JBR, and SCR and contribute to the frequency of wildfire; however, resulting fires are usually small because of expeditious detection and aggressive fire suppression activities (MHAFB 2012b).

Frequent fire and other ground disturbances such as mowing, firebreak maintenance, grazing, off-road vehicle use, and military training activities can also promote the establishment of other invasive species such as Russian thistle (*Salsola tragus*), pigweed (*Amaranthus* spp.), tall tumble mustard (*Sisymbrium altissimum*), annual kochia (*Bassia scoparia*), rush skeletonweed (*Chondrilla juncea*), yellow star thistle (*Centaura solstitialis*), and goathead, also called puncturevine (*Tribulus terrestris*), the last three of which are classified as noxious weeds by the Idaho Department of Agriculture (Idaho State Department of Agriculture [ISDA] 2016).

Land managers across the region have implemented various methods of controlling cheatgrass including prescribed fire (BLM 2007; DiTomaso et al. 2000), herbicides, mowing, tillage, grazing, seeding, control of soil nitrogen availability, microbial soil inoculation, as well as other methods with various rates of success (Pellant et al. 1999; Paschke 2005). At MHAFB, large-scale treatment of cheatgrass via aerial herbicide application was conducted on 1,450 ac at SCR in 2000 (MHAFB 2000) and has been conducted on approximately 3,200 ac of rangeland annually since 2006 (MHAFB 2012a).

The most widely used herbicide for controlling cheatgrass is imazapic (Mangold et al. 2013). Imazapic is an amino acid synthesis inhibitor, which specifically inhibits Acetolactate Synthase (ALS), and selectively kills many annual grasses and broadleaf weeds depending on the species and the rate of application (Tu et al. 2001). Many native prairie grasses are tolerant of imazapic when used at prescribed rates, though newly emerged grasses are sensitive to the product and the adjuvant used in the mix.

Glyphosate is another amino acid synthesis inhibitor that is widely used for rangeland improvement and control of cheatgrass (Rinella et al. 2013). Glyphosate is a broad-spectrum, nonselective systemic herbicide that kills or suppresses many grasses, forbs, vines, shrubs, and trees (Tu et al. 2001). Higher recommended rates of glyphosate should be limited to the period when range grasses are dormant to avoid risk of injury to desirable plant species. If perennial grasses have initiated new growth, lower recommended rates can be used, though some growth stunting of perennial grasses may occur. Broad-scale low-rate glyphosate application, however, has not been found to be a reliable option for native grass improvement as other invasive brome grasses became dominant during use (Espeland and Kilian 2015).

Although shown to be effective in cheatgrass control, these herbicides have potential to impact non-target, desirable plant species (Rinella et al. 2013) and, with repeated use, increase the likelihood of the development of herbicide-resistant weed biotypes. Resistance to ALS inhibitor herbicides including imazapic and others such as sulfometuron methyl and chlorsulfuron has been documented in cheatgrass and several other brome species in the western US (Heap 2016) and is the fastest growing class of herbicide-resistant weeds (Warwick et al. 2010). ALS inhibitor resistant annual kochia and pigweed biotypes have also been documented. Glyphosate resistance in weeds is also widespread with 36 known resistant species, including two species of brome

grass, pigweed, annual kochia, and Russian thistle occurring in the US and around the world (Heap 2016).

Recent advancements in the use of the bioherbicide PFD7 provide an additional method to help control cheatgrass and two other annual grasses, medusahead rye and jointed goatgrass (*Aegilops cylindrica*). This weed-suppressive bacterium is a naturally occurring soil bacterium that has been shown to have specificity for cheatgrass, medusahead, and jointed goatgrass and had minimal effect on non-target species during field trials (Kennedy et al. 2001). When applied in the fall, the bacterium colonizes the roots of cheatgrass, inhibiting radicle formation, root growth, and tiller initiation, which allows desirable species to gain a competitive advantage (Kennedy et al. 2015). In field trials, the bacterium consistently reduced annual grass weed growth by 50 percent within 3 years of one bacterial application. In long-term field trials, the bacterium reduced fall annual grass weeds to near zero, when desirable plants (perennial grasses and other native species) were present (Kennedy et al. 2013). Regional trials conducted at the Idaho Army National Guard Orchard Combat Training Center, located south of Boise, showed similar results (Baun 2016). Use of this bioherbicide would be particularly useful in reducing cheatgrass in areas at risk of wildfire and in post-fire rehabilitation practices to reduce competition with desirable native sagebrush-steppe species.

1.3 Weed Control Regulations, Policies, and Agreements

Air Force policy on invasive species management is outlined in Air Force Instruction (AFI) 32-7064, *Integrated Natural Resources Management*, which establishes the requirement that invasive species management be addressed in the installation Integrated Natural Resources Management Plan (INRMP) (MHAFB 2012b) and identifies requirements of the Federal Noxious Weed Act of 1974 (as amended) (7 US Code [U.S.C.] § 2814) and Executive Order [EO] 13112, *Safeguarding the Nation from the Impacts of Invasive Species* (as amended 5 December 2016), on Air Force properties. The Federal Noxious Weed Act requires federal land management agencies to develop a management program for control of plants that are classified under federal or state law as undesirable, noxious, or harmful and to cooperate with state governments in control of undesirable plants on federal lands. The Idaho Noxious Weed Law of 1977 identifies and establishes a legal requirement to control weeds designated by the state as noxious. A complete listing of Idaho's noxious weeds is included in **Appendix B**.

EO 13112 requires federal agencies for which that agency's actions may affect the introduction, establishment, or spread of invasive species, to the extent practicable and permitted by law, to

- prevent the introduction of invasive species;
- detect, respond rapidly to, and control populations of such species in a cost-effective and environmentally sound manner that minimizes human, animal, plant, and environmental health risks;
- monitor invasive species populations accurately and reliably;
- provide for restoration of native species and habitats that have been impacted by invasive species;
- conduct research on invasive species and develop and apply technologies to prevent their introduction and provide for environmentally sound methods of eradication and control of invasive species;

- promote public education and action on invasive species, their pathways, and ways to address them, with an emphasis on prevention, early detection, and rapid response;
- assess and strengthen, as appropriate, policy and regulatory frameworks pertaining to the prevention, eradication, and control of invasive species and address regulatory gaps, inconsistencies, and conflicts;
- coordinate with and complement similar efforts of States, territories, federally recognized American Indian tribes, Alaska Native Corporations, Native Hawaiians, local governments, nongovernmental organizations, and the private sector;
- consult with the Department of State and other agencies as appropriate and coordinate with foreign governments to prevent the movement and minimize the impacts of invasive species;
- refrain from authorizing, funding, or implementing actions that are likely to cause or promote the introduction, establishment, or spread of invasive species in the US unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm caused by invasive species; and
- take all feasible and prudent measures to minimize risk of harm in conjunction with such actions.

EO 13112 further requires, that to the extent practicable, federal agencies also expand the use of new and existing technologies and practices.

Noxious weed control and wildfire prevention requirements specific to the withdrawn lands of SCR and JBR, are further identified in the Butte Range Withdrawal Act, Public Law 105–261 of 1998; the *Cooperative Agreement for the Protection, Development, and Management of Fish and Wildlife Resources at Saylor Creek Air Force Range Between Air Force, US Fish and Wildlife Service (USFWS), and Idaho Fish and Game*; the terms, conditions, and BLM Rights-of-Way Stipulations for rights-of-way (ROWs) granted the Air Force for training sites; and the *Programmatic Agreement Regarding the Management of Historic Properties between the Idaho State Historic Preservation Office and the MHAFB, Idaho*.

1.4 Purpose of the Action

The purpose of the Proposed Action is to improve efficacy of noxious and invasive plant species control and provide an alternate method of control for cheatgrass at MHAFB and MHRC. Increased fire probability and frequency and associated issues with air quality, fugitive dust, and increased soil loss resulting from cheatgrass infestations can impact readiness training at MHAFB. Reducing the occurrence of cheatgrass in infested areas and controlling its introduction following wildfire and other land disturbances are key to reducing its potential impacts to mission readiness and meeting the Air Force’s mandate to manage natural ecosystems at MHAFB and MHRC.

1.5 Need for the Action

The need for the action is to reduce mission and resource management impacts as a result of wildfire and air quality impacts associated with fugitive dust and erosion. Continuing to introduce additional resources and cutting-edge tools to the noxious and invasive plant control

program is essential to manage training lands that are a critical component of the Air Force mission. The introduction of the bioherbicide *P. fluorescens* is needed to create a more integrated approach to weed management that reduces the dependence on amino acid inhibitor herbicides, while gaining better control of the aggressive annual grasses and restoring native sagebrush steppe vegetation. The Proposed Action complies with state and federal legislation, AFIs, and land management agreements with BLM and the state.

1.6 Decision to be Made

The EA evaluates whether the Proposed Action would result in significant impacts on the human and natural environment. Based on the analysis in this EA, the Air Force will make one of three decisions regarding the Proposed Action: 1) choose the alternative action that best meets the purpose of and need for this project and sign a FONSI, allowing implementation of the selected alternative; 2) initiate preparation of an EIS if it is determined that significant impacts would occur through implementation of the action alternatives; or 3) select the No Action Alternative, whereby the Proposed Action would not be implemented.

This EA is a planning and decision-making tool that will be used to guide MHAFB in implementing the Proposed Action or taking No Action in a manner consistent with Air Force standards for environmental stewardship.

1.7 Cooperating Agency and Intergovernmental Coordination/Consultations

1.7.1 Interagency Coordination and Consultation

The Intergovernmental Coordination Act and EO 12372, *Intergovernmental Review of Federal Programs*, require federal agencies to cooperate with and consider state and local views in implementing a federal proposal. Through the coordination process, the 366 FW sent letters to interested and affected government agencies, government representatives, elected officials, and interested parties potentially affected by the Proposed Action on 19 April 2017. The recipient mailing list is located in **Appendix C** and agency and intergovernmental coordination letters are included in **Appendix D**.

A federal-listed threatened species, slickspot peppergrass (*Lepidium papilliferum*), is known to occur at JBR. A letter to the USFWS was sent with the Draft EA to request concurrence of the Air Force determination that Section 7 consultation would not be needed to implement the Proposed Action. The activities proposed would remain consistent with conservation measures outlined in the *Biological Opinion on the Effects of U.S. Air Force Ongoing Actions at Juniper Butte Range and in Owyhee County, Idaho on the Slickspot Peppergrass (Lepidium papilliferum)* (USFWS 2010). Any response to the letter or review of the Draft EA will be addressed once received.

1.7.2 Government to Government Coordination

EO 13175, *Consultation and Coordination with Indian Tribal Governments*, directs federal agencies to coordinate and consult with Native American tribal governments whose interests might be directly and substantially affected by activities on federally administered lands. Consistent with that executive order, DoD Instruction (DoDI) 4710.02, *Interactions with Federally-Recognized Tribes*, and AFI 90-2002, *Air Force Interaction with Federally-recognized Tribes*, federally recognized tribes that are historically affiliated with the MHAFB geographic region were invited to consult on all proposed undertakings that have a potential to affect

properties of cultural, historical, or religious significance to the tribes. The tribal consultation process is distinct from NEPA consultation or the interagency coordination process, and it requires separate notification of all relevant tribes. The MHAFB point-of-contact for Native American tribes is the Installation Commander.

The tribal governments that have been consulted with regarding the Proposed Action are listed in **Appendix C**. Project introduction letters, sent on 16 May 2017, are included in **Appendix D**. Tribes have been asked for input on any concerns or information of traditional resources within the project area potentially impacted by the Proposed Action.

1.8 Public Involvement

Regulations from the Council on Environmental Quality (CEQ) (40 CFR Part 1506.6) direct agencies to involve the public in preparing and implementing their NEPA procedures. An advertisement will be posted in the Idaho Statesman notifying the public of the availability of the Draft EA and unsigned FONSI for review. Information about the Draft EA, unsigned FONSI, and public comment period will also be posted to MHAFB's public website (<http://www.mountainhome.af.mil/>). Copies of the Draft EA and unsigned FONSI will be sent to agencies and tribes as well as to interested groups and the public. All comments received from the public and interested parties and the Air Force response will be included in **Appendix E**.

Chapter 2

Description of the Proposed Action and Alternatives

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 Overview of the Proposed Action and Alternatives

This chapter presents an overview of the invasive and noxious weed control program and the additional measures needed to augment the program. The No Action Alternative is described in conformance with the CEQ regulations (40 CFR 1502.14[d]). Alternatives considered but not carried forward for analysis are discussed in **Section 2.4**.

The Proposed Action is to augment the existing invasive and noxious weed control program with additional weed control measures. The program would continue weed control in operational areas and portions of unimproved lands in support of the mission, reducing wildland fire, and improving native sagebrush-steppe habitat at MHAFB and MHRC. Continuing to implement the program would preserve and restore training lands that are essential to the MHAFB mission and maintain compliance with state and federal legislation, AFIs, and land management agreements with BLM and the state. All procedures, guidelines, restrictions, and prohibitions for invasive and noxious weed control operations identified in the *366 FW Plan 3211-12, Installation Pest Management Plan* (MHAFB 2012a) would continue to be implemented.

The current invasive and noxious weed control program consists of annual weed control efforts that are conducted as part of routine grounds maintenance, fire prevention, range access, and habitat improvement (MHAFB 2012a; MHAFB 2015). Ground-based treatments are conducted at specified areas of MHAFB and MHRC as identified in the annual Noxious Weed Survey and Spray Reports prepared by 366 Civil Engineer Squadron/Civil Engineer-Installation Management Flight, Environmental Element (CES/CEIE).

Ground-based treatments would include

- surveying and spraying for Idaho State-listed noxious weeds on BLM issued ROWs at SCR and JBR;
- implementing invasive and noxious weed control at specified locations at MHAFB including all 1-ac and 0.25-ac emitter sites, Rattlesnake Radar Station, Grasmere EC site, C.J. Strike Dam Recreation Annex, SAR, SCR, and JBR;
- controlling weeds on utility corridors, as needed; and
- controlling goathead, rush skeletonweed, and other noxious weeds that may occur on MHAFB.

Aerial spray applications have been conducted on up to 3,200 ac at SCR since 2000. Treatments have been conducted by the 910 Airlift Wing (AW) Aerial Spray Unit homebased at Youngstown Air Reserve Station in Ohio. Prior to aerial spray operations, the 366 FW submits a statement of need to the Headquarters (HQ) Air Combat Command (ACC) Entomologist for approval. Imazapic (trade names Panoramic 2SL[®] and Plateau[®]) has been the primary herbicide used during aerial spray operations since 2000 when Oust[®] was used. The use of Oust[®] was subsequently rescinded after it was shown to kill crops downwind from the application site when used by BLM (Robertson 2011).

In addition to imazapic, a number of commonly used herbicides including glyphosate (trade names Rodeo[®] and Roundup Pro[®] plus others), sulfometuron methyl (trade name Oust[®]), picloram (trade name Tordon[®]), bromacil/diuron (trade name Krovar[®]), 2,4-D (trade names Barrage HF[®], Amine[®], Crossbow[®] plus others), and dicamba (trade name Clarity[®]) are typically

used for ground-based vegetation control. **Table 2-1** indicates herbicides and their characteristics currently or historically used for invasive and noxious weed control at MHAFB. Use of these herbicides would continue as described in the MHAFB 2012 INRMP, which was analyzed through the NEPA process and resulted in a signed FONSI in 2004 and will therefore not be analyzed further in this EA.

Areas treated for invasive and noxious weed control at MHAFB and MHRC facilities to date are indicated on **Figures 2-1** through **2-4**. Spray avoidance areas are also shown. Annual vegetation control through soil sterilization activities at the 30 emitter and 5 ND zones and other small remote training sites are not illustrated.

For both ground and aerial spray operations, any herbicide used is on the MHAFB Pest Management Plan (MHAFB 2012a) authorized pesticide use list and is pre-approved by the HQ ACC Entomologist prior to use. In addition, any herbicides used on withdrawn or joint land use area lands are pre-approved through a pesticide use permit coordinated by BLM and on the list of BLM-approved herbicides for use in 17 western states (**Appendix A**). All chemical applications are made in accordance with label instructions and herbicide usage are recorded via the Integrated Pest Management Information System and submitted to the HQ ACC Entomologist on a monthly basis.

A public notification regarding the intent to spray is made in advance of the mission via the MHAFB website. An explanation of the need to control cheatgrass, type of aircraft, location and timing of the mission sorties, and Public Affairs office telephone number to ask questions regarding the operation are provided.

2.2 Selection Standards

Only those alternatives determined as reasonable relative to their ability to fulfill the need for a Proposed Action warrant detailed analysis. To be considered reasonable, an alternative must not only fulfill the purpose of and need for the action, it must be technically feasible. Selection standards served to assist MHAFB in defining the minimum standards that any alternative must support to meet the purpose of and need for the Proposed Action. The best solutions for controlling invasive and competitive plant species at MHAFB were identified based on the following selection standards:

- improved control of cheatgrass and other invasive annual grasses in fire prone areas;
- control of listed state noxious weeds on withdrawn or joint land use area lands;
- control of the movement of invasive and noxious weeds along roadways and utility corridors; and
- minimization of risk to non-target species, wildlife, cultural resources, and human health.

2.3 Screening of Alternatives

Alternatives were reviewed against the selection standards. Regardless of the action, all would be managed in accordance with the

- Federal Noxious Weed Act;
- EO 13112;
- BLM Rights-of-Way Stipulations for ROWs granted the Air Force for training sites;

Table 2-1. Herbicides Currently Used for Weed Control Operations at MHAFB and MHRC

Active Ingredient	Example Trade Names	EPA Reg. No.	Characteristics	Herbicide Class	Resistant Weed Biotypes	Restrictions
2,4-D	2,4-D Amine Barrage HF [®] Clean Amine [®] Weedar 64 [®] + others	5905-72 5905-529 34704-120 71368-1	Selective post-emergent control of annual/perennial broadleaf weeds. Key species treated include mustard species and Russian thistle.	Synthetic auxin/growth inhibitor		Grazing restrictions vary by label.
Bromacil + diuron	Krovar I DF [®]	432-1551 352-505	Nonselective herbicide; will kill desirable vegetation.	Photosynthesis inhibitor	kochia, pigweed	Not labeled for use on rangelands
Dicamba	Clarity [®]	7969-137	Selectively controls broadleaf weeds, brush, and trees. Suppresses annual grasses when used at high rates in fall applications.	Synthetic auxin/growth inhibitor	kochia	7- to 40-day restriction on grazing.
Glyphosate	Rodeo [®] Roundup Pro [®] + others	62719-324 524-529	Nonselective herbicide, will kill desirable vegetation.	EPSP* synthase inhibitor	brome grass pigweed, kochia, Russian thistle	8-week restriction on grazing.
Imazapic	Panoramic 2SL [®] Plateau [®] Imazapic 2SL [®]	66222141- 81927 241-365 71368-99	Selectively controls many annual/perennial grasses and broadleaf weeds; some native prairie grasses and wildflowers are tolerant.	ALS inhibitor	cheatgrass, pigweed, kochia	7-day restriction on grazing.
Picloram	Tordon 22K [®]	62719-6	Selectively controls broadleaf weeds.	Synthetic auxin/growth inhibitor	kochia	14-day restriction on grazing.
Sulfometuron methyl	Oust XP [®]	352-601	Nonselective herbicide, will kill desirable vegetation.	ALS inhibitor	kochia, Russian thistle, prickly lettuce	12-month grazing restriction; Not approved for use on BLM lands in Idaho.

*5-enolpyruvylshikimate-3-phosphate (EPSP) synthase

ALS = Acetolactate Synthase; BLM = Bureau of Land Management; USEPA = United States Environmental Protection Agency

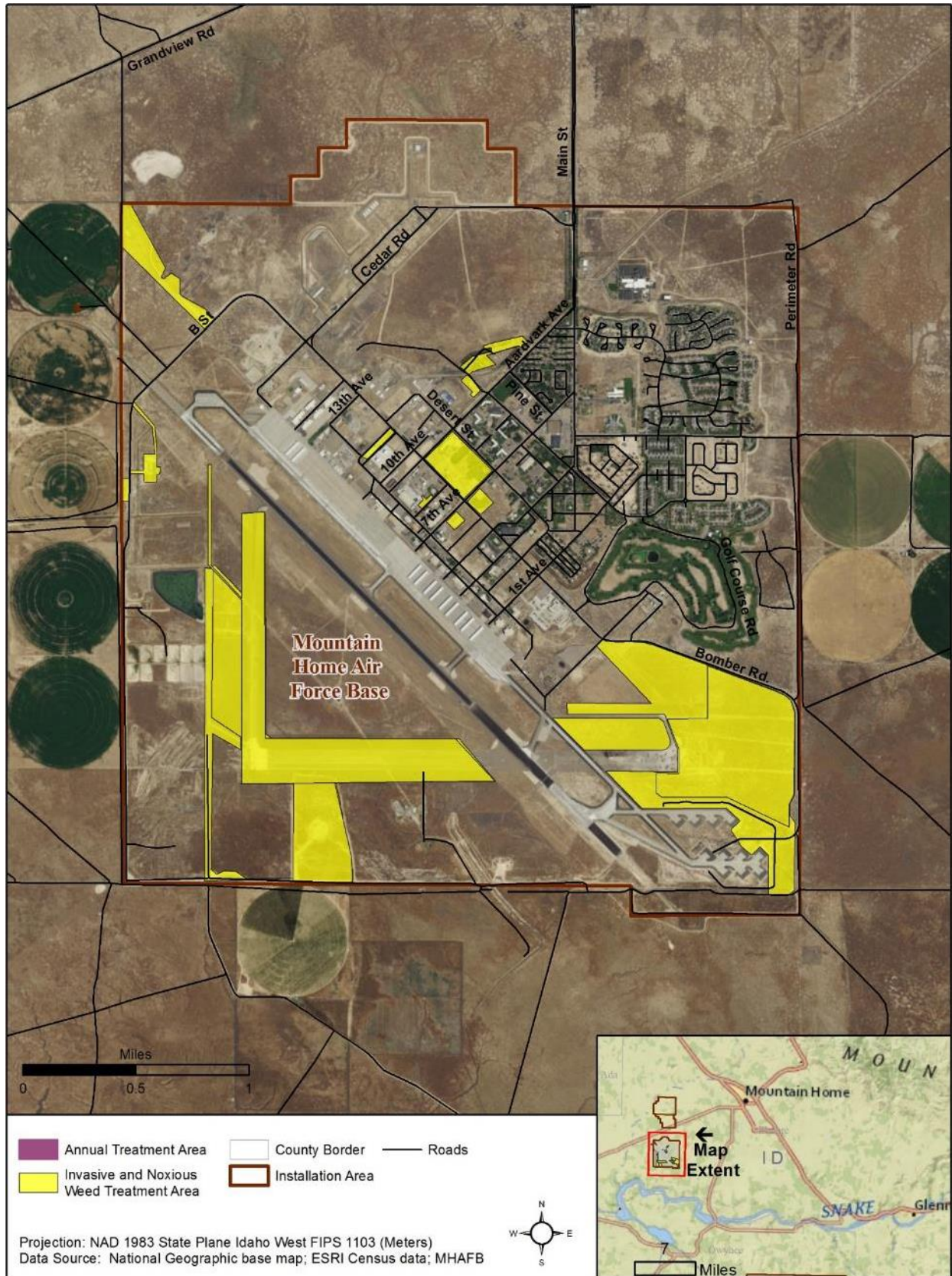


Figure 2-1. MHAFB Herbicide Treatment Areas

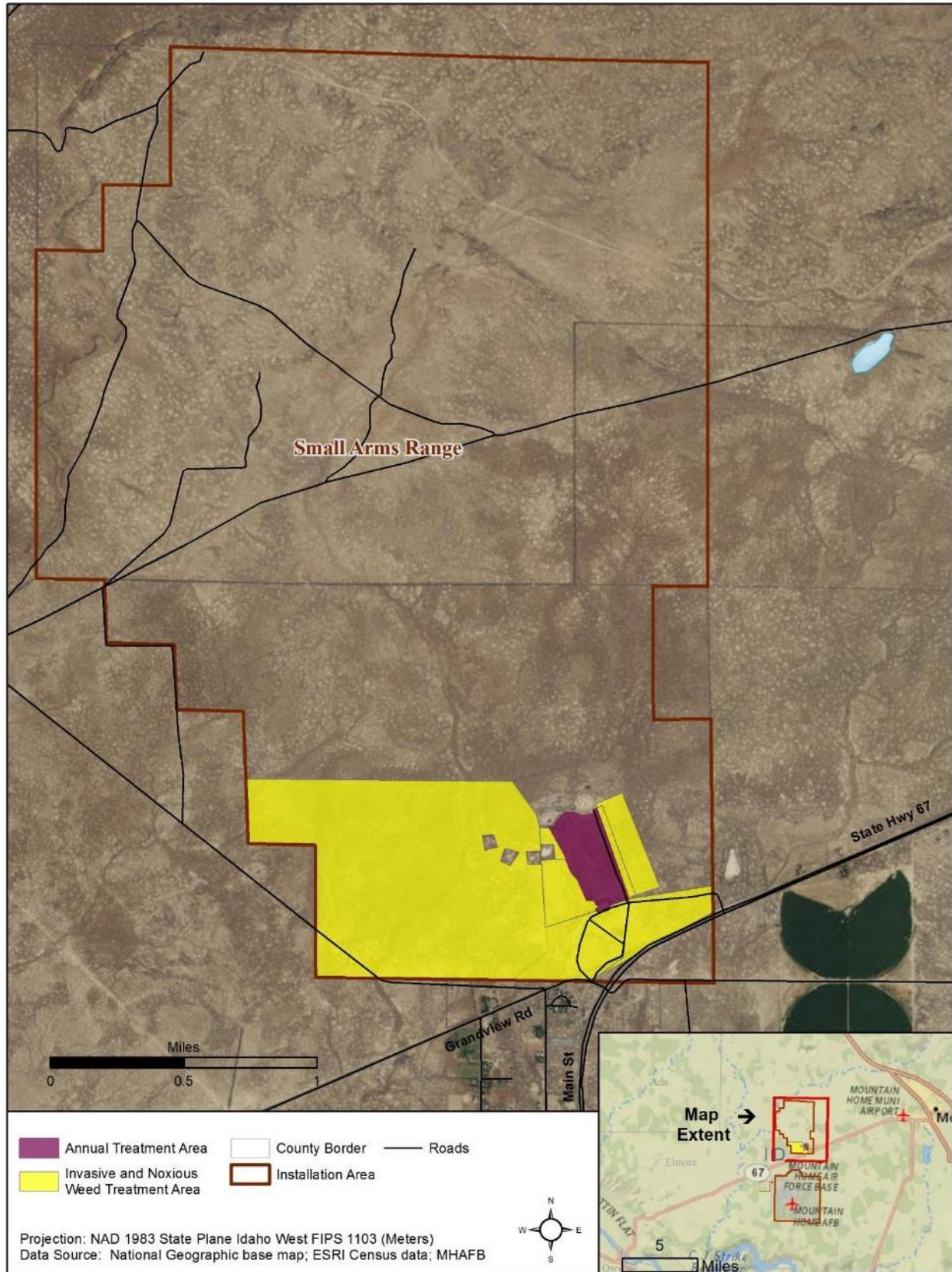


Figure 2-2. SAR Herbicide Treatment Areas

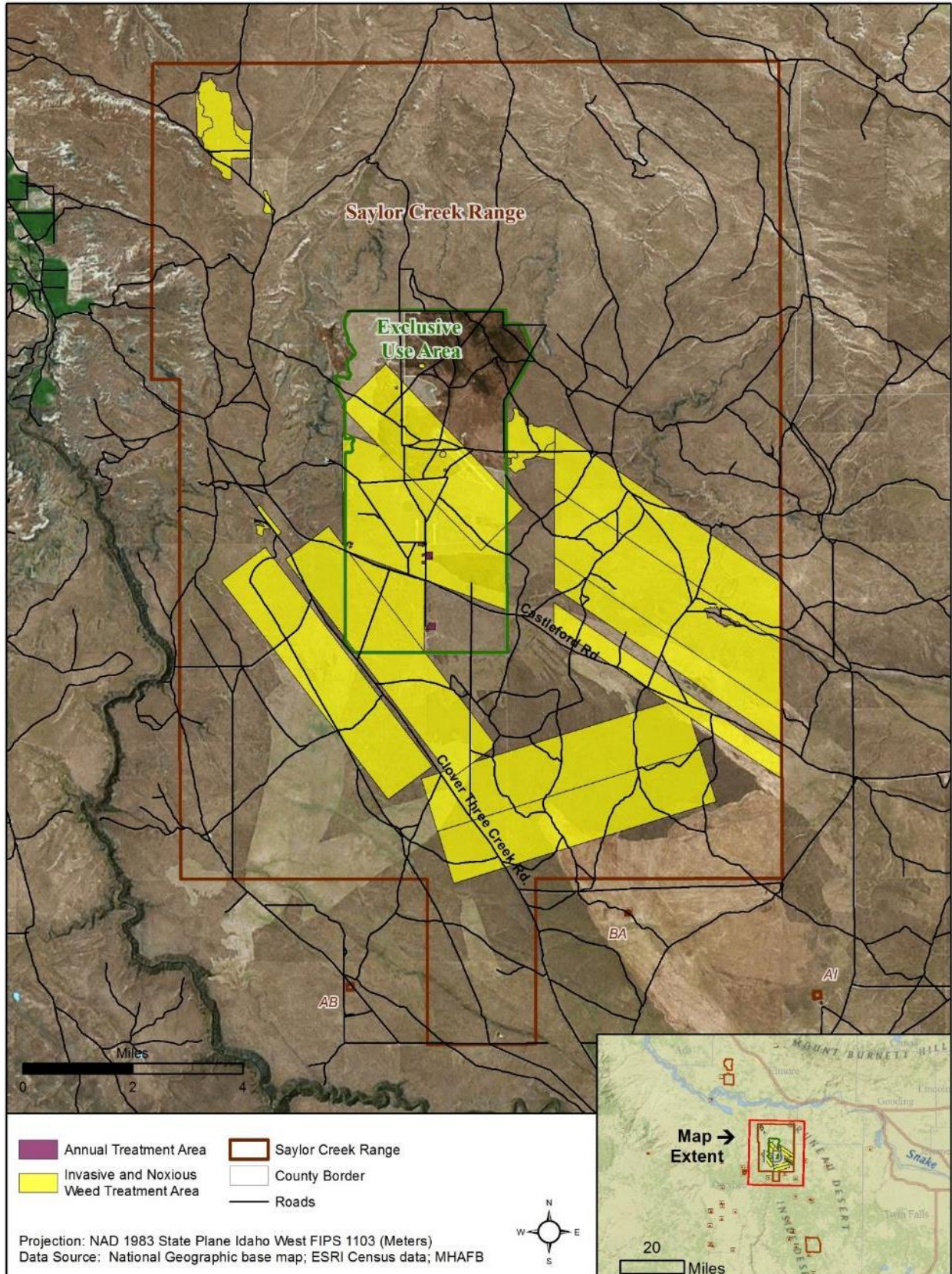


Figure 2-3. SCR Herbicide Treatment Areas

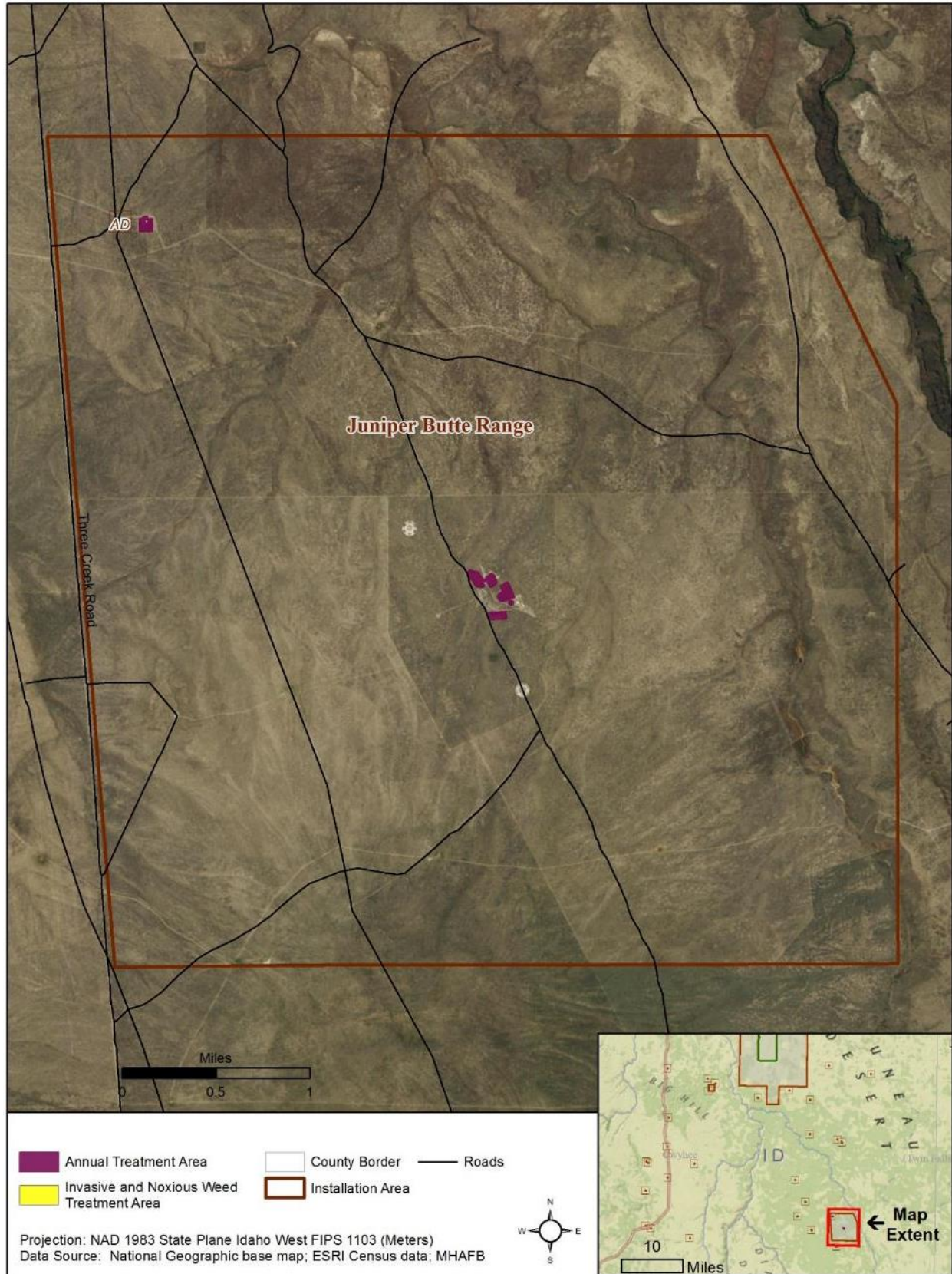


Figure 2-4. JBR Herbicide Treatment Areas

- INRMP for MHAFB, SAR, SCR, JBR, and other MHRC Sites;
- Programmatic Agreement (PA) regarding the management of historic properties between the Idaho State Historic Preservation Office (SHPO) and the MHAFB, Idaho;
- Integrated Cultural Resources Management Plan (ICRMP) for SCR and JBR; and
- Biological Opinion (USFWS 2010) associated with JBR activities.

The INRMP and ICRMP have specific measures for avoiding sensitive species and significant cultural resources. These measures include, but are not limited to, enforcing no-spray buffers of 25 feet (ft) around sensitive species locations, restricting herbicide use if winds exceed 10 miles per hour (mph), and avoiding vehicle use, digging, and other ground-disturbing activities in natural or cultural sensitive areas without prior evaluation and approval (MHAFB 2011, 2012b).

2.4 Detailed Description of the Alternatives

2.4.1 Proposed Action

Under the Proposed Action, the 366 FW would continue to control cheatgrass and other invasive and noxious weeds using the previously authorized techniques and herbicides. Additional herbicides proposed for use under the Proposed Action include Landmark[®] (active ingredients sulfometuron methyl + chlorsulfuron), Matrix[®] (active ingredient rimsulfuron), and Milestone[®] (active ingredient aminopyralid). Increasing the variety of herbicides, particularly those with alternate modes of action, would help minimize the development and spread of herbicide resistant weeds. Imazapic would continue to be used on SCR and would also be used on MHAFB, SAR, and ND-1 to control annual grasses. Landmark[®] and Matrix[®] would be used to control weeds during post-fire rehabilitation projects and to control weeds on parking lots and roads. Landmark[®] and other sulfometuron methyl herbicides would not be used on joint use lands as they are not permitted for use on BLM lands in Idaho as per the 2001 Idaho BLM Information Memorandum #050. Milestone[®] would be used on trial plots to determine its effectiveness in cheatgrass control before use in large-scale applications. Herbicide use on JBR would be restricted to use on parking lots, gravel areas, and along road corridors. Oust[®] and Landmark[®] are not approved for aerial application on BLM lands and would therefore not be used for large-scale cheatgrass control under any alternative. Any herbicides used would be on the MHAFB Pest Management Plan (MHAFB 2012a) authorized pesticide list and the list of BLM-approved herbicides for use in 17 western states (**Appendix A**).

In addition to the use of these herbicides, a recently developed strain of the USEPA-registered bioherbicide, PFD7 (tradename Deploy[®]), would be used to reduce cheatgrass in areas at risk of wildfire and incorporated in post-fire rehabilitation practices to reduce competition with desirable species. PFD7 is not being proposed for use at JBR. PFD7 is a freeze-dried powder that is dissolved in water and applied as a spray solution to the soil surface as a pre-emergent ground or aerial spray treatment or applied as a seed treatment. Currently, the product must be kept frozen (Verdesian Life Science 2016). The product manufacturer, Verdesian Life Sciences, is developing a new formulation that will only require refrigeration, which is expected to be available in 2017 or 2018. Other characteristics of PFD7 include

- being active during the late fall and early spring, which coincides with the germination and active growth of brome grass species (Optimum application conditions are cool (<50 degrees Fahrenheit [°F]) and wet [measurable precipitation]);

- colonizing the plant root intracellular spaces outside the Casparian strip, not entering the cell, and, therefore, not mobile in the plant vascular system;
- injuring standing plants, as it only suppresses root elongation in seedlings;
- decomposing readily, not mobilizing outside of application area, and not persisting in the soil or the soil solution; and
- specificity associated with the compound produced by the bacterium and inhibition of certain lipid combinations in the root cell membrane which inhibit cell elongation, combinations associated with the three targeted invasive grass species.

Studies submitted in support of the registration indicated that there was no impact on the growth and development of daphnia, ladybugs, honeybees, fish, birds, or rats, or as an acute eye or dermal irritant on rabbits as specified through the USEPA registration process.

Additional herbicides and their characteristics considered for use under the Proposed Action are listed in **Table 2-2**. Detailed analyses of these herbicides, their appropriate uses, and assessment of the impacts to the natural, cultural, and social environment associated with the use of the active ingredient were conducted by the BLM as part of the 2007 and 2016 PEISs on herbicide use (BLM 2007, 2016a). The conclusions and results of these PEISs for each relevant resource are included in this EA, but no further in-depth analysis was conducted. PFD7 and its characteristics are also included in **Table 2-2** and are fully analyzed in this EA.

2.4.2 No Action Alternative

The No Action Alternative consists of continuing annual weed control efforts as described under the current invasive and noxious weed control program. Ground-based treatments would be continued at specified areas of MHAFB and MHRC as identified in the annual Noxious Weed Survey and Spray Reports and aerial spray applications would continue as described in Annual Statements of Need for Aerial Dispersal of Herbicides. Herbicides used would include, but not be restricted to glyphosate (trade names Rodeo[®] and Roundup Pro[®] plus others), imazapic (trade names Panoramic 2SL[®] and Plateau[®]), sulfometuron methyl (trade name Oust[®]), picloram (trade name Tordon[®]), bromacil/diuron (trade name Krovar[®]), 2,4-D (trade names Barrage HF[®], Amine[®], Crossbow[®] plus others), dicamba (trade name Clarity[®]), and other herbicides used for cheatgrass and other weed control at MHAFB to date. Cheatgrass control would continue to be conducted via aerial spray applications on up to 3,200 ac at SCR by the 910 AW. Prior to aerial spray operations, the 366 FW would submit a statement of need describing the aerial mission to the HQ ACC Entomologist for approval. Panoramic[®] 2SL and Plateau[®] would continue to be the primary herbicides used during aerial spray operations. Oust[®] is not approved for aerial application on BLM lands and would therefore not be used for large-scale cheatgrass control under this alternative.

2.5 Alternatives Eliminated from Further Consideration

Ground-based control of invasive and noxious weeds on specified semi-developed and developed lands and infrastructure, including access roads, ND targets, emitter sites, railroads, parking lots, and radar sites, and on BLM-issued ROWs would remain largely unchanged under the Proposed Action. Treatments would continue as part of annual grounds maintenance with the addition of the three new herbicides being proposed for use. No additional ground-based control alternatives were considered for the routine weed treatments in semi-developed and developed areas.

Table 2-2. Additional Herbicides Proposed for Weed Control Operations at MHAFB and MHRC

Active Ingredient	Example Trade Names	EPA Reg. No.	Characteristics	Herbicide Class	Resistant Weed Biotypes	Restrictions
Aminopyralid	Milestone [®]	62719-519	Broadleaf weed control, however studies show it reduces cheatgrass seed production;	Synthetic auxin/growth inhibitor	kochia	No grazing restrictions.
<i>Pseudomonas fluorescens</i>	Deploy [®]	73771-4	Suppresses cheatgrass, medusahead, and jointed goatgrass.	Bioherbicide – soil microbe	not applicable	24-hour grazing restriction; Do not use with adjuvants.
Rimsulfuron	Matrix SG [®]	352-768	Kills certain grasses, annual broadleaf weeds and perennial broadleaf weeds. Controls brome grasses when applied at 3 oz/ac in the fall.	ALS inhibitor	cheatgrass, pigweed, kochia	12-month grazing restriction.
Sulfometuron methyl + chlorsulfuron	Landmark XP [®]	352-645	Nonselective herbicide; controls many annual and perennial grasses and broadleaf weeds.	ALS inhibitor	kochia, Russian thistle, prickly lettuce, maretail	12-month grazing restriction; Not approved for aerial spray use on BLM lands.

*5-enolpyruvylshikimate-3-phosphate (EPSP) synthase

ALS = Acetolactate Synthase; BLM = Bureau of Land Management; USEPA = United States Environmental Protection Agency

Methods of large-scale cheatgrass control and site restoration following wildfires on ranges and undeveloped lands could be accomplished through various alternatives. The following alternatives were considered, compared to the selection criteria, and eliminated from further consideration.

2.5.1 Mechanical Control

Mixed results are reported for controlling cheatgrass with mechanical methods such as cutting or mowing, and disking or tilling (Carpenter and Murray 1999). Tillage is often cited as an effective control method when combined with other methods; however, such intensive treatments are not usually appropriate for natural areas or wildlands and often lead to establishment of other undesirable plants. Cutting or mowing can only be a recommended control method for cheatgrass if it can be repeated several times per year, for several years. Plants that are cut before seed ripening can generate new culms and produce seeds at the cut height and plants that are cut after seed ripening will still leave viable seeds (Zouhar 2003). Tillage, disking, and mowing can also cause an extensive amount of surface disturbance, and in turn would require extensive archeological survey and clearance. In addition to the surface disturbance and accessibility issues, operation of the required equipment, along with the costs for archeological survey, can be uneconomical, and therefore, this alternative was eliminated from further consideration.

2.5.2 Prescribed Fire

In sagebrush ecosystems, prescribed burning alone will generally decrease cheatgrass cover only in the short term, and in areas where cheatgrass dominates the understory, fire may best be used as a seedbed preparation technique prior to seeding desirable species (Zouhar 2003). Keeley and McGinnis (2007) evaluated the timing of prescribed fire in controlling cheatgrass and found that altering burning season to coincide with seed maturation (usually during spring) was not successful in controlling cheatgrass, due to the sparse fuel loads generating low fire intensity. In addition, fire can have a negative impact on cultural resources. While fire makes archaeological resources more visible on the surface, it can also result in aeolian processes that undermine or destroy the soil matrix and transport artifacts out of context. Prescribed burning alone is not anticipated to achieve the project objectives without combining it with some other range improvement practice, such as seeding, and therefore will not be analyzed further.

2.5.3 Targeted Grazing

Livestock grazing can reduce cheatgrass cover and can be manipulated to control cheatgrass; however, use of electric fencing, active herding, and control of timing and duration of grazing use are critical components to provide effective control through grazing (Amundson 2015). Livestock grazing prior to seed maturation can reduce biomass and seed production; however, heavy use may result in negative impacts to perennial grasses (Pellant et al. 1999). Benefits to grazing are that it can disrupt fine fuel continuity, reduce fuel loads, and increase the length of fire intervals. Grazing during the winter can reduce the buildup of annual grasses and promote perennial grasses seeding; however, perennial grasses may be adversely affected if spring grazing is conducted two or more years in a row. The benefits of grazing tend to be localized and grazing, in conjunction with restoration techniques such as prescribed burning, herbicides, and seeding, can be more successful in restoration of range lands than grazing alone (Vallentine and Stevens 1994). Additionally, as with prescribed fire, grazing has potential to impact cultural resources. While historical grazing has already somewhat compromised levels of site integrity at

MHAFB, concentrated grazing activities can have the same results as fire and potentially increase bioturbation.

Target grazing would require close monitoring of livestock use. Establishment of temporary electric fences and the movement of livestock would be cost- and time-prohibitive. Consequently, this alternative was eliminated from further consideration.

2.5.4 Bioherbicides

In addition to efforts to develop *P. fluorescens* as a commercially available bioherbicide for effective control of cheatgrass, research has been conducted on various other bioherbicides including the soil fungus black-fingers-of-death (*Pyrenophora semeniperda*). *P. semeniperda* is generalist fungal pathogen that occurs primarily in cheatgrass seed banks, where it causes mortality; however, studies indicate an increase mortality in native grass under certain conditions where *P. semeniperda* populations are high (Merrill 2010). Additionally, large-scale field trials have not yet been conducted, nor have the potential impacts to native prairie grasses and grain crops been thoroughly examined (Ehlert et al. 2014). Studies indicate potential for other fungal pathogens including head smut pathogen (*Ustilago bullata*) and chestnut bunt pathogen (*Tilletia fusca*) also have potential to control cheatgrass (Meyer et al. 2008); however, no large-scale studies were found regarding their effectiveness or commercial availability. Other than *P. fluorescens*, no other bioherbicides are considered for use at MHAFB at this time and this alternative was eliminated from further consideration.

2.6 Integrated Pest Management

Integrated pest management (IPM) is a planned program incorporating continuous monitoring, education, record-keeping, and communication to prevent pests and disease vectors from causing unacceptable damage to operations, people, property, materiel, or the environment. The Air Force uses a combination of mechanical and manual methods, such as mowing, weed-eating, and prescribed fire (for removal of tumbleweeds); biological treatments, such as targeted grazing; and herbicides in their IPM program. Introduction of the bioherbicide PFD7 is consistent with the Air Force's policies on IPM.

Avoiding disturbance is another key method of pest management as invasive species infestations generally gain a foothold on sites where native species and ecological cycles have been disrupted. Except where unavoidable, all vehicles are required to remain on existing roads to avoid destroying habitat at MHAFB and MHRC. Grazing and the management activities associated with grazing are other sources of ground disturbance that are permitted on portions of SAR, SCR, JBR, and on ND-1. Grazing is used to reduce biomass as a fire management tool and, on balance, may provide a benefit to native ecosystems. The effects of grazing on slickspot peppergrass were analyzed in the 2010 the *Biological Opinion on the Effects of U.S. Air force Ongoing Actions at Juniper Butte Range and in Owyhee County, Idaho on the Slickspot Peppergrass (Lepidium papilliferum)* is likely to cause localized impacts to slickspot peppergrass and its habitat, but these localized adverse effects are not expected to significantly change the distribution or abundance of slickspot peppergrass (USFWS 2010).

Revegetation of affected areas is an integral part of site restoration and many restoration and habitat improvement activities have been implemented on MHAFB and SAR. Specifically-selected seed mixes with native and non-native species were created and applied

with methods to increase the chance of success to provide good forage and ground cover. The primary application method has been drill seeding, though aerial seeding of Wyoming big sagebrush was conducted on 2,800 ac in alternating strips for a total of 5,600 ac in 2015 and 2016.

2.7 Herbicide Treatment Standard Operating Procedures

Under each of the alternatives, the Air Force would follow standard operating procedures (SOPs) that are designed to protect and enhance natural resources that could be affected by vegetation treatments involving the use of herbicides. General planning and herbicide application SOPs are presented in **Table 2-3**. Resource specific SOPs are discussed in **Chapter 4 Environmental Consequences** under the respective resource. These SOPs are consistent with the 366th Fighter Wing Plan 3211-12, *Installation Pest Management Plan*; AFI 32-1053, *Integrated Pest Management Program*; AFI 32-1074, *Aerial Application of Pesticides*; and the *Final PEIS for Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States* (BLM 2007) and *Final PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Land Management Lands in 17 Western States* (BLM 2016a).

Table 2-3. Standard Operating Procedures for Applying Herbicides

	Prepare spill contingency plan in advance of treatment - A spill kit capable of containing and preventing release of chemical into adjacent water sources must be available during mixing and loading operations.
	Conduct a pretreatment survey before applying herbicides.
	Select herbicide that is least damaging to environment while providing the desired results.
	Select herbicide products carefully to minimize additional impacts from degradates, adjuvants, inert ingredients, and tank mixtures.
	Apply the least amount of herbicide needed to achieve the desired result.
	Follow product label for use and storage.
General	Have licensed applicators apply herbicides.
	Use only United States Environmental Protection Agency-approved herbicides and follow product label directions and advisory statements.
	Review, understand, and conform to the “Environmental Hazards” section on the herbicide label. This section warns of known pesticide risks to the environment and provides practical ways to avoid harm to organisms or to the environment.
	Comply with herbicide-free buffer zones to ensure that drift will not affect crops or nearby residents/landowners.
	Post treated areas and specify reentry or rest times, if appropriate.
	Notify adjacent landowners prior to treatment.
	Keep copy of SDSs at work sites. SDSs available for review at

Table 2-3. Standard Operating Procedures for Applying Herbicides

	<p>http://www.cdms.net/.</p> <p>Keep records of each application, including the active ingredient, formulation, application rate, date, time, and location.</p> <p>Consider site characteristics, environmental conditions, and application equipment in order to minimize damage to non-target vegetation.</p> <p>Do not apply herbicides if rainfall is threatening.</p> <p>Clean off-highway vehicles to remove seeds.</p>
General	<p>Conduct pre-treatment surveys for sensitive habitat and special status species within or adjacent to proposed treatment areas.</p> <p>Use drift reduction agents, as appropriate, to reduce the drift hazard to non-target species.</p> <p>Refer to the herbicide label when planning revegetation to ensure that subsequent vegetation would not be injured following application of the herbicide.</p> <p>Avoid aerial spraying during periods of adverse weather conditions (snow or rain imminent, fog, or air turbulence).</p> <p>Limit herbicide applications to wind speeds between 3 – 10 miles per hour to reduce drift potential.</p> <p>Turn off applied treatments at the completion of spray runs and during turns to start another spray run.</p>
Aerial Applications	<p>Make applications at the lowest possible height that is safe and practical reduces exposure of droplets to evaporation and wind. Follow label instructions for height restrictions (i.e., Panoramic 2SL[®] and Plateau[®] labels state 10 feet or less above the tallest plants).</p> <p>Avoid treating powdery dry or light sandy soils when conditions are favorable for wind erosion.</p> <p>Do not conduct aerial applications during a temperature inversion because drift potential is high.</p> <p>Limit large-scale aerial applications to fall when native plant species have set seed and/or are dormant.</p> <p>Proper coordination with air traffic control personnel must be arranged to ensure safety.</p>

Sources: BLM 2007, 2016a; MHAFB 2015, 2016a
SDS = Safety Data Sheet

Chapter 3

Affected Environment

3.0 AFFECTED ENVIRONMENT

3.1 Scope of the Analysis

NEPA requires a focused analysis of the areas and resources potentially affected by an action or alternative and a comparative analysis that allows decision makers and the public to differentiate among the alternatives. A NEPA document should consider, but not analyze in detail, those areas or resources not potentially affected by the proposal. CEQ regulations (40 CFR §§ 1500-1508) further require an EA to discuss impacts in proportion to their potential magnitude and present only enough discussion of peripheral issues as necessary to demonstrate why more study is not warranted. Both description and analysis of the potential impacts in an EA should provide sufficient detail and depth to ensure that the agency (i.e., Air Force) has a proper understanding of the potential environmental consequences of a contemplated course of action.

This EA focuses on those resources that would be affected by the proposed changes to the invasive and noxious weed control program at MHAFB. The analysis in this EA considers the current (baseline) conditions of the affected environment and compares those to conditions that might occur should the Air Force implement Proposed Action or No Action Alternative.

3.1.1 Resources Analyzed

Air quality and climate change, land use, water resources, biological/natural resources, earth resources, hazardous materials, cultural resources, and health and safety are included for analysis.

3.1.2 Resources Eliminated from Detailed Analysis

3.1.2.1 Airspace Management and Use

Under the Proposed Action, there would be no changes to airspace management or use. Aerial spray applications would continue to be conducted at the rate of one mission per year, which would include approximately 10 to 15 sorties conducted over a 5 to 7-day period. The 910 AW Aerial Spray Unit would continue to conduct all spray applications. Management of the airspace would remain consistent with existing practices and would require the SCR be closed to other aircraft (or) where see and avoid is predominantly employed over the ranges; therefore, because there would be no impacts to airspace management and use, this resource was eliminated from further analysis.

3.1.2.2 Noise/Acoustic Environment

Under the Proposed Action, there would be no changes to the acoustic environment.

3.1.2.3 Infrastructure/Utilities

Infrastructure consists of the systems and physical structures that enable a population in a specified area to function. Infrastructure is wholly human-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as “urban” or developed. The Proposed Action would have no impact on infrastructure systems, physical structures, or utilities; therefore, this resource is eliminated from further consideration.

3.1.2.4 Socioeconomic Resources

Socioeconomics is defined as the basic attributes and resources associated with the human environment, particularly demographic characteristics of the population and economic activity (employment, income, and industrial or commercial growth). Changes in these two fundamental socioeconomic indicators are typically accompanied by changes in other components, such as housing availability and the provision of public services. No impacts would be expected on socioeconomic resources, as neither the Proposed Action nor No Action Alternative would cause a measurable change in revenue for local businesses or government agencies; displace numbers of people or existing housing; cause a substantial change in the local employment or labor force; or cause a change in property values; therefore, this resource is eliminated from further consideration.

3.1.2.5 Environmental Justice

Environmental justice concerns are associated with disproportionately high and adverse effects on minority or low-income populations as defined in EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. This includes consideration of (a) whether there is or will be an impact on the natural or physical environment that significantly and adversely affects a minority or low-income population, (b) whether environmental effects are significant and are or might be having an adverse impact on minority populations or low income populations that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group, and (c) whether the environmental effects occur or would occur in a minority or low-income population affected by cumulative or multiple adverse exposures from environmental hazards.

The Proposed Action would take place entirely within the boundaries of MHAFB and MHRC and would have minimal impact on populations outside of the installation. The closest population that could support low-income and minority populations, as well as children and the elderly is located 25 mi northwest of SCR and 50 mi northwest of JBR; therefore, no impacts to low income and minority populations, children, or the elderly are anticipated and this resource was eliminated from further analysis.

3.2 Air Quality

3.2.1 Definition of Resource

Under the authority of the Clean Air Act (CAA) and subsequent regulations, the USEPA has divided the country into geographical regions known as Air Quality Control Regions (AQCRs) to evaluate compliance with the National Ambient Air Quality Standards (NAAQS). MHAFB is in Elmore County and the MHRC is in Owyhee county both of which are in the Idaho Intrastate AQCR (40 CFR 81.313). The project area for Air Quality is the Idaho Intrastate AQCR.

3.2.1.1 Criteria Pollutants

In accordance with CAA requirements, the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. Measurements of these “criteria pollutants” in ambient air are expressed in units of parts per million (ppm) or in units of micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). Regional air quality is a result not only of the types and

quantities of atmospheric pollutants and pollutant sources in an area but also surface topography, the size of the “air basin,” and prevailing meteorological conditions.

The CAA directed the USEPA to develop, implement, and enforce strong environmental regulations that would ensure clean and healthy ambient air quality. To protect public health and welfare, the USEPA developed numerical concentration-based standards, NAAQS, for pollutants that have been determined to impact human health and the environment, and established both primary and secondary NAAQS under the provisions of the CAA. NAAQS are currently established for six criteria air pollutants: ozone (O₃), carbon monoxide (CO), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), respirable particulate matter (including particulates equal to or less than 10 microns in diameter [PM₁₀] and particulates equal to or less than 2.5 microns in diameter [PM_{2.5}]), and lead (Pb). The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represent the maximum pollutant concentration necessary to protect vegetation, crops, and other public resources in addition to maintaining visibility standards. The primary and secondary NAAQS are presented in **Table 3-1**.

The criteria pollutant O₃ is not usually emitted directly into the air but is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants or “O₃ precursors.” These O₃ precursors consist primarily of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) that are directly emitted from a wide range of emissions sources. For this reason, regulatory agencies limit atmospheric O₃ concentrations by controlling VOC pollutants (also identified as reactive organic gases) and NO_x.

The USEPA has recognized that particulate matter emissions can have different health affects depending on particle size and, therefore, developed separate NAAQS for coarse particulate matter (PM₁₀) and fine particulate matter (PM_{2.5}). The pollutant PM_{2.5} can be emitted from emission sources directly as very fine dust and/or liquid mist or formed secondarily in the atmosphere as condensable particulate matter typically forming nitrate and sulfate compounds. Secondary (indirect) emissions vary by region depending upon the predominant emission sources located there and thus which precursors are considered significant for PM_{2.5} formation and identified for ultimate control.

The CAA and USEPA delegated responsibility for ensuring compliance with NAAQS to the states and local agencies. As such, each state must develop air pollutant control programs and promulgate regulations and rules that focus on meeting NAAQS and maintaining healthy ambient air quality levels. These programs are detailed in State Implementation Plans (SIPs) that must be developed by each state local regulatory agency and approved by USEPA. A SIP is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS. Any changes to the compliance schedule or plan (e.g., new regulations, emissions budgets, controls) must be incorporated into the SIP and approved by USEPA.

The CAA required that USEPA draft general conformity regulations. These regulations are designed to ensure that federal actions do not impede local efforts to achieve or maintain attainment with the NAAQS. The General Conformity Rule and the promulgated regulations

found in 40 CFR 93 exempt certain federal actions from conformity determinations (e.g., contaminated site cleanup and natural disaster response activities). Other federal actions are assumed to conform if total indirect and direct project emissions are below de minimis levels presented in 40 CFR 93.153. The threshold levels (in tons of pollutant per year) depend upon the nonattainment status that USEPA has assigned to a region. Once the net change in nonattainment pollutants is calculated, the federal agency must compare them to the de minimis thresholds.

Table 3-1. National Ambient Air Quality Standards

Pollutant	Standard Value ⁶		Standard Type
Carbon Monoxide (CO)			
8-hour average	9 ppm	(10 mg/m ³)	Primary
1-hour average	35 ppm	(40 mg/m ³)	Primary
Nitrogen Dioxide (NO₂)			
Annual arithmetic mean	0.053 ppm	(100 µg/m ³)	Primary & Secondary
1-hour average ¹	0.100 ppm	(188 µg/m ³)	Primary
Ozone (O₃)			
8-hour average ²	0.070 ppm	(137 µg/m ³)	Primary & Secondary
Lead (Pb)			
3-month average ³		0.15 µg/m ³	Primary & Secondary
Particulate <10 Micrometers (PM₁₀)			
24-hour average ⁴		150 µg/m ³	Primary & Secondary
Particulate <2.5 Micrometers (PM_{2.5})			
Annual arithmetic mean ⁴		12 µg/m ³	Primary
Annual arithmetic mean ⁴		15 µg/m ³	Secondary
24-hour average ⁴		35 µg/m ³	Primary & Secondary
Sulfur Dioxide (SO₂)			
1-hour average ⁵	0.075 ppm	(196 µg/m ³)	Primary
3-hour average ⁵	0.5 ppm	(1,300 µg/m ³)	Secondary

Notes:

- 1 In February 2010, the USEPA established a new 1-hour standard for NO₂ at a level of 0.100 ppm, based on the 3-year average of the 98th percentile of the yearly distribution concentration, to supplement the then-existing annual standard.
- 2 In October 2015, the USEPA revised the level of the 8-hour standard to 0.070 ppm, based on the annual 4th highest daily maximum concentration, averaged over 3 years; the regulation became effective on 28 December 2015. The previous (2008) standard of 0.075 ppm remains in effect for some areas. A 1-hour standard no longer exists.
- 3 In November 2008, USEPA revised the primary lead standard to 0.15 µg/m³. USEPA revised the averaging time to a rolling 3-month average.
- 4 In October 2006, USEPA revised the level of the 24-hour PM_{2.5} standard to 35 µg/m³ and retained the level of the annual PM_{2.5} standard at 15 µg/m³. In 2012, USEPA split standards for primary and secondary annual PM_{2.5}. All are averaged over 3 years, with the 24-hour average determined at the 98th percentile for the 24-hour standard. USEPA retained the 24-hour primary standard and revoked the annual primary standard for PM₁₀.
- 5 In 2012, the USEPA retained a secondary 3-hour standard, which is not to be exceeded more than once per year. In June 2010, USEPA established a new 1-hour SO₂ standard at a level of 75 ppb, based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations.
- 6 Parenthetical value is an approximately equivalent concentration for NO₂, O₃, and SO₂.

µg/m³ = microgram(s) per cubic meter; mg/m³ = milligram(s) per cubic meter; ppb = part(s) per billion; ppm = part(s) per million; USEPA = United States Environmental Protection Agency

Title V of the CAA Amendments of 1990 requires states and local agencies to implement permitting programs for major stationary sources. A major stationary source is a facility (e.g., plant, base, activity) that has the potential to emit (PTE) more than 100 tons per year (tpy) of any one criteria air pollutant, 10 tpy of a hazardous air pollutant, or 25 tpy of any combination of hazardous air pollutants; however, lower pollutant-specific “major source” permitting thresholds apply in nonattainment areas. The purpose of the permitting rule is to establish regulatory control over large, industrial-type activities and monitor their impact on air quality.

Federal Prevention of Significant Deterioration (PSD) regulations also define air pollutant emissions from proposed major stationary sources or modifications to be “significant” if a proposed project’s net emission increase meets or exceeds the rate of emissions listed in 40 CFR 52.21(b)(23)(i); or (1) a proposed project is within 10 kilometers of any Class I area (e.g., wilderness area greater than 5,000 ac or national park greater than 6,000 ac), and (2) regulated pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 $\mu\text{g}/\text{m}^3$ or more (40 CFR 52.21[b][23][iii]). PSD regulations also define ambient air increments, limiting the allowable increases to any area’s baseline air contaminant concentrations, based on the area’s designation as Class I, II, or III (40 CFR 52.21[c]).

3.2.1.2 Greenhouse Gases and Climate Change

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. These emissions are generated by both natural processes and human activities. The accumulation of GHGs in the atmosphere helps regulate the earth’s temperature and is believed to contribute to global climate change. GHGs include water vapor, carbon dioxide (CO₂), methane, nitrous oxide, O₃, and several hydrocarbons and chlorofluorocarbons. Each GHG has an estimated global warming potential (GWP), which is a function of its atmospheric lifetime and its ability to absorb and radiate infrared energy emitted from the earth’s surface. The GWP of a particular gas provides a relative basis for calculating its carbon dioxide equivalent (CO₂e) or the amount of CO₂ equivalent to the emissions of that gas. CO₂ has a GWP of 1 and is, therefore, the standard by which all other GHGs are measured.

According to the CEQ Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions memorandum dated 18 December 2014, CEQ advises federal agencies to consider, in performing their NEPA analysis, whether analysis of the direct and indirect GHG emissions from their Proposed Actions may provide meaningful information to decision makers and the public. If a Proposed Action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO₂e GHG emissions on an annual basis, agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. CEQ does not propose this as an indicator of a threshold of significant effects but rather as an indicator of a minimum level of GHG emission that may warrant some description in the appropriate NEPA analysis for agency actions involving direct emissions of GHGs. CEQ also notes this indicator serves as a minimum standard for reporting emissions under the CAA. GHG emissions because of the Proposed Action are discussed in **Section 4.1.3**.

On 13 May 2010, the USEPA issued the final GHG Tailoring Rule. This rule established thresholds for GHG emissions that define when permits under the PSD and Title V Operating Permit programs are required for new and existing industrial facilities. The Rule was implemented using a phased-in approach, effective January 2011. The salient features of the Rule are as follows (USEPA, 2011):

- The Tailoring Rule generally defines a major source of GHGs as one that has the PTE of GHG emissions equal to or greater than 100,000 tpy CO₂e. An installation that is a major source and has not already applied for a Title V permit had to apply for a Title V permit by 1 July 2012, or within 1 year after having a PTE of at least 100,000 tpy or more of GHGs as CO₂e.
- An installation must obtain a PSD permit and apply Best Available Control Technologies (BACT) for GHGs if the PTE is 100,000 tpy or more of CO₂e for a new source (and for a modification, if the modification also results in a 75,000 tpy increase or more in CO₂e). A PSD permit and BACT for GHGs also applies if an installation is already subject to PSD for non-GHG pollutants and has a PTE of 75,000 tpy or more of CO₂e (new sources) or an increase of 75,000 tpy or more of CO₂e for modifications.
- PSD and BACT requirements apply if a source is an existing minor source for PSD, and the modification alone has actual or PTE of GHG emissions equal to or greater than 100,000 tpy CO₂e.
- The USEPA had planned to propose rules for smaller sources of GHG (i.e., with less than 50,000 tpy of GHG on a CO₂e basis) by 30 April 2016. On 26 August 2016, USEPA proposed to modify the PSD rules, and requested comment on setting the lower boundary of the Significant Emissions Rate (SER) for GHG at 30,000 tpy; these proposed rules were published in the Federal Register (FR) on 3 October 2016. As of August 2017, there has been no change to the PSD threshold. Until the USEPA finalizes rules to bring the PSD threshold below 75,000, it cannot act to make small sources subject to GHG regulation.

On 19 August 2015, the USEPA published regulations that removed several provisions pertaining to Step 2 of the PSD Tailoring Rule. Effectively, GHGs are no longer treated as an air pollutant for the specific purpose of determining whether a source (or modification) is required to obtain a PSD or title V permit. In other words, a stationary source would not need to obtain a PSD or title V permit solely because the source emits or has the PTE GHGs above the applicable major source thresholds (80 FR 65292).

On 26 August 2016, the USEPA proposed regulations that revise provisions to determine whether a source must obtain a permit. In addition, the USEPA proposed a 75,000 tpy CO₂e SER for GHGs. The SER establishes a de minimis level below which BACT is not required for this pollutant (81 FR 68216).

3.2.2 Affected Environment

3.2.2.1 Regional Climate

On average, there are 210 sunny days per year at MHAFB, Idaho. The July high temperature is approximately 92°F. The January low temperature is 22°F. MHAFB gets approximately 8 inches of rain per year. Snowfall is about 6 inches. The number of days with any measurable precipitation is 34. (Sperling’s, 2017).

3.2.2.2 Baseline Air Emissions

The USEPA has delegated enforcement of the PSD and Title V programs to the Idaho Department of Environmental Quality (IDEQ). The IDEQ has adopted the NAAQS by reference, thereby requiring the use of the standards within the state of Idaho.

MHAFB and MHRC is located within the Idaho Intrastate AQCR #63 which consists of 22 counties in central Idaho, including Elmore and Owyhee Counties.

Air quality in the AQCR has been designated as either in “attainment,” “unclassifiable/attainment,” or “better than national standards” with the NAAQS for all pollutants (40 CFR 81.313).

Ambient air quality for criteria pollutants is summarized in **Table 3-2**. Ambient air quality for the AQCR, is in attainment for the 8-hour O₃ NAAQS established in 2008 (75 parts per billion [ppb] of ground-level ozone). The region is designated as an unclassifiable/attainment area for all other criteria pollutants. Unclassifiable areas are those areas that have not had ambient air monitoring and are assumed to be in attainment with NAAQS. Any of the pending attainment designations have no regulatory effect on the current analysis.

Table 3-2. Idaho/Federal Ambient Air Quality Standards and Status

Air Pollutant	Averaging Time	Attainment Status
Nitrogen Dioxide (NO ₂)	1-hour ¹	Not yet designated
Sulfur Dioxide (SO ₂)	1-hour ¹	Not yet designated
Lead (Pb)	Calendar Quarter	Attainment
	Rolling 3-month ²	Not yet designated
Particulate Matter (PM _{2.5})	24-hour	Attainment
	Annual	Attainment
Ozone (O ₃) ³	8-hour	Attainment

Notes:

1 Standard established in 2010.

2 Standard established in 2008.

3 In October 2015, the United States Environmental Protection Agency tightened the 8-hour National Ambient Air Quality Standards for ground-level ozone to 70 parts per billion.

Air quality is typically good in the region and is generally affected only locally by military and civilian vehicle emissions, particulate pollution from vehicle traffic, emissions from wastewater treatment plants, industrial sources, and construction activities. Mobile sources, such as vehicle

and aircraft emissions, are generally not regulated and are not covered under existing stationary source permitting requirements. Stationary emissions sources at MHAFB include natural gas boilers; jet engine testing (hush houses); paint spray booths; refueling operations; and emergency power generators.

3.3 Land Use

3.3.1 Definition of Resource

The term “land use” refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. An important measure in analyzing the effects of a Proposed Action in terms of land use is its compliance with any applicable land use or zoning regulations. Existing land use at the project site, the types of land uses on adjacent properties and their proximity to a Proposed Action, the duration of a proposed activity are other relevant factors. Land use on and off base are considered in this EA.

3.3.2 Affected Environment

3.3.2.1 Surrounding Off-Installation Land Use

MHAFB and associated training areas are located in southwestern Idaho in Elmore, Owyhee, and Twin Falls Counties, though only one small site is in Twin Falls County. Elmore County is primarily a rural county with a strong ranching and agri-business economy with over 65 percent of land classified as rangeland (Elmore County 2017). Over 67 percent of the land in Elmore County is owned by the federal government including the USDA Forest Service, BLM, and DoD. Of the federally owned land, less than 1 percent is owned by DoD. Twenty-six percent is privately owned and about 6 percent is owned by the state (Elmore County 2017). The BLM and Forest Service administer the majority of the public lands in the County including most of the BLM’s Morley Nelson Snake River Birds of Prey National Conservation Area, which surrounds MHAFB, SAR, Rattlesnake Radar Station, Middle Marker, and the C.J. Strike Dam Recreation Annex, and abuts SCR to the north (**Figure 3-1**).

Both SCR and JBR are located within Owyhee County. Over 80 percent of the land within the county is owned by the BLM. The remaining land is DoD (3 percent), private (8 percent), or state-owned (7 percent). Less than 1 percent is owned by city and county jurisdictions. Over 93 percent of the land within Owyhee County is used for grazing, while irrigated agriculture is the second largest land use in the County. Most of this is located adjacent to the Snake River and its tributaries (Owyhee County 2010).

In addition to the Morley Nelson Snake River Birds of Prey National Conservation Area, there are a number of other special land use areas within the vicinity of or adjacent to the MHAFB and MHRC facilities. Included are a designated Wilderness Area, the Bruneau-Jarbidge Rivers Wilderness Area, that is located to the south of SCR and west of JBR; the Bruneau and Sheep Creek Wild and Scenic Rivers associated with the Wilderness Area; the Saylor Creek Wild Horse Herd Management Area, which is located adjacent to the eastern boundary of SCR; C.J. Strike Wildlife Management Area (0.5 mi west of the C.J. Strike Dam Recreation Annex), and the Trueblood Wildlife Management Area (12 mi east of the C.J. Strike Dam Recreation Annex);

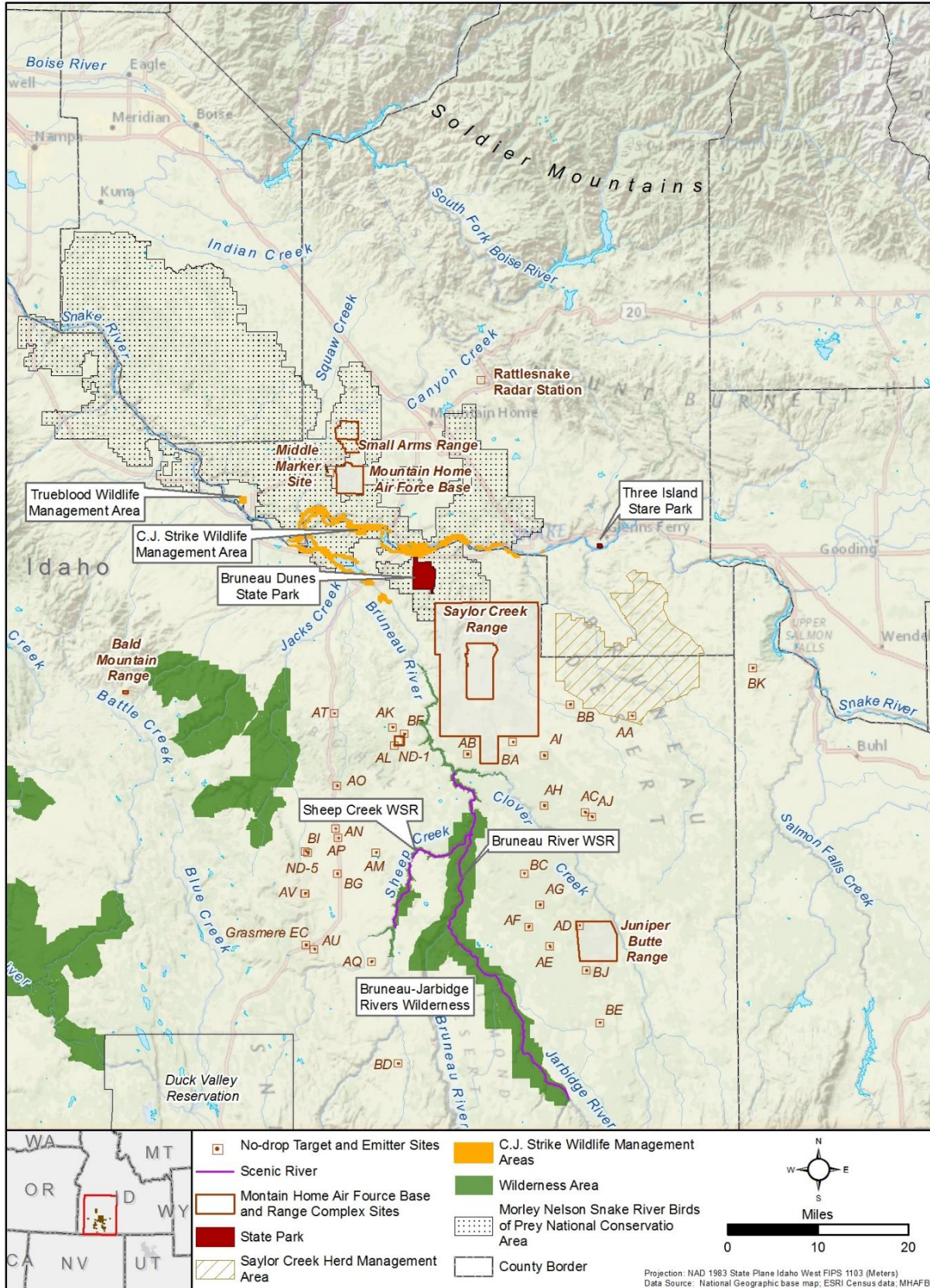


Figure 3-1. Special Land Use Areas

and two state parks, Bruneau Dunes and Three Island, are located about 5 mi to the northwest and 10 mi to the northeast, respectively, from SCR boundaries. With the exception emitter site AA, no other MHRC ranges, facilities, emitter sites, and targets are located in special land use designated areas.

Duck Valley Indian Reservation, the Shoshone-Paiute Tribal Headquarters, encompasses approximately 289,820 ac in southern Idaho and northern Nevada. The reservation is located approximately 35 mi from JBR and more than 40 mi from SCR.

3.3.2.2 Installation Land Use

MHAFB

MHAFB is approximately 6,844 ac of which approximately 25 percent is composed of developed or semi-developed lands. Included are an airfield with a 13,510-by-200-ft (4,118-by-61-meter) runway (AirNav, LLC 2016), training facilities, hospital, commissary, child development center, lodging, privatized housing, administrative and recreation facilities, including a golf course, roads, parking lots, and other paved surfaces, sewage ponds, and rubble piles. The remainder of the lands range from open, undeveloped fields to partially disturbed areas separating buildings and facilities.

SAR

SAR is located 1 mi north of MHAFB and consists of 4,622 ac; 1,622 ac of land withdrawn from public use and 3,000 ac of land leased from the State of Idaho. SAR includes predominantly open, undeveloped land. A 10-ac complex, located in the southeastern portion of SAR, includes a parking area, classroom building, firing line shelter, observation tower, and a set of large earthen berms, represents the only form of development within the SAR. In addition, an area encompassing approximately 190 ac in the southeast portion of SAR has been used for unexploded ordnance disposal. The State administers a grazing program on the state-owned portion of the site.

Middle Marker

The Middle Marker site is a 21-ac site located west of the runway at MHAFB. It contains a road and a fenced area with an Instrument Landing Systems Building, ceilometers (cloud sensors), and antennae supports.

C.J. Strike Dam Recreation Annex

The C.J. Strike Dam Recreation Annex is on land leased from the Idaho Power Company, approximately 8 mi southwest of MHAFB. The Recreation Annex encompasses 3 ac on the northwest edge of the C.J. Strike Reservoir, a 7,500-ac reservoir formed an impoundment of the Snake River and Bruneau River. A 600-ft long shoreline with a marina is included within the boundaries of the Annex.

SCR

SCR is a 109,466-ac range located approximately 20 mi southeast of MHAFB. Approximately 12,200 ac within the central portion of SCR constitute the Exclusive Use Area (EUA), which is

used for target practice. The land within SCR includes land leased from the State of Idaho as well as land withdrawn from all forms of appropriation under Public Land Order (PLO) No. 1027 of 2 November 1954, and as amended by PLO No. 3192 of 2 August 1963 and PLO No. 4902 of 16 September 1970. Overall management and use of the withdrawn lands are the responsibility of the Air Force, including land management, prevention and suppression of fires, and ordnance cleanup. The EUA is a designated impact area that consists of 12,200 fenced acres in the center of the range.

The remaining 97,266-ac area outside of the EUA is a joint land use area and is jointly managed and used by the Air Force, BLM, and State of Idaho. All of the SCR joint land use area is open for public uses including hunting, camping, and off-highway vehicle use. In addition, the Idaho Centennial Trail crosses through the western portion of SCR joint land use area and is open to all forms of travel including foot, horseback, bicycle, and off-highway vehicle. Grazing is administered by the BLM and Idaho Department of Lands, however, to provide for safety while managing the lands, and ensure compliance with applicable laws, the BLM and MHAFB coordinate training and grazing activities occurring within SCR boundaries.

JBR

JBR is a 12,141-ac range located approximately 25 mi southeast of SCR. The range was established by the JBR Withdrawal Act under PLO No. 105-261 in 1998 to augment SCR. JBR is used for air-to-ground delivery of inert ordnance, laser targeting, and ground operations. Grazing is allowed within JBR and is used as a management tool to reduce standing biomass and reduce wildland fire risk. The Air Force has a grazing lease agreement with one lessee, which is managed by 366 Civil Engineer Squadron. Grazing is permitted on 10,790 ac for a maximum period of 60 days between 1 April and 30 June. JBR is fenced into four main areas to separate the grazing areas from the targets. There is no public access to or other public land uses conducted at JBR without special permission and clearance from MHAFB.

Remote Training Sites

Land use at the remote training sites, including the 30 emitter sites, 5 ND target sites, Grasmere EC site, and Rattlesnake Radar Station, varies by site. The electronic emitter sites are used to simulate enemy threats; 29 emitter sites are established in Owyhee County and one in Twin Falls County. Twenty sites are 0.25-ac each, consisting of an unfenced gravel parking area designed to support temporary use. The other 10 sites are 1-ac each and contain one 400-square-foot building approximately 15 ft in height. The 1-ac emitter sites are fenced and graveled.

ND targets range from 2.5 to 640 ac in size and are used for simulated ordnance delivery. No live ordnance is used on any of the ND targets. ND-1 is a 640-ac site that lies to the southwest of SCR. As with all ND targets at MHRC, ND-1 is used for simulated ordnance delivery and no live ordnance is used. Grazing is permitted at ND-1 as part of the West Canyon View Allotment administered by BLM. Grazing is permitted from 1 November through 30 April. The actual grazing use varies yearly based on ecological conditions and needs of the permittee. Nonuse has been fairly common on this allotment in recent years. The ND-1 tends to be used during fall, winter, and early spring.

The Grasmere EC site is a 7-ac complex that contains solar panels, several permanent buildings, water tanks, fuel tanks, several concrete pads for different facilities, a paved road, radio tower, radar sites, antenna masts, and other support facilities. The Grasmere EC site supports electronic combat operations. No ordnance is dropped on Grasmere EC site.

Rattlesnake Radar Station is an electronic control station located adjacent to MHAFB. The site contains a maintenance facility, concrete pad, and microwave antenna. Prior to construction, the area was leveled and 3 to 10 ft of fill were added. A chain-link fence defines the perimeter the site (MHAFB 2012b).

3.4 Water Resources

3.4.1 Definition of Resource

Water resources relevant to MHAFB include groundwater, surface water, wetlands, and floodplains. The Snake River and its tributaries are important water resources in the MHAFB region. Playas, a type of natural ephemeral water-collecting basin, are another water resource relevant to MHAFB. Playas provide habitat for migratory birds, waterfowl, and other wildlife and may be home to a number of rare species.

3.4.1.1 Groundwater

Groundwater is water that occurs in the saturated zone beneath the earth's surface, and includes underground streams and aquifers. It is an essential resource that functions to recharge surface water and can be used for drinking, irrigation, and industrial processes. Groundwater typically can be described in terms of depth from the surface, aquifer or well capacity, water quality, recharge rate, and surrounding geologic formations. The susceptibility of aquifers to groundwater contamination relates to geology, depth to groundwater, infiltration rates, and solubility of contaminants.

Groundwater resources are regulated on the federal level by the USEPA under the Safe Drinking Water Act (SDWA) 42 U.S.C. §300f et seq. and on the state level by the IDEQ under the Ground Water Quality Rule (Idaho Administrative Procedure Act 58.01.11), which set standards for groundwater to protect human health. The USEPA's Sole Source Aquifer Program, authorized the SDWA, further protects aquifers that are designated as critical to water supply and makes any proposed federal or federal financially assisted project that has the potential to contaminate the aquifer subject to USEPA review.

3.4.1.2 Surface Water and Wetlands

Surface water is important for its contribution to the economic, ecological, recreational, and human health of a community or locale. Surface waters that are defined as Waters of the US are federally protected under the Clean Water Act (Section 404), which is administered by the USEPA and US Army Corps of Engineers. Waters of the US include rivers, streams, and wetlands or any channel with defined banks that is connected to a Water of the US.

In addition, wetlands are protected under EO 11990, *Protection of Wetlands*, the purpose of which is to reduce adverse impacts associated with the destruction or modification of wetlands.

This order directs federal agencies to provide leadership in minimizing the destruction, loss, or degradation of wetlands.

3.4.1.3 Floodplains

Floodplains are areas of low-level ground along rivers, stream channels, or coastal waters that provide a broad area to inundate and temporarily store floodwaters. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main water body. Floodplains are subject to periodic or infrequent inundation due to rain or melting snow. Risk of flooding typically hinges on local topography, the frequency of precipitation events, and the size of the watershed above the floodplain. Flood potential is evaluated by the Federal Emergency Management Agency (FEMA), which defines the 100-year floodplain. The 100-year floodplain is the area that has a 1 percent chance of inundation by a flood event in a given year. Federal, state, and local regulations often limit floodplain development to passive uses, such as recreational and preservation activities, to reduce the risks to human health and safety.

EO 11988, *Floodplain Management*, requires federal agencies to determine whether a Proposed Action would occur within a floodplain. This determination typically involves consultation of FEMA Flood Insurance Rate Maps, which contain enough general information to determine the relationship of the project area to nearby floodplains.

3.4.2 Affected Environment

3.4.2.1 Groundwater

All MHAFB and MHRC sites, with the exception of one of the 1-ac emitter sites (BK), are located in the Western Snake River Plain Aquifer, which is not designated as a sole-source aquifer (USEPA 2017c); however, the Western Snake River Aquifer borders the Eastern Snake River Plain Aquifer, which is a USEPA sole-source aquifer. Because groundwater flow in the Western Plain generally feeds into main drainages, directed toward the Snake River and groundwater from the Eastern Plain flows west toward the Western Plain, impacts on the Western Plain Snake River Aquifer should not affect the Snake River Plain Aquifer.

The Bruneau Formation is the primary regional unconfined aquifer underlying MHAFB that supplies water to the base, the city of Mountain Home, and surrounding areas. It is approximately 400 ft below ground surface and is composed of coarse sands. Recharge occurs through subsurface flow, although the water usage exceeds the recharge rates. Water demand at MHAFB and Strike Dam Recreation Annex is met by five groundwater wells. In 2016, one well received a violation for elevated nitrate levels (IDEQ 2017). IDEQ has performed source water assessments on each of MHAFB wells and found all wells in the MHAFB well field to be moderately susceptible to contamination from inorganic chemicals, synthetic organic chemicals, and microbes (IDEQ 2017). The US Geological Survey (USGS) has been monitoring groundwater at MHAFB since the 1980s and has found MHAFB groundwater levels are declining at an average rate of about 1.08 feet per year and that 35 percent of monitoring wells exceed the USEPA's maximum contaminant level for nitrate (USGS 2014).

Water needs on SAR, SCR, JBR, and other MHAFB components are minimal and are not supplied with water from the aquifers underlying those locations. Water needs on SCR are met

using water trailers or tank trucks filled off-site, transported to SCR, and stored in two underground water tanks (5,000 gallons [gal] and 3,000 gal). Other than water for livestock, water needs on JBR are also met using offsite sources that are transported to JBR and stored in potable (6,000 gal) and non-potable (50,000 gal) aboveground water tanks. Livestock water needs are satisfied by a pipeline distribution system owned by the grazing lessee.

3.4.2.2 Surface Water and Wetlands

MHAFB

The Snake River lies approximately 2 mi south of MHAFB and is the only perennial water body within the vicinity of MHAFB. Canyon Creek is an intermittent tributary to the Snake River that lies approximately 3 mi to the west. There are no perennial streams on MHAFB, though there are several unnamed ephemeral streams and four man-made drainage ditches. Surface water flows into two ephemeral stream channels or into the man-made drainage ditches and travels in a northeast-to-southwest direction (MHAFB 2012b). The only open water bodies on the installation are several rapid infiltration basins, two golf course ponds, and a treated effluent lagoon situated along the western installation boundary. In addition, 10 small playas were found on MHAFB in 1990 rare plant survey (SAIC 1990). In 2007, a wetland delineation and request for jurisdictional determination was conducted for MFAFB, SAR, SCR, and JBR, which determined no Waters of the US or jurisdictional wetlands occur on MHAFB (CH2MHILL 2007).

SAR

Canyon Creek lies along the northwest border of SAR, and one unnamed ephemeral stream is located on the range. Six playas are also found on SAR; however, no Waters of the US or jurisdictional wetlands were identified at SAR (CH2MHILL 2007).

Middle Marker

The 21-ac Middle Marker site is located west of the MHAFB runway. No surface water or wetland features were identified in the 2007 wetland delineation (CH2MHILL 2007) and no other surface water or wetland features are known to occur on the Middle Marker site.

C.J. Strike Dam Recreation Annex

The C.J. Strike Dam is 7,500-ac reservoir formed an impoundment of the Snake River and Bruneau River, just below the Bruneau River confluence. The C.J. Strike Dam Recreation Annex includes 600-ft long shoreline along the impoundment (MHAFB 2012b). No other wetlands or water features are present.

SCR

Although the Bruneau River lies within 0.25 mi of the western boundary of SCR, no perennial drainages are located on SCR. Three intermittent creeks including Pot Hole Creek, Brown's Creek, and West Fork Brown's Creek and numerous unnamed ephemeral drainages occur on the range. In addition, four playas, several small (less than 0.1 ac), and an artificial 1.1-ac pond, Pot Hole Reservoir, which can hold significant amounts of water during wet seasons, were documented during the 2007 wetland delineation. Additional surface water runoff from

thunderstorms and snowmelt collects in slickspots, which are a type of mini-playa with high sodium and clay content (USFWS 2011b). They are easily identified by their light colored soils and noticeable lack of vegetation. Slickspots occur within the EUA and in the public use areas (MHAFB 2012b). No Waters of the US or jurisdictional wetlands were found at SCR (CH2MHILL 2007). An undetermined number of artificial stock ponds also occur at SCR.

JBR

JBR contains no perennial drainages; however, within the range boundaries, one intermittent creek, Juniper Draw, collects water during the spring. Slickspots have been found to occur throughout JBR with the exception of the bluffs, slopes, and streambed of Juniper Draw (MHAFB 2012b). None of the drainages or other features were determined to be jurisdictional in the 2007 wetland delineation (CH2MHILL 2007). As with SCR, an undetermined number of artificial stock ponds also occur at JBR.

Remote Training Sites

No perennial drainages are associated with the remote training sites or other MHAFB components, including the 30 emitter sites, 5 ND target sites, Rattlesnake Radar Station, and Grasmere EC site. Small, intermittent and ephemeral drainages may be located on or near some of these sites. The ND targets and emitter sites, however, were constructed with retention berms around their perimeters to store any water accumulation onsite, where it could then percolate down into the soil. The Grasmere EC site is on a rhyolite outcrop. Infiltration rates at the site are expected to be high over the fractured rhyolite. Slickspots have been found on the ROWs for emitter sites AA, AC, AE, AF, AG, AH, AJ, AK, AM, AQ, AT, BA, BB, BC, BE, BI, and BJ (MHAFB 2012b).

3.4.2.3 Floodplains

There are no designated 100-year floodplains contained within the boundaries of MHAFB, MHRC, or any of the immediate surrounding area (FEMA 2014; MHAFB 2012b).

3.5 Biological/Natural Resources

3.5.1 Definition of Resource

Biological resources include plant and animal species and the habitats in which they occur. The protection of these resources is critical to the maintenance of functioning, intact ecosystems that are necessary to ensure the military's continued access to its land, air, and water resources for realistic military training and testing and to sustain the long-term ecological integrity of natural resources and the ecosystem services they provide (DoDI 4715.03, *Natural Resources Conservation Program*).

The analyses in this EA (**Section 4.5**) focus on species or vegetation types that are important to the function of the ecosystem, of special societal importance, or are protected under federal or state law or statute. For purposes of this EA, biological resources are divided into three major categories: vegetation, as vegetation communities and associations; wildlife, including common wildlife species; and special-status species including those protected by state or federal law or executive order including:

1. Endangered Species Act of 1973 (ESA) (16 U.S.C. § 1531 et seq.);
2. Migratory Bird Treaty Act of 1918 (MBTA) (16 U.S.C. §§ 703-712);
3. EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds* (2001);
4. Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. §§ 668-668); and
5. Other special-status species, including state-listed threatened and endangered species, wildlife species of greatest conservation need (SGCN) in Idaho, BLM, USFWS sensitive species.

3.5.1.1 Federally Listed Threatened and Endangered Species

The ESA established measures for the protection of plant and animal species that are federally listed as threatened and endangered and for the conservation of habitats that are critical to the continued existence of those species. Endangered species are those species that are at risk of extinction in all or a significant portion of their range. Threatened species are those that could be listed as endangered in the near future. Federal agencies must evaluate the effects of their Proposed Actions through a set of defined procedures, which can include the preparation of a Biological Assessment and can require formal consultation with the USFWS under Section 7 of the ESA.

3.5.1.2 Migratory Bird Treaty Act

The MBTA is the primary legislation in the United States established to conserve migratory birds. The MBTA prohibits the taking, killing, or possessing of migratory birds their eggs, parts, and nests unless permitted by regulation. An exemption to the MBTA that allows incidental take of migratory birds by DoD during military readiness activities (72 FR 8931) authorizes such take, with limitations, that result from military readiness activities. Military readiness activities include all training and operations of the Armed Forces that relate to combat, and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use. Military readiness does not include the routine operation of installation support functions (72 FR 8931). If DoD determines that a proposed or an ongoing military readiness activity may result in a significant adverse effect on a population of a migratory bird species, they must confer and cooperate with the USFWS to develop appropriate and reasonable conservation measures to minimize or mitigate identified significant adverse effects.

3.5.1.3 Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds

This EO further requires federal agencies to evaluate the effects of their actions and plans on migratory birds (with an emphasis on species of concern) in their NEPA documents. Species of concern are those identified as birds of management concern (BMCs) by the USFWS (USFWS 2011a), priority species identified by Partners in Flight, and ESA-listed species.

3.5.1.4 Bald and Golden Eagle Protection Act

The BGEPA prohibits the taking, possession, and transportation of bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) and their parts, nests, and eggs for

scientific, educational, and depredation control purposes, except as allowed by a valid permit issued by the USFWS. In September 2009, the USFWS issued a final rule authorizing limited take and establish permit provisions for bald and golden eagle under the BGEPA where the take to be authorized is associated with otherwise lawful activities (74 FR 46836).

3.5.1.5 Bureau of Land Management Sensitive Species

These sensitive species designations are normally used for species that occur on BLM public lands and for which BLM has the capability to significantly affect the conservation status of the species through management (BLM 2015b).

Special Status Animal Categories:

- Type 1 = federally listed threatened or endangered species, essential experimental population, and critical habitat.
- Type 2 = Idaho BLM Sensitive Species, including USFWS Proposed and Candidate species, ESA species delisted during the past 5 years, and ESA Experimental Non-essential populations.

Special Status Plant Categories:

- Type 1 = Federally listed Threatened or Endangered Species and designated Critical Habitat.
- Type 2 = These are species that have a high likelihood of being listed in the foreseeable future due to their global rarity and significant endangerment factors. Species also include USFWS Proposed and Candidate Species, ESA species delisted during the past 5 years, ESA Experimental Non-essential Species, and ESA Proposed Critical Habitat.
- Type 3 = Range-wide or State-wide Imperiled - Moderate Endangerment. These are species that are globally rare or very rare in Idaho, with moderate endangerment factors. Their global or state rarity and the inherent risks associated with rarity make them imperiled species.
- Type 4 = Species of Concern - These are species generally rare in Idaho with small populations or localized distribution and currently have low threat levels; however, due to the small populations and habitat area, certain future land uses in close proximity could significantly jeopardize these species.

3.5.1.6 State Special Status Species

Species designated as threatened, endangered, proposed, or candidate by the Idaho Department of Fish and Game (IDFG) or the Idaho Governor's Office of Species Conservation (2017) and SGCN are other special status species that need to be considered. All state-protected species and SGCN are identified in the Idaho State Wildlife Action Plan (SWAP), which is the state's guiding document for managing and conserving at-risk species (IDFG 2017a). The Idaho SWAP provides voluntary guidance on conservation actions intended to benefit the highest priority SGCN.

3.5.2 Affected Environment

3.5.2.1 Special Status Species

A search of the USFWS Information for Planning and Conservation (IPaC) tool indicated potential for two federally listed species to occur on MHAFB and MHRC properties; the federally listed endangered Snake River physa snail (*Physa natrica*) and federally listed threatened slickspot peppergrass (USFWS 2017c; **Table 3-3**).

Table 3-3. Federally Listed Threatened or Endangered Species Identified as having to Potential to Occur at MHAFB and MHRC Sites

Scientific Name	Common Name	Federal Status	Potential Occurrence
<i>Physa natrica</i>	Snake River physa snail	E	C.J. Strike Dam Recreation Annex - Low potential in the reservoir; Zero potential in terrestrial habitats
<i>Lepidium papilliferum</i>	Slickspot peppergrass	T	JBR - Known to occur

E = Endangered, T = Threatened
Source: USFWS 2017a,b

The Snake River physa snail is a freshwater mollusk found in the middle Snake River of southern Idaho where it inhabits areas of swift current on sand to boulder-sized substrate. The only potential habitat for this species at MHAFB is within the Snake River adjacent to C.J. Strike Dam Recreation Annex; however, it is not likely that this species would occur in this location as very few live specimens have been recovered from reservoirs that have been extensively sampled (USFWS 2017b). This species has no potential to occur within the herbicide treatment areas, which are limited to terrestrial habitats only.

Slickspot peppergrass is a small annual or biannual plant that is endemic to Idaho’s Snake River Plains and adjacent foothills and primarily within slickspots. It is identified as having potential to occur on most of the MHAFB and MHRC locations (USFWS 2017a). Extensive surveys have been conducted at the MHAFB sites and numerous known locations have been mapped. Currently, all known occupied slickspots are limited to JBR (MHAFB 2015), though it was documented at ROW AE in 2002 and 2003 (MHAFB 2003). This species occurs throughout the JBR with the exception of the bluffs, slopes, and streambed of Juniper Draw (MHAFB 2003). Annual surveys are conducted to assess the health and condition of slickspot peppergrass populations at JBR. All slickspots are also avoided during vegetation maintenance and herbicide application activities. The biological opinion on the effects of ongoing actions at JBR provides a detailed life history, habitat characteristics, threats, and population trends for slickspot peppergrass (USFWS 2010). Conservation recommendations are also provided for the benefit of this species.

A letter was sent on 19 April 2017 to the USFWS notifying them of the Air Forces’ preparation of an EA and avoidance of any special status species (see **Appendix D**).

A large number of special status species protected under the MBTA or BGEPA, or that are classified as SGCN in the Idaho SWAP, BLM Sensitive Species, or BMC by the USFWS have

also been documented at MHAFB sites. **Table 3-4** lists special status species and their documented locations and type of protection afforded each species. MBTA status for each bird species is identified in **Appendix F**

Table 3-4. Other Special-Status Species Known to Occur at MHAFB and MHRC Sites

Common Name	Scientific Name	Location	Federal Status	BLM	IDFG SGCN	USFWS
Birds						
American White Pelican	<i>Pelecarus erythrorhynchos</i>	MHAFB			Tier 2	
Bald Eagle	<i>Haliaeetus leucocephalus</i>	MHAFB	BGEPA	Type 2		BMC
Black-throated Sparrow	<i>Amphispiza bilineata</i>	ES		Type 2	Tier 2	
Brewer's Sparrow	<i>Spizella breweri</i>	MHAFB, SCR, JBR, ES		Type 2		BMC
Burrowing Owl	<i>Athene cunicularia</i>	MHAFB, SCR, JBR, ES		Type 2	Tier 2	BMC
California Gull	<i>Larus californicus</i>	MHAFB			Tier 2 B	
Common Nighthawk	<i>Chordeilus minor</i>	MHAFB, SCR, JBR, ES			Tier 3	
Ferruginous Hawk	<i>Buteo regalis</i>	SCR, JBR		Type 2	Tier 2	BMC
Golden Eagle	<i>Aquila chrysaetos</i>	MHAFB, SCR, JBR, ES	BGEPA	Type 2	Tier 2	
Grasshopper Sparrow	<i>Aminodramus savannarum</i>	SCR		Type 2	Tier 3	
Greater Sage-Grouse	<i>Centrocercus urophasianus</i>	SCR, JBR		Type 2	Tier 1	BMC
Lesser Yellowlegs	<i>Tringa flavipes</i>	ES				BMC
Loggerhead Shrike	<i>Lanius ludovicianus</i>	MHAFB, SCR, JBR, ES		Type 2		BMC
Long-Billed Curlew	<i>Numenius americanus</i>	MHAFB, SCR, ES		Type 2	Tier 2	BMC
Marsh Wren	<i>Cistothorus palustris</i>	SCR				BMC
Mourning Dove	<i>Zenaida macroura</i>	MHAFB, SCR, JBR, ES				BMC
Rufous Hummingbird	<i>Selasporus rufus</i>	MHAFB				BMC
Sage Thrasher	<i>Oreoscoptes montanus</i>	MHAFB, SCR, JBR, ES		Type 2	Tier 2	BMC
Sagebrush Sparrow	<i>Artemisiospiza nevadensis</i>	MHAFB, SCR, JBR, ES			Tier 2	
Sandhill Crane	<i>Grus canadensis</i>	ES			Tier 3	BMC
Sharp-Shinned Hawk	<i>Accipiter striatus</i>	SCR				BMC
Short-Eared Owl	<i>Asio flammeus</i>	SCR, JBR, ES			Tier 3	BMC

Table 3-4. Other Special-Status Species Known to Occur at MHAFB and MHRC Sites

Common Name	Scientific Name	Location	Federal Status	BLM	IDFG SGCN	USFWS
Swainson's Hawk	<i>Buteo swainsoni</i>	MHAFB, SCR, JBR, ES				BMC
Vesper Sparrow	<i>Pooecetes gramineus</i>	MHAFB, SCR, JBR, ES				BMC
White-Faced Ibis	<i>Plegadis chihi</i>	MHAFB			Tier 2	
Mammals						
Big Brown Bat	<i>Eptesicus fuscus</i>	MHAFB		Type 2		
Silver-Haired Bat	<i>Lasiorycteris noctivagans</i>	MHAFB		Type 2	Tier 2	
Western Small-Footed Myotis	<i>Myotis ciliolabrum</i>	SCR, JBR		Type 2	Tier 3	
Long-Eared Myotis	<i>Myotis evotis</i>	MHAFB, SCR		Type 2		
Little Brown Bat	<i>Myotis lucifugus</i>	MHAFB, JBR		Type 2	Tier 3	
Yuma Myotis	<i>Myotis yumanensis</i>	MHAFB, SCR		Type 2		
Western (Canyon) Pipistrelle	<i>Pipistrellus hesperus</i>	SCR, JBR		Type 2		
Piute Ground Squirrel	<i>Urocitellus mollis</i>	MHAFB, SCR		Type 2		
Kit Fox	<i>Vulpes macrotis</i>	JBR, ES		Type 2		
Plants						
Snake River milkvetch	<i>Astragalus purshii ophiogenes</i>	SCR		Type 4		
Alkali Cleomella	<i>Cleomella plocasperma</i>	ES		Type 3		
Greeley's wavewing	<i>Cymopterus acaulis greeleyorum</i>	SCR		Type 3		
Fringed waterplantain	<i>Damasonium californicum</i>	ES		Type 4		
White eatonella	<i>Eatonella nivea</i>	ES		Type 4		
Giant helleborine	<i>Epipactis gigantean</i>	ES		Type 3		
Calcareous buckwheat	<i>Eriogonum ochrocephalum</i>	ES		Type 3		
Packard's buckwheat	<i>Eriogonum shockleyi packardiae</i>	ES		Type 4		
Matted cowpie buckwheat	<i>Eriogonum shockleyi shockleyi</i>	ES		Type 4		
White-margined wax plant	<i>Glyptopleura marginata</i>	ES		Type 4		
Spreading gilla	<i>Ipomopsis polycladon</i>	SCR, ES		Type 3		
Davis' peppergrass	<i>Lepidium davisii</i>	MHAFB, SAR, ES		Type 3		

Table 3-4. Other Special-Status Species Known to Occur at MHAFB and MHRC Sites

Common Name	Scientific Name	Location	Federal Status	BLM	IDFG SGCN	USFWS
Slick Spot peppergrass	<i>Lepidium papilliferum</i>	JBR, ES	LE	Type 2		
Bruneau river prickly phlox	<i>Leptodactylon glabrum</i>	ES		Type 3		
Inch-high lupine	<i>Lupinus uncialis</i>	ES		Type 4		
Rigid threadbush	<i>Nemacladus rigidus</i>	ES		Type 4		
Simpson's hedgehog cactus	<i>Pediocactus simpsonii</i>	ES		Type 4		
Janish's penstemon	<i>Penstemon janishiae</i>	ES		Type 3		
Spine-noded milkvetch	<i>Peteria thompsoniae</i>	ES		Type 4		

BGEPA = Bald and Golden Eagle Protection Act; BLM = Bureau of Land Management; ES = Emitter Sites; JBR = Juniper Butte Range; LE = listed endangered; MHAFB = Mountain Home Air Force Base; SAR = Small Arms Range; SCR = Sailor Creek Range; USFWS BMC = United States Fish and Wildlife Service Bird of Management Concern
Sources: BLM 2015b, 2016b; IDFG 2017a; USFWS 2011a, 2017a

MHAFB

No federally listed threatened or endangered species have been found on MHAFB and limited potential habitat is available. Other sensitive species include bird, mammal, and plant species. Of the 83 bird species that have been documented at MHAFB, all but four are protected by the MBTA; seven are BLM type 2 species; ten are considered BMC by the USFWS; and nine are Idaho SGCN. Of the 22 mammal species documented mammal species, six are BLM type 2 species, and two are Idaho SGCN. One plant species, Davis' peppergrass (*Lepidium davisii*), which is a BLM Sensitive Species, is also known to occur in a playa at MHAFB.

SAR

No federally listed threatened or endangered species or wildlife species of concern are known to occur at SAR; however, six of the seven playas on the SAR contain Davis' peppergrass. The playas are fenced to deter all-terrain vehicles (ATVs) use within the areas.

SCR

No federally listed threatened or endangered species are known to occur on SCR; however, other sensitive species have been documented. All but 3 of the 52 bird species known to occur at SCR are MBTA-protected species. Of these species, 9 are BLM type 2 species; 10 are considered SGCN by the IDFG; and 13 are USFWS BMC. Five BLM sensitive mammal species and three BLM sensitive plant species have been confirmed at SCR as well (see **Table 3-4**).

JBR

JBR supports the only known federally listed species at MHAFB. Numerous populations of slickspot peppergrass, which is listed as threatened under the ESA (USFWS 2016) occur throughout the entire JBR with the exception of the bluffs, slopes, and streambed of Juniper Draw

(MHAFB 2015b). Proposed critical habitat for slickspot peppergrass also occurs to the west and south of JBR. A 2002 comprehensive survey and mapping effort of potential habitat and actual occurrences of slickspot peppergrass at JBR, excluding the target area, identified approximately 108 ac of potential slickspot peppergrass habitat and approximately 11,300 slickspot peppergrass plants. Approximately 4 percent of the potential habitat was found to be occupied (MHAFB 2002). Maps of occupied habitat (**Figure 3-2**) are used to guide management decisions at JBR. Annual monitoring has been conducted since 2003 to assess the health and condition of slickspot peppergrass populations and to assess the effectiveness of conservation measures. A series of 16 permanent slickspot monitoring transects are currently surveyed (MHAFB 2012b). Although not limited by conservation recommendations in the 2010 Biological Opinion for slickspot peppergrass (USFWS 2010), herbicide use is restricted to use on parking lots, gravel areas, and along roads at JBR.

Other sensitive species include 38 MBTA-protected bird species, 7 of which are BLM type 2 species; 8 are considered IDFG SGCN; and 10 are USFWS BMC. Three mammal species are also considered BLM type 2 species and/or Idaho SGCN.

Remote Training Sites

In addition to the JBR populations, the federally listed slickspot peppergrass may also occur at emitter site ROWs where appropriate habitat has been identified. Slickspot peppergrass was found in ROW AE in 2002 and 2003 (MHAFB 2012b). The same precautions that are taken at JBR to protect slickspot peppergrass are also taken at these sites. Other sensitive species that have been documented at the remote training sites include 33 MBTA-protected bird species, seven BLM type 2 species, nine Idaho SGCN bird species, nine USFWS BMC, and one mammal listed as a BLM type 2 species. In addition, 16 other plant species listed as a BLM Sensitive Species.

3.5.2.2 General Vegetation

The sagebrush steppe ecosystems of the Snake River Plain historically consisted of a mosaic of sagebrush and perennial grass species, including Wyoming big sagebrush (*Artemisia tridentata* var. *wyomingensis*), low sagebrush (*Artemisia arbuscula*), rabbitbrush (*Chrysothamnus viscidiflorus*), saltbush (*Atriplex* spp.), greasewood (*Sarcobatus vermiculatus*), bluebunch wheatgrass (*Pseudoroegneria spicata*), basin wildrye (*Leymus cinereus*), Thurber's needlegrass (*Achnatherum thurberianum*), Idaho fescue (*Festuca idahoensis*), Indian ricegrass (*Achnatherum hymenoides*) and other bunchgrasses, shrubs, and forbs (Sleeter et al. 2012).

The natural vegetation communities of the sagebrush steppe ecosystems at each of the MHAFB facilities have been altered by current and historic land use, invasive species infestations, and altered fire regimes (MHAFB 2012b). Existing vegetation varies by location at each of the facilities.

MHAFB

The residential and administrative areas are landscaped with many native and non-native trees and shrubs and typically have nonnative grass lawns. Trees have been planted to form

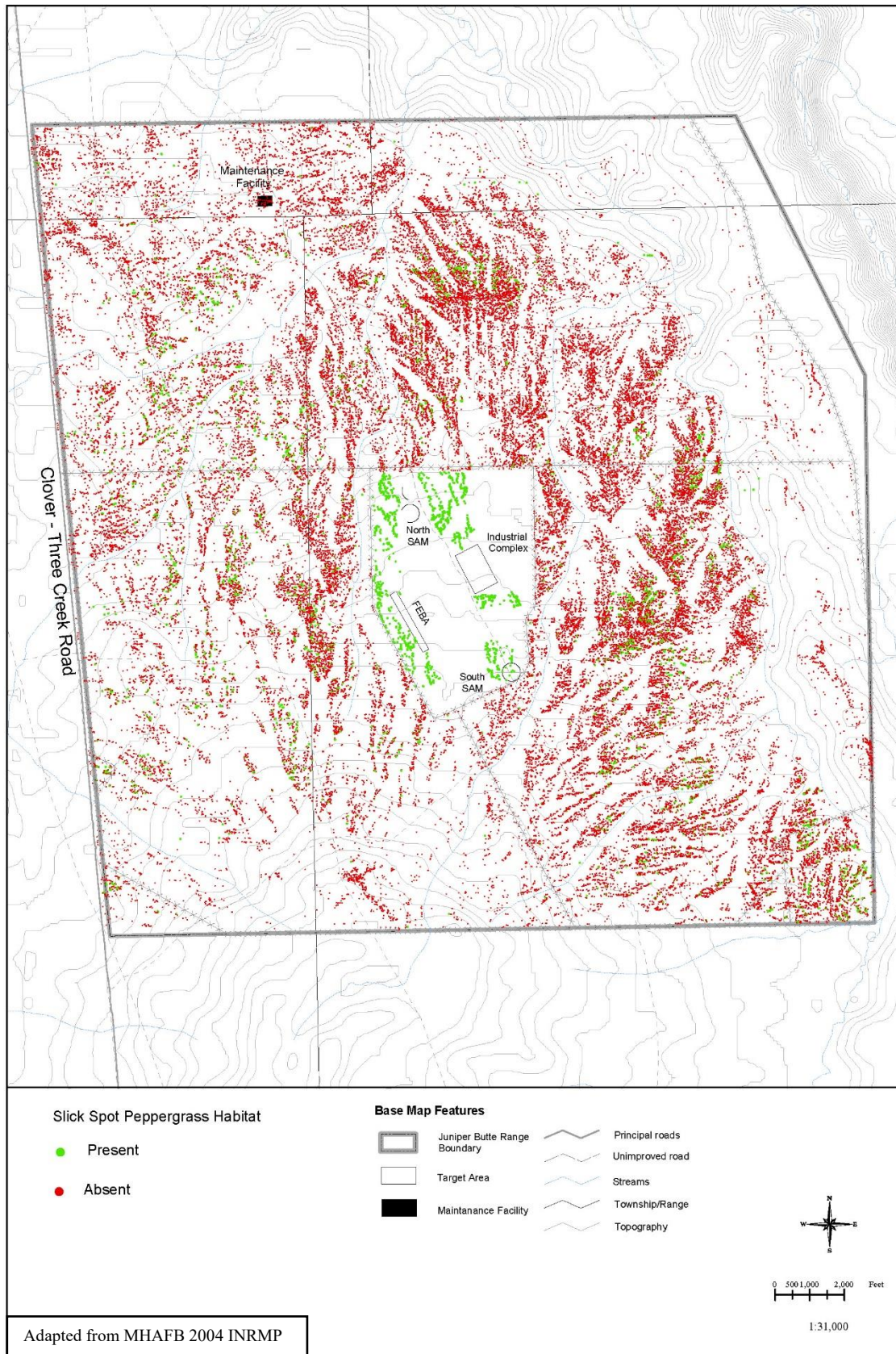


Figure 3-2. Slickspot peppergrass occurrences

windbreaks in several areas as well. Areas that have had little or no human-caused disturbance over the years generally have discontinuous patches of Wyoming big sagebrush habitat. These communities have been found to support sagebrush and sparse individuals of spiny hopsage (*Grayia spinosa*) and rabbitbrush. The understory is predominantly cheatgrass with scattered bulbous bluegrass (*Poa bulbosa*). Small populations of Sandberg bluegrass (*Poa secunda*), bottlebrush squirreltail (*Elymus elymoides*), and crested wheatgrass (*Agropyron cristatum*) are relatively common, whereas Russian thistle and annual kochia occur throughout the entire Base property because of their ability to quickly establish after disturbance (Kaweck and Launchbaugh 2014).

Seeding and weed control treatments on MHAFB have been conducted in some areas to remove cheatgrass and establish perennial grasses. Forage kochia (*Bassia prostrata*), a perennial subshrub related to the weedy annual kochia, has also been planted in areas to help displace and control the spread of tumbleweeds (primarily Russian thistle).

Idaho listed noxious weed species on MHAFB include rush skeletonweed, with small, incidental infestations of field bindweed (*Convolvulus arvensis*), buffalobur (*Solanum rostratum*), black henbane (*Hyoscyamus niger*), puncturevine, perennial sowthistle (*Sonchus arvensis*), perennial pepperweed (*Lepidium latifolium*), whitetop (*Cardaria draba*), and Canada thistle (*Cirsium arvense*). Noxious weeds are those species defined by the State of Idaho as having the potential to cause injury to public health, crops, livestock, land, or other property (Idaho Code, Title 22). Landowners are required by Idaho law to control noxious weeds on their lands.

SAR

Military training, extensive wildfires, and grazing (in the state-owned portion of the site) have disturbed much of the original vegetation cover at SAR. Off-road vehicle use is another common disturbance at SAR. Off-road vehicles include ATVs, motorcycles, and other vehicles. Annual grasses dominate the plant community with very few, scattered shrubs present. Non-native invasive species are more abundant than native species at SAR with cheatgrass and Russian thistle being the most abundant, followed by tall tumble mustard and bur buttercup, also called curvseed butterwort (*Ceratocephala testiculata*) (Kaweck and Launchbaugh 2014).

Rattlesnake Radar Station

Native vegetation at Rattlesnake Radar Station has been removed through site construction and most of the area is graveled. Areas not graveled are dominated by exotic weed species, such as cheatgrass, tumble mustard, and spotted knapweed (*Centaurea stoebe* ssp. *C. maculosa*). This and several other species of knapweed are listed on the Idaho noxious weed list, and must be removed according to Idaho law. No turf or landscaped areas are found at Rattlesnake Radar Station, as all grounds are unimproved or part of the facility.

Middle Marker

The Middle Marker site is comprised of a small fenced area with a road, building, equipment, and antennae supports. Little vegetation occurs within the fenced area, due to weed maintenance at the site. The area immediately surrounding the site is dominated by cheatgrass, bare ground, and scattered bunchgrasses. No turf or landscaped areas are found at the site.

C.J. Strike Dam Recreation Annex

The C.J. Strike Dam Recreation Annex includes a mix of turf and landscaped areas, and an undeveloped area dominated by weedy species such as cheatgrass and tumble mustard. Pavement separates the landscaped and undeveloped areas. Wetland vegetation, notably willows (*Salix* spp.) and cottonwoods (*Populus* spp.), is present along the water/land interface. Aerial photographs from 1982, 1984, and 1989 suggest that this area was cleared of vegetation and probably scraped and filled during construction of facilities in 1982 (MHAFB 2012b).

SCR

Frequent, large fires occur in the 97,266-ac public use area with approximately 66,373 ac (68 percent) having experienced fire since 2000. In addition to fire, fire rehabilitation and seeding activities strongly influence area's current vegetation. Seeded species include crested wheatgrass, rangeland alfalfa (*Medicago sativa*), four-wing saltbush (*Atriplex canescens*), forage kochia, Russian wildrye (*Psathyrostachys juncea*), Lewis flax (*Linum perenne* var. *lewissii*) and other hardy perennials used for cattle forage. Sandburg bluegrass also occurs. Unburned areas of SCR contain disconnected stands of sagebrush and scattered rabbitbrush. Unburned stands also have some degree of cheatgrass invasion, and perennial grass cover is low as a result of competition.

The SCR EUA is fenced and has a 100-ft-wide, bare-ground firebreak that is maintained around its perimeter. This area has been subjected to intense disturbance and management, including natural and prescribed fires, reseeding, weed encroachment, disturbance activities from training, firebreak plowing, and road maintenance. Extensive areas within the public land use area of SCR have also been treated with herbicides in an effort to control cheatgrass and other non-native annual grasses. Approximately 3,200 ac have been treated annually since 2006. Cheatgrass cover is generally lower in sprayed areas (CH2MHILL 2013).

Skeletonweed is the major noxious weed species at SCR. Tall tumble mustard, clasping leaf pepperweed (*Lepidium perfoliatum*) and bur buttercup are other frequently occurring invasive species.

JBR

Disturbances such as livestock grazing, fire, and range reseeding have resulted in a landscape with a mosaic of shrub-steppe and non-native plant communities at JBR. Burned areas are now dominated by rabbitbrush shrubland and seeded grass species, including crested wheatgrass and intermediate wheatgrass (*Thinopyrum intermedium*). Cheatgrass and other invasive annual grasses are dominant where seedings have failed or did not occur. Mixed sagebrush and rabbitbrush stands and pockets of bluebunch wheatgrass and sagebrush occur throughout the range. Common herbaceous species in these areas include clasping leaf pepperweed, long-leaf phlox (*Phlox longifolia*), Sandberg bluegrass, lupine (*Lupinus* spp.), and bottlebrush squirreltail. Western juniper (*Juniperus occidentalis*) also occurs in low densities in Juniper Draw on the eastern portion of the range. Russian thistle and annual kochia are the primary invasive species treated at JBR. Cheatgrass infestations appear to be decreasing naturally, and no noxious weeds were encountered during recent vegetation monitoring efforts (CH2MHILL 2013).

Remote Training Sites

The Air Force implements a total vegetation control program at the 30 emitter sites, Rattlesnake Radar Station, and Grasmere EC site. Vegetation at the emitter sites is variously composed of annual and seeded grasses, sagebrush, and other shrub species (MHAFB 2006). All vegetation within Rattlesnake Radar Station and the Grasmere EC site is controlled by herbicides and mechanical removal and the sites are fully graveled. Vegetation in the ND target areas ranges from shrub-steppe vegetation to introduced annual grasslands. Most of the sites have experienced prior disturbances and are now composed of weedy vegetation, such as tumble mustard and cheatgrass, or seeded species, such as crested wheatgrass. ND-1 is used for simulated ordnance delivery and no live ordnance is used. Fire, however, is still a factor that influences the vegetation community type and abundance and little variety in plant species occurs due to fire, grazing, military training, and historic reseeding efforts. Vegetation at ND-1 is primarily annual and seeded grassland. The dominant species are cheatgrass and crested wheatgrass. Other species present include the invasive Russian thistle, tumble mustard, and halogeton (*Halogeton glomeratus*), and the native Sandberg bluegrass (Kaweck and Launchbaugh 2014).

3.5.2.3 General Wildlife

Historically, the vast areas of sagebrush-steppe habitat supported herds of wildlife species such as pronghorn (*Antilocapra americana*), mule deer (*Odocoileus hemionus*), and elk (*Cervus canadensis*), small mammals such as pygmy rabbits (*Brachylagus idahoensis*) and sagebrush voles (*Lemmyscus curtatus*), reptiles including the sagebrush lizard (*Sceloporus graciosus*), birds of prey such as golden eagles (*Aquila chrysaetos canadensis*), and other species such as the greater sage grouse (*Centrocercus urophasianus*) that live nowhere else in the world (USFWS 2014b). A number of the playas and other temporary water sources across MHAFB also provide habitat for several species of fairy shrimp, which were sampled from 2004 – 2010 at eight sites on or near base properties (USFWS 2014a).

Wildlife populations at MHAFB vary by availability of habitat and management at each site. Brief summaries of common wildlife species documented during wildlife surveys at each MHAFB facility follow.

MHAFB

MHAFB has limited natural habitat and generally supports small mammals, reptiles, and bird species that have adapted to urban areas and human disturbance. General wildlife surveys in all habitat types conducted in 2006 and 2007 (MHAFB 2006 and 2007b), targeted bat surveys (MHAFB 2012b), and fairy shrimp surveys (USFWS 2014a) resulted in the documentation of 83 bird species, 22 mammal species, and 6 reptile species. European Starling (*Sturnus vulgaris*), horned lark (*Eremophila alpestris*), common raven (*Corvus corax*), California quail (*Callipepla californica*), black-chinned hummingbird (*Archilochus alexandri*), and bank swallow (*Riparia riparia*) are the most abundant bird species documented with several hundred individuals of each species observed. In addition, 99 western burrowing owls (*Athene cunicularia hypugaea*) were captured and banded during a 2008 burrowing owl study (MHAFB 2007a). Piute ground squirrels (*Spermophilus mollis*) were the most abundant mammal species, which were especially numerous around the golf course and landscaped areas. Mountain cottontail (*Sylvilagus nuttallii*),

black-tailed jackrabbit (*Lepus californicus*), coyote (*Canis latrans*) and American badger (*Taxidea taxus*) were also documented. Bats have been observed in the evenings and may roost in buildings and trees and forage around lights. Silver-haired bat (*Lasiorycteris noctivagans*), big brown bat (*Eptesicus fuscus*), long-eared myotis (*Myotis evotis*), and Yuma myotis (*Myotis yumanensis*) have been documented (MHAFB 2012b). Sagebrush lizard (*Sceloporus graciosus*) was the most abundant reptile recorded, while desert horned lizard (*Phrynosoma platyrhinos*), Great Basin gopher snakes (*Pituophis catenifer deserticola*), common garter snake (*Thamnophis sirtalis*), and western rattlesnakes (*Crotalus viridis*) also occurred. Although not documented on base, two fairy shrimp species, versatile fairy shrimp (*Branchineta lindahli*) and raptor fairy shrimp (*B. raptor*) were documented at T-Bolt Playa just outside the MHAFB boundary (USFWS 2014a).

SAR

Wildlife habitat on SAR is generally poor condition due to repeated fires and invasive species although the presence of several playas adds to the diversity of available habitat. Although previously documented from six playas (MHAFB 1999), four individual fairy shrimp (*Branchinecta* sp.) specimens of unknown species were captured at one sampled playa adjacent to SAR in 2008 and 2010 (USFWS 2014a). No other wildlife surveys are known to have been conducted on or in the immediate vicinity of SAR (MHAFB 2012b).

C.J. Strike Dam Recreation Annex

The Air Force has not conducted wildlife surveys at the C.J. Strike Dam Recreation Annex; however, as the lands and waters are managed by the Idaho Power Company and IDFG as a Wildlife Management Area (WMA), a diversity of wildlife species including game and non-game wildlife, water birds, waterfowl, and fish are known to occur in the area. The IDFG reports that 240 species of birds are known to use the C.J. Strike area annually (IDFG n.d.). The C.J. Strike Reservoir supports many fish species as well. Idaho Power stocks the Snake River with rainbow trout (*Oncorhynchus mykiss*) annually (Idaho Power Company 2006) and non-native sportfish such as large and small mouth bass (*Micropterus salmoides* and *M. dolomieu*), channel catfish (*Ictalurus punctatus*), yellow perch (*Perca flavescens*), white crappie (*Pomoxis annularis*) and bluegill (*Lepomis macrochirus*) are reported by local anglers (Fishhound 2017). IDFG also reports that ring-necked pheasant (*Phasianus colchicus*) and white-tailed deer (*Odocoileus virginianus*) have been released on the WMA for hunting purposes (IDFG 2017b).

SCR

The extensive area of undeveloped land at SCR supports a wide range of wildlife that is typical of the sagebrush-steppe ecosystems as indicated by wildlife surveys dating from 1994. As of 2012, 82 species had been recorded during surveys at SCR, including 52 bird, 19 mammal, 9 reptile, 1 amphibian, and 1 documented invertebrate species (MHAFB 2012b). Western meadowlark (*Sturnella neglecta*), horned lark (*Eremophila alpestris*), and common nighthawk (*Chordeiles minor*) were the most abundant bird species observed, while Brewer's sparrow (*Spizella breweri*), sagebrush sparrow (*Artemisiospiza nevadensis*), and sage thrasher (*Oreoscoptes montanus*) were sagebrush obligate bird species that are found on SCR within sagebrush habitat. Ord's kangaroo rat (*Dipodomys ordii*), black-tailed jackrabbit, mountain

cottontail, mule deer, and pronghorn antelope were the most abundant mammals documented. Auditory bat surveys conducted in 2008 and 2009 recorded western pipistrelle (*Pipistrellus hesperus*), long-eared myotis calls, Yuma myotis, and western small-footed myotis (*Myotis ciliolabrum*). A call suggestive of a Townsend's big-eared bat (*Corynorhinus townsendii*) was recorded, but was not definitive (MHAFB 2012b). Nine species of reptiles have been documented at SCR. Included are desert horned lizard, long-nosed leopard lizard (*Gambelia wislizenii*), western fence lizard (*Sceloporus occidentalis*), sagebrush lizard (*Sceloporus graciosus*), Great Basin gopher snake, western rattlesnake, western whiptail (*Aspidoscelis tigris*), striped whipsnake (*Masticophis taeniatus*), and common garter snake. As amphibian habitat is generally lacking at MHAFB, the unique identification of one amphibian, Great Basin spadefoot (*Spea intermontana*), occurred at SCR. Colorado fairy shrimp (*Branchinecta coloradensis*) and an unidentified fairy shrimp were also identified in three separate playas at SCR (USFWS 2014a).

JBR

JBR supports a mosaic of native shrub-steppe and non-native plant communities and Juniper Draw, which provides a wildlife access point to Clover Creek and serves as a wildlife movement corridor for both seasonal and daily movements. General wildlife surveys conducted in 2007 as well as incidental observations made during other surveys have documented 40 bird, 20 mammal, and 4 reptile species at JBR (MHAFB 2006, MHAFB 2012b). As with the other sites, horned lark and western meadowlark were very common. Sage grouse, sagebrush sparrow, and sage thrasher also occurred. Song sparrow (*Melospiza melodia*) was the only bird species unique to JBR. An assortment of small mammals, including deer mice (*Peromyscus maniculatus*), mountain cottontail, jackrabbits, least chipmunks (*Tamias minimus*), Great Basin pocket mice (*Perognathus parvus*), bushy-tailed woodrats (*Neotoma cinerea*), and Ord's kangaroo rats were documented. Large mammals including mule deer, pronghorn antelope, coyotes, and badgers also occur. One cougar (*Puma concolor*) was also documented in 2007. A 2009 auditory bat survey documented western pipistrelle, little brown bat (*Myotis lucifugus*), and western small-footed myotis on JBR. Typical reptiles include desert horned lizard, side-blotched lizard (*Uta stansburiana*), sagebrush lizard, gopher snake, and western rattlesnake. Water troughs and the rock pool on JBR may provide limited amphibian habitat though none have been observed (MHAFB 2012b).

Remote Training Sites

Wildlife surveys and incidental observations from 2005 at a number of remote training sites resulted in 78 species, representing 39 families, being identified (MHAFB 2006). Mammals that have been seen on or near emitter and ND sites include feral horses (*Equus caballus*), white-tailed jackrabbit (*Lepus townsendii*), black-tailed jackrabbit, and the bobcat (*Lynx rufus*). Birds that have been on or near these sites are golden eagle, northern harrier (*Circus cyaneus*), rough-legged hawk, American kestrel (*Falco sparverius*), short-eared owl (*Asio flammeus*), western screech owl (*Megascops kennicottii*), prairie falcon (*Falco mexicanus*), chukar (*Alectoris chukar*), tundra swan (*Cygnus columbianus*), merlin (*Falco columbarius*), and great-horned owl (*Bubo virginianus*), among others (MHAFB 2012b).

3.6 Soils

3.6.1 Definition of Resource

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses.

3.6.2 Affected Environment

The soils are typical of semi-arid regions and are characterized by poor drainage and lack of organic matter. Most soils at MHAFB, SAR, and JBR are silt loams, while the soils at SCR also include sandy loams and sands. The soils vary in thickness, depending on the location of bedrock and hardpans, but may reach 60 inches in depth. Rocky ridges and lava fields are characteristic of some areas. Almost all of the soils are well drained, with poorly drained soils only in swale bottoms and depressions. Basewide, the soils typically have a low to moderate potential for wind and water erosion, although soil disturbance and lack of vegetative cover increase erosion potential. Soils at the emitter sites and ND targets are varied but are also silt loams and sandy silt loams with low to moderate potential for wind and water erosion (USDA NRCS 2017).

Biological soil crusts are an important soil feature in arid and semi-arid ecosystems. These complex assemblages of mosses, cyanobacteria, lichens, algae, and microfungi occur in the first few millimeters of the soil surface and strongly interact with the soil (Rosentreter et al. 2007). Crusts play an important role in the environment where they affect soil stability and erosion, atmospheric nitrogen fixation, nutrient contributions to plants, soil-plant-water relations, infiltration, seedling germination, and plant growth (Belnap et al. 2001). They are important on SCR and JBR because they stabilize the soil surface, thus, protecting it from wind erosion. Cyanobacteria and microfungi within these crusts expel polysaccharides, which bind soil particles together, creating larger soil aggregates. These larger soil aggregates require a greater wind velocity to be moved. Therefore, soils with the most developed biological crusts experience the greatest resistance to wind erosion.

Slickspots are another particular type of soil feature that can be found on portions of the project area. These features consist of bare areas that temporarily pool water and contain soils that are significantly higher in sodium and clay content. They sometimes include smaller areas where remnants of thin soil-algal crusts indicate surface ponding of water (St. John and Ogle 2009).

3.7 Hazardous Materials/Waste

3.7.1 Definition of Resource

Air Force Policy Directive (AFPD) 32-70 establishes the policy that the Air Force is committed to

- cleaning up environmental damage resulting from its past activities;
- meeting all environmental standards applicable to its present operations;
- planning its future activities to minimize environmental impacts;

- managing responsibly the irreplaceable natural and cultural resources it holds in public trust; and
- eliminating pollution from its activities wherever possible.

AFI 32-7086, *Hazardous Materials Management*, establishes procedures and standards that govern management of hazardous material (HAZMAT) throughout the Air Force. It applies to all Air Force personnel who authorize, procure, issue, use, or dispose of HAZMAT, and to those who manage, monitor, or track any of those activities. HAZMAT is defined as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that might cause an increase in mortality, serious irreversible illness, and incapacitating reversible illness, irritation, sensitization, or that might pose a substantial threat to human health or the environment. Hazardous waste is defined as any solid, liquid, contained gaseous, or semi-solid waste; or any combination of wastes that pose a substantial present or potential hazard to human health or the environment.

Evaluation of HAZMAT and hazardous wastes focuses on underground storage tanks (USTs) and aboveground storage tanks (ASTs) and the storage, transport, and use of pesticides, herbicides, fuels, petroleum, oils, and lubricants. Evaluation might also extend to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site of a Proposed Action. In addition to being a threat to humans, the improper release of HAZMAT and hazardous wastes can threaten the health and well-being of wildlife species, botanical habitats, soil systems, and water resources. In the event of release of HAZMAT or hazardous wastes, the extent of contamination varies based on type of soil, topography, and water resources.

The Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act (SARA) and the Toxic Substances Control Act (TSCA), defines HAZMAT. The Occupational Safety and Health Administration (OSHA) is responsible for enforcement and implementation of federal laws and regulations pertaining to worker health and safety under 29 CFR Part 1910. OSHA also includes the regulation of HAZMAT in the workplace and ensures appropriate training in their handling.

The Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (RCRA), which was further amended by the Hazardous and Solid Waste Amendments, defines hazardous wastes. In general, both HAZMAT and hazardous wastes include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, might present substantial danger to public health or welfare or the environment when released or otherwise improperly managed.

Through the Environmental Restoration Program (ERP) initiated in 1980, a subcomponent of the Defense ERP that became law under SARA (formerly the Installation Restoration Program), each DOD installation is required to identify, investigate, and clean up hazardous waste disposal or release sites. Remedial activities for ERP sites follow the Hazardous and Solid Waste Amendment of 1984 under the RCRA Corrective Action Program. The ERP provides a uniform, thorough methodology to evaluate past disposal sites, control the migration of contaminants,

minimize potential hazards to human health and the environment, and clean up contamination through a series of stages until it is decided that no further remedial action is warranted.

Description of ERP activities provides a useful gauge of the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be foreclosed where a groundwater contaminant plume remains to complete remediation).

Toxic substances might pose a risk to human health, but are not regulated as contaminants under the hazardous waste statutes. Included in this category are asbestos-containing materials (ACM), lead-based materials, radon, and polychlorinated biphenyls (PCBs). The presence of special hazards or controls over them might affect, or be affected by, a Proposed Action. Information on special hazards describing their locations, quantities, and condition assists in determining the significance of a Proposed Action.

Asbestos. AFI 32-1052, *Facility Asbestos Management*, provides the direction for asbestos management at Air Force installations. This instruction incorporates by reference applicable requirements of 29 CFR 669 et seq., 29 CFR 1910.1025, 29 CFR 1926.58, 40 CFR 61.3.80, Section 112 of the CAA, and other applicable AFIs and DOD Directives. AFI 32-1052 requires bases to develop an Asbestos Management Plan to maintain a permanent record of the status and condition of ACM in installation facilities, as well as documenting asbestos management efforts. In addition, the instruction requires installations to develop an asbestos operating plan detailing how the installation accomplishes asbestos-related projects. Asbestos is regulated by the USEPA with the authority promulgated under OSHA, 29 U.S.C. Section 669, et seq. Section 112 of the CAA regulates emissions of asbestos fibers to ambient air. USEPA policy is to leave asbestos in place if disturbance or removal could pose a health threat.

Lead-based Materials. Human exposure to lead has been determined an adverse health risk by agencies such as OSHA and the USEPA. Sources of exposure to lead are dust, soils, and paint. In 1973, the Consumer Product Safety Commission (CPSC) established a maximum lead content in paint of 0.5 percent by weight in a dry film of newly applied paint. In 1978, under the Consumer Product Safety Act (Public Law 101-608, as implemented by 16 CFR Part 1303), the CPSC lowered the allowable lead level in paint to 0.06 percent (600 ppm). The Act also restricted the use of lead-based paint (LBP) in nonindustrial facilities. DoD implemented a ban of LBP use in 1978; therefore, it is possible that facilities constructed prior to or during 1978 may contain LBP.

Radon. The United States Surgeon General (USSG) defines radon as an invisible, odorless, and tasteless gas, with no immediate health symptoms, that comes from the breakdown of uranium inside the earth (USSG 2005). Radon that is present in soil can enter a building through small spaces and openings, accumulating in enclosed areas such as basements. No federal or state standards are in place to regulate residential radon exposure at the present time, but guidelines were developed. Although 4.0 picocuries per liter (pCi/L) is considered an “action” limit, any reading over 2 pCi/L qualifies as a “consider action” limit. The USEPA and the USSG have evaluated the radon potential around the country to organize and assist building code officials in

deciding whether radon-resistant features are applicable in new construction. Radon zones can range from 1 (high) to 3 (low).

Polychlorinated Biphenyls. PCBs are a group of chemical mixtures used as insulators in electrical equipment, such as transformers and fluorescent light ballasts. Chemicals classified as PCBs were widely manufactured and used in the US until they were banned in 1979. The disposal of PCBs is regulated under the federal TSCA (15 U.S.C. Section 2601, et seq., as implemented by 40 CFR Part 761), which banned the manufacture and distribution of PCBs, with the exception of PCBs used in enclosed systems. Per Air Force policy, all installations should have been PCB-free as of 21 December 1998. In accordance with 40 CFR Part 761 and Air Force policy, both of which regulate all PCB articles, PCB articles are regulated as follows:

- Less than 50 ppm—non-PCB (or PCB-free)
- 50 ppm to 499 ppm—PCB-contaminated
- 500 ppm and greater—PCB equipment (USEPA 2008a)

The TSCA regulates and the USEPA enforces the removal and disposal of all sources of PCBs containing 50 ppm or more; the regulations are more stringent for PCB equipment than for PCB-contaminated equipment.

3.7.2 *Affected Environment*

3.7.2.1 *Hazardous Materials*

Hazardous and toxic material procurements at MHAFB are tracked by the HAZMART. The HAZMART ensures that only the smallest quantities of HAZMAT necessary to accomplish the mission are purchased and used. HAZMART is also responsible maintaining Safety Data Sheets (SDSs) for hazardous materials. Hazardous substances used at MHAFB primarily for aircraft maintenance and training operations include hydraulic fluid, engine oil, JP-8 and other fuels, antifreeze and deicing fluids, solvents, corrosive liquids, paints and adhesives, pesticides (includes herbicides), and contaminated solids (Air Force 2014).

MHAFB has a storage capacity well over 1,000,000 gal in 140 ASTs. Most are small from 85 gal to 30,000, but the Base has two 1.9-million-gal capacity tanks and two 500,000-gal tanks to store Jet A fuel alone. Five USTS are currently used on the Base, ranging in size from 25,000 to 50,000 gal, to store Jet A fuel in support of hydrant system operations. Some oil storage containers on MHAFB are not owned or operated by the Base, but instead are tanks owned by contractors, transformers owned by Idaho Power Company, used cooking oil containers at base dining facilities, and oil containers operated by the Defense Logistics Agency (DLA) and Holly Corporation (MHAFB 2017b). Hazardous materials are not used or stored at SAR or C.J. Strike Dam Recreation Annex but are at MHAFB, SCR, JBR, ND target sites, and Grasmere EC. HAZMAT release of fuel or oil during maintenance activities is a concern at SCR, JBR, ND targets, and emitters sites though prevention measures have been implemented (MHAFB 2012b).

The *Integrated Contingency Plan (ICP) for Oil Spill Prevention and Response* (MHAFB 2017b) was developed to serve at the MHAFB Spill Prevention, Control, and Countermeasure Plan required by 40 CFR 112 to address the issues of spill prevention, discharge containment and

cleanup, and emergency response actions. The MHAFB Fire Department will respond to any HAZMAT spill considered an emergency with potential life, health, fire, or other safety hazard. The Senior Fire officer will notify the Emergency Operations Center Director and the Environmental Office (MHAFB 2017b).

3.7.2.2 Hazardous Waste

The 366 CES/CEIE maintains a Hazardous Waste Management Plan in accordance with AFI 32-7042. The purpose of this plan is to provide base personnel with an organized program that will allow for proper waste management and allow generated hazardous waste to be managed in compliance with all federal, state, and local laws and regulations. The plan sets base policies and assigns responsibilities to base personnel in order to preserve public health and the environment from activities management and generating hazardous. MHAFB is regulated under the RCRA as a large-quantity generator of hazardous waste as more than 2,200 pounds of hazardous waste is generated per month (MHAFB 2017a).

Hazardous waste accumulation involves three different stages: accumulation point at or near the point of generation and owner/manager-controlled, interim accumulation at central collection facility (90-day storage) once accumulation point storage is full, and extended storage for that facility's accrual at a Treatment, Storage, and Disposal Facility via a DLA contractor. Examples of typical waste products include petroleum products (oil, grease, gasoline, diesel, JP-8, etc.), sealants, antifreeze, absorbents, scrap metal, universal wastes (thermostats, batteries, mercury lamps), and waste aerosol cans (MHAFB 2017b). Hazardous waste is generated and stored at MHAFB, SCR, and JBR; no waste is generated or stored within the SAR (MHAFB 2012b).

3.7.2.3 Environmental Restoration Program/Military Munitions Response Program

MHAFB initialized ERP in 1983 and has since identified 32 sites in need of further investigation. Six sites have been closed, three have LUCs, four are in the Remedial Action-Objective/Long-Term Monitoring stage, and the remaining twenty-two have unlimited use/unrestricted exposure status meaning they do not have land use or other natural resource restrictions (Air Force 2011). No active ERP sites are located within the SAR, SCR, or JBR.

3.7.2.4 Toxic Substances

Asbestos

The 366 CES is primarily responsible for the Asbestos Management Plan supplemented by the Asbestos Operations Plan that minimizes asbestos exposure to building occupants, maintenance, and contractor personnel. Buildings built prior to the 1970s are likely to contain ACM.

Lead-based Materials

AFI 32-7042 requires installations to ensure that construction, renovation, or demolition involving lead-based materials are managed in accordance with applicable federal, state, and local transportation, occupational health treatment, storage, and disposal requirements. Buildings built prior to the 1978 are likely to contain lead-based materials.

Radon

The USEPA radon zone for Elmore County, Idaho, is Zone 1 (High Potential), predicted average indoor radon screening levels greater than 4 pCi/L. The USEPA radon zone for Owyhee County, Idaho, is Zone 2 (Moderate Potential), predicted average indoor radon screening levels between 2 and 4 pCi/L (USEPA 2017b).

Polychlorinated Biphenyls

Transformers and buildings containing fluorescent lights built prior to the 1979 are likely to contain PCBs. Building 1296 (HAZMAT storage facility) is the designated PCB storage area.

3.8 Cultural Resources

3.8.1 *Definition of Resource*

The term 'cultural resource' refers to physical evidence or place of past human activity. Categories of cultural resources include sites, buildings, structures, objects, and districts. These resources are protected and identified under several federal laws and EOs.

Significant cultural resources are those that have been listed on the National Register of Historic Places (NRHP) or determined to be eligible for listing. To be eligible for the NRHP, properties must be 50 years old and have national, state, or local significance in American history, architecture, archaeology, engineering, or culture. They must possess sufficient integrity of location, design, setting, materials, workmanship, feeling, and association to convey their historical significance, and meet at least one of four criteria:

- Associated with events that have made a significant contribution to the broad patterns of our history (Criterion A);
- Associated with the lives of persons significant in our past (Criterion B);
- Embody distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction (Criterion C); and/or
- Have yielded or be likely to yield information important in prehistory or history (Criterion D)

Properties that are less than 50 years old can be considered eligible for the NRHP under Criteria Consideration G if they possess exceptional historical importance. Those properties must also retain historic integrity and meet at least one of the four NRHP Criteria for Evaluation (Criteria A, B, C, or D). The term “Historic Property” refers to National Historic Landmarks, NRHP-listed, and NRHP-eligible cultural resources.

Federal laws protecting cultural resources include the Archaeological and Historic Preservation Act of 1960 as amended, the American Indian Religious Freedom Act of 1978, the Archaeological Resources Protection Act of 1979, the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA), and the National Historic Preservation Act of 1966 (NHPA), as amended through 2016, and associated regulations (36 CFR 800). NAGPRA also

requires agencies to consult with federally recognized Indian tribes with a vested interest in the undertaking.

3.8.2 Affected Environment

MHAFB dates to 1943, when it was established as a facility for World War II bomber aircraft training. The installation includes the Main Base Cantonment Area, SCR, SAR, and JBR. Also included are the following remote sites: Rattlesnake Radar Station, Middle Marker, Strike Dam Recreation Area, Grasmere EC site, emitter sites, and ND target areas. This area comprises the Area of Potential Effects (APE).

According to the ICRMP, the Main Base Cantonment Area has been 100 percent surveyed for cultural resources. Cultural resource surveys have identified five archaeological sites, none of which were determined eligible to the NRHP (MHAFB 2011). Architectural surveys have determined five World War II era hangars, located along the flightline, as eligible to the NRHP. Cold War era resources determined NRHP-eligible number 20 buildings and structures. These are located within a Bomber Alert Facility complex, a Strategic Air Command (SAC) maintenance dock, and an SAC Special Storage Compound. Additionally, three residential units built in 1959 and associated with famed architect Richard Neutra have been determined eligible to the NRHP (Weitze et al. 2009). Lastly, an 11-mi railroad spur dating to 1943 has been determined eligible to the NRHP.

The SCR has also been 100 percent inventoried for cultural resources. A total of 812 archaeological sites have been recorded. Of those, 77 sites have been determined not eligible to the NRHP. The remaining 735 archaeological sites are either eligible to the NRHP or of undetermined eligibility. No historically significant architectural resources from the World War II or Cold War eras have been identified at the range. The Pothole Reservoir Dam, constructed circa 1933 by the Civilian Conservation Corps, is the only structure on Saylor Creek Range to have been formally determined eligible to the NRHP (MHAFB 2011).

Cultural resource surveys of the SAR have identified five archaeological sites. The sites—either sheepherder camps or trash scatters—have all been determined not eligible to the NRHP. No historically significant architectural structures from the World War II or Cold War eras have been identified at the range.

At the JBR, 18 archaeological sites have been recorded. Ten of the sites have been determined eligible for the NRHP; these include campsites, lithic scatters, and rock cairns. No architectural resources are located on the range.

No archaeological sites have been recorded on remote sites including the ND target areas, Rattlesnake Radar Station, Middle Marker Site, Strike Dam Recreation Annex, and Grasmere EC site. One NRHP-eligible archaeological site—a multicomponent prehistoric and historic period site—has been recorded at one of the emitter sites. Architectural resources have been recorded at Strike Dam Recreation Annex, but all were determined not eligible to the NRHP (MHAFB 2011).

No Traditional Cultural Properties have been identified on MHAFB including the ranges and associated remote sites (MHAFB 2011). But the ICRMP specifies that the Saylor Creek and

Juniper Butte ranges do fall within the area of concern for several Indian tribes with historical ties to the area. These include the Shoshone-Paiute Tribes of the Duck Valley Indian Reservation, the Burns Paiute Colony, the Northwest Band of Shoshone, the Shoshone-Bannock of the Fort Hall Indian Reservation, and the Paiute-Shoshone of the Fort McDermitt Indian Reservation. The Grasmere Electronic Range, in particular, is within the viewshed of significant traditional locations (MHAFB 2011).

3.9 Health and Safety

3.9.1 Definition of Resource

A safe environment is necessary to prevent or reduce the potential for death, serious injury and illness, or property damage. Human health and safety addresses public and occupational receptors potential health risks under routine and accidental exposure scenarios. Public use exposure scenarios involve public receptors using lands open to the public treated with herbicides. Routine-use exposure scenarios involve a public receptor which is exposed to herbicide active ingredient(s) that have drifted outside the area of application. Accidental scenarios include instances where public receptors may prematurely enter a sprayed area, be sprayed directly, or contact water bodies that have accidentally been sprayed directly or into which an herbicide active ingredient has accidentally been spilled. Routine exposures for occupational receptors include dermal and inhalation exposures that could occur by a worker during an application of the herbicide. Accidental exposures for occupational receptors could occur via spills or direct spray onto a worker.

AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program*, implements AFD 91-3, *Occupational Safety and Health*, by outlining the AFOSH Program. The purpose of the AFOSH Program is to minimize loss of Air Force resources and to protect Air Force personnel and contractors from occupational deaths, injuries, or illnesses by managing risks. In conjunction with the Air Force Mishap Prevention Program, these standards ensure all Air Force workplaces meet federal safety and health requirements. This instruction applies to all Air Force activities and extends to personnel, contractors, and dependants on base.

SDSs are developed as required by OSHA for any hazardous substance. SDSs include information regarding the properties of each chemical; the physical, health, and environmental health hazards; protective measures; and safety precautions for handling, storing, and transporting the chemical. SDSs include a toxicology section that identifies toxicological and health effects information or indicates that such data are not available. This information aids in defining the health and safety risks associated with the Proposed Action.

Chemical pesticides can be human skin irritants, eye irritants, and can cause allergic skin reactions after prolonged and repeated contact. Serious toxicological health effects can occur in humans, if exposed to high enough concentrations and under prolonged duration. This would most likely occur as a result of occupational exposure due to mishandling of the material. It is therefore essential that all precautions set forth on the label and on the SDSs be strictly followed.

3.9.2 *Affected Environment*

The 910 AW Aerial Spray Unit would continue to conduct all aerial spray applications, whereas local contractors would conduct ground-based spray operations. All SOPs described for the Proposed Action would be followed and all contractors and the 910 AW performing activities associated with the Proposed Action would be responsible for following safety regulations and workers compensation programs. They would be required to conduct herbicide, including bioherbicide, application in a manner that does not pose any risk to workers or personnel. Any applicator must be licensed and trained. Only USEPA, BLM, and MHAFB-approved herbicides would be applied and techniques would be followed according to label directions. All required personal protective equipment to prevent exposure to chemicals would be used.

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Chapter 4

Environmental Consequences

4.0 ENVIRONMENTAL CONSEQUENCES

This section presents an analysis of environmental impacts associated with the Proposed Action and No Action Alternative described in **Chapter 2**. Direct and indirect effects and their significance and means to reduce adverse environmental impacts are also discussed for each resource. Cumulative impacts for each resource are discussed in **Chapter 5**.

The specific criteria for evaluating impacts and assumptions for the analyses are presented under each resource area. Evaluation criteria for most potential impacts were obtained from standard criteria; federal, state, or local agency guidelines and requirements; and/or legislative criteria. Proposed environmental commitments (Best Management Practices [BMPs] and SOPs) to reduce potential impacts are included for each resource area, as appropriate.

Impacts may be direct or indirect and are described in terms of type, context, duration, and intensity, which is consistent with the CEQ regulations. “Direct effects” are caused by an action and occur at the same time and place as the action. “Indirect effects” are caused by the action and occur later in time or are farther removed from the place of impact, but are reasonably foreseeable. Impacts are defined in general terms and are qualified as adverse or beneficial, and as short-term or long-term.

4.1 Air Quality/Climate Change

4.1.1 Evaluation Criteria

The CAA Section 176(c), General Conformity, requires federal agencies to demonstrate that their proposed activities would conform to the applicable SIPs for attainment of the NAAQS. General conformity applies particularly to nonattainment and maintenance areas (40 CFR 51.853 [k]). If the emissions from a federal action proposed in a nonattainment area exceed annual de minimis thresholds identified in the rule, a formal conformity determination is required of that action. The thresholds are more restrictive as the severity of the nonattainment status of the region increases. For attainment areas an impact analysis is required under NEPA regulations.

Ambient air quality for the project area is in attainment for the 8-hour O₃ NAAQS established in 2008 (75 ppb of ground-level ozone) (USEPA 2017a). The region is designated as an unclassifiable/attainment area for all other criteria pollutants. Because of the area’s attainment status, no conformity analysis is required; however, an impact analysis is required under NEPA regulations. Emissions of each criteria pollutant and ozone precursors (VOCs and NO_x) are assessed against the attainment area thresholds of 100 tpy for each of those pollutants.

Potential impacts to air quality are evaluated with respect to the extent, context, and intensity of the impact in relation to relevant regulations, guidelines, and scientific documentation. The CEQ defines significance in terms of context and intensity in 40 CFR 1508.27. This requires that the significance of the action must be analyzed with respect to the setting of the Proposed Action and based relative to the severity of the impact. The CEQ NEPA Regulations (40 CFR §1508.27[b]) provide 10 key factors to consider in determining an impact’s intensity.

Emissions of each pollutant must first be compared against the de minimis thresholds of 100 tpy each. If these thresholds are exceeded, additional impact analyses are required. Impacts are

considered significant if the proposed alternative would increase ambient air pollution concentrations above any NAAQS or emissions exceed 10 percent of the AQCR emissions.

Ordinarily, the Air Conformity Applicability Model (ACAM) (version 5.0.7) would be used to provide emissions estimates for activities associated with the Proposed Action, including construction, demolition, grading, trenching, and paving. Additionally, emissions from worker and employee commuting would be estimated by ACAM. (ACAM was developed by the Air Force [2016a,b]; it provides estimated air emissions from proposed federal actions for each specific criteria and precursor pollutant as defined in the NAAQS.) The Proposed Action, however, will not result in any such activity, and ACAM was not required.

The air quality analysis focused on emissions associated with the proposed use of PFD7. It is assumed that the application of PFD7 will not result in increased activity that requires the use of fuel combustion equipment – aerial spraying, ground-level spraying, vehicular traffic, construction of additional storage, etc. Accordingly, the only possible source of emissions would be the product itself.

4.1.2 Proposed Action

Under the Proposed Action, PFD7 and several additional herbicides will be used as a supplement to existing pesticides. Analysis of aminopyralid, rimsulfuron, sulfometuron methyl, and chlorsulfuron by the BLM (2007, 2016a) determined none of the predicted annual emissions by pollutant, state, or alternative would exceed PSD annual emission significance thresholds. To estimate emissions for PFD7, the product label was reviewed. As the product is an aqueous suspension (freeze-dried powder mixed in water), and no organic solvents are used, there will be no emissions of criteria pollutants or precursors. As such, NAAQS thresholds were not exceeded for any pollutant, and no significant impacts to air quality are expected from the Proposed Action.

4.1.3 No Action Alternative

The No Action Alternative would not generate any new emissions and would not change emissions from current baseline levels presented in **Section 3.2.2**. As a result, no impacts would occur to regional air quality under the No Action Alternative.

4.1.4 Climate Change

The Air Force expects there to be no impact of global climate change. There is no increase in emissions of GHG from the Proposed Action. Additionally, the base is neither located on a coast nor in a major flood plain; therefore, increased storm frequency will not create catastrophic impacts on the base. Accordingly, there is no need to build “storm contingencies” into the design of the proposed project.

4.1.5 Measures to Reduce Impacts to Air Quality

Under either alternative, the Air Force would continue to implement avoidance measures to reduce potential impacts to air quality from herbicides as follows:

- Apply herbicides in favorable weather conditions to minimize drift. For example, do not treat when winds exceed 10 mph or rainfall is imminent.

- Use drift reduction agents, as appropriate, to reduce the drift hazard.
- Select proper application equipment and follow instructions on herbicide label in regards to droplet size (spray droplets of 100 microns and less are most prone to drift) and boom length and nozzle orientation for aerial application.
- Select proper application methods (e.g., set maximum spray heights, use appropriate buffer distances between spray sites and non-target resources).

4.2 Land Use

4.2.1 Evaluation Criteria

Potential impacts on land use are based on the level of land use sensitivity in areas potentially affected by the Proposed Action as well as compatibility of those actions with existing conditions. In general, a land use impact would be adverse if it met one of the following criteria:

- inconsistency or noncompliance with existing land use plans or policies;
- precluded the viability of existing land use;
- precluded continued use or occupation of an area;
- incompatibility with adjacent land use to the extent that public health or safety is threatened; and
- conflict with planning criteria established to ensure the safety and protection of human life and property.

4.2.2 Proposed Action

Adding new active ingredients to the Air Force's list of approved herbicides would be expected to have a minimal effect on land uses on or off base. Herbicide treatments would continue to be conducted over the same geographic area and with the same program goals, and so would have no additional effects. Sulfometuron methyl, however, would not be used on BLM joint use lands or emitter site ROWs in accordance with the 2001 Idaho BLM Information Memorandum #050.

The BLM is the primary land manager in areas adjacent to MHAFB and MHRC. The Proposed Action would not change land use on these or other lands and is consistent with the BLM's overarching goals for vegetation management are to improve biological diversity and ecosystem function, promote and maintain native and resilient plant communities, and reduce invasive vegetation and the risk of wildfire (BLM 2016a).

Current land use on MHAFB and MHRC includes military training and support activities, grazing on the state-owned portion of SAR, the SCR joint land use area, JBR, and ND-1, and recreational use at the C.J. Strike Dam Recreation Annex and all of the SCR joint land use area. Land use categories would remain the same under the Proposed Action, though some temporary restrictions in grazing could occur. Restrictions in grazing would vary by herbicide, including PFD7, ranging from no restrictions to 12 months and would be coordinated with the BLM, State, and any grazing lessee at JBR. Long-term positive impacts to grazing could result if herbicide treatments were effective in controlling cheatgrass and other annual grasses and native forage was able to reestablish once this area was cleared.

Under the Proposed Action, treatments would result in some short-term and temporary loss of recreational value due to vegetation being killed or discolored. In some cases, areas might be closed to visitors during and after treatments; however, these impacts would be short-term and any values affected would be restored within two growing seasons in most cases.

4.2.3 *No Action Alternative*

Under the No Action Alternative, noxious weed and cheatgrass control would be limited to currently used herbicides. Herbicide treatments would continue to be conducted over the same geographic area and with the same program goals, and so would have no additional effects. Potential long-term positive impacts to grazing from the control of cheatgrass and improvements in native forage may not be achieved.

4.2.4 *Measures to Reduce Impacts to Land Use*

Under either alternative, the Air Force would continue to implement avoidance measures to reduce potential impacts to land use from herbicides as follows:

- Notify the public of treatment methods, hazards, times, and nearby alternative recreation areas.
- Coordinate vegetation management activities on joint land use properties and ROWs.
- Notify other public land users within or adjacent to the ROW proposed for treatment.
- Use only herbicides that are approved for use in ROW areas.
- Coordinate grazing restrictions according to herbicide use with the BLM, State, and any grazing lessee at JBR.

4.3 *Water Resources*

4.3.1 *Evaluation Criteria*

Evaluation criteria for potential impacts on water resources are based on water availability, quality, and use; existence of floodplains; and associated regulations. Adverse impacts to water resources would occur if the Proposed Action

- reduces water availability or supply to existing users;
- overdrafts groundwater basins;
- exceeds safe annual yield of water supply sources;
- affects water quality adversely;
- endangers public health by creating or worsening health hazard conditions; or
- violates established laws or regulations adopted to protect water resources.

Potential impacts related to flood hazards can be significant if such actions are proposed in areas with high probabilities of flooding; however, any impacts can be mitigated through the use of specific design features to minimize the effects of flooding.

4.3.2 Proposed Action

The potential exists for herbicides to adversely affect water quality through herbicide drift, erosion of contaminated soils into waterways, and contamination of surface water and groundwater. This EA tiers to the MHAFB *Environmental Assessment, Saylor Creek Air Force Range Cheatgrass Reduction Plan Implementation* (MHAFB 2000), which concluded that the lack of surface water features and depth to groundwater at SCR make any negative effects to water quality and water resources from cheatgrass control efforts unlikely.

This EA also tiers to two BLM PEISs: the *Final PEIS for Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States* (BLM 2007) and *Final PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Land Management Lands in 17 Western States* (BLM 2016a), which analyze the potential impacts of aminopyralid, rimsulfuron, sulfometuron methyl, and chlorsulfuron.

The PEISs determined that use of new herbicides would increase the number of potential pollutants used, although use of herbicides with a greater risk to water resources would likely decrease as a result of availability of the new active ingredients. None of the new herbicides are approved for aquatic use; therefore, appropriate buffers would be maintained adjacent to waterbodies, perennial and ephemeral streams, and playas. None of the above herbicides would be applied through aerial application. Sulfometuron methyl would not be used on BLM joint use lands or emitter site ROWs.

In addition, by minimizing fire risk through management of cheatgrass and other winter annual grasses, the risk of post-fire sedimentation into aquatic habitats would also be minimized. Furthermore, annual grasses reduce the overall vegetative cover relative to native grasses, which leads to reduced infiltration, increased runoff, and loss of soil moisture, resulting in increased sedimentation and reducing water quality. Consequently, control of these annual grasses and restoration of native range habitats would benefit water resources on and near Air Force lands.

PFD7 is a common soil bacterium that can live in a variety of environments including soil, plants, and water surfaces (Department of Energy 2017). There is an increased potential for surface water contamination with aerial applications; however, as there are no potable water sources, sole-source aquifers, or perennial drainages are located in the proposed treatment areas, risk for contamination is negligible. Additionally, the gradual reduction in invasive annual grasses expected from the introduction of PFD7 would result in long-term reductions in herbicide use that would benefit water quality. As with the chemical herbicide applications, avoidance of surface waters, wetlands, and groundwater would also minimize any potential water contamination and the increased control of invasive annual grasses and native habitat restoration would benefit water resources on and near Air Force lands.

4.3.3 No Action Alternative

Under the No Action Alternative, the Air Force would continue its vegetation management programs using the current list of herbicides. There would be some risks to water resources from herbicide treatments, as well as benefits associated with herbicide use reduction. No long-term benefit from the introduction of PFD7 would be achieved.

4.3.4 Measures to Reduce Impacts to Water Resources

Under either alternative, the Air Force would continue to implement avoidance measures to reduce potential impacts to water quality from herbicide use as follows:

- Follow all label instructions and advisory notes.
- Do not use under adverse weather conditions (winds >10 mph, predicted rainfall).
- Conduct mixing and loading operations in an area where an accidental spill would not contaminate an aquatic body.
- Do not apply directly to water or areas where surface water is present.
- Do not rinse spray tanks in or near water bodies.
- Do not broadcast or spray where there is danger of contaminating water supplies.
- Minimize treating areas with high risk for groundwater contamination.
- Maintain buffers between treatment areas and water bodies. Buffer widths should be developed based on herbicide- and site-specific criteria to minimize impacts to water bodies.
- Do not apply herbicides within the MHAFB Drinking Water/Wellhead Protection Zone to protect on-base drinking water.

4.4 Biological/Natural Resources

4.4.1 Evaluation Criteria

To evaluate the potential impacts on the biological resources, the level of impact on biological resources is based on

- importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource;
- proportion of the resource that would be affected relative to its occurrence in the region;
- sensitivity of the resource to the proposed activities; and
- duration of potential ecological ramifications.

The impacts on biological resources are adverse if species or habitats of high concern are negatively affected over relatively large areas. Impacts are also considered adverse if disturbances cause reductions in population size or distribution of a species of high concern.

As a requirement under the ESA, federal agencies must provide documentation that ensures that agency actions do not adversely affect the existence of any threatened or endangered species. The ESA requires that all federal agencies avoid “taking” threatened or endangered species (which includes jeopardizing threatened or endangered species habitat). Section 7 of the ESA establishes a consultation process with USFWS that ends with USFWS concurrence or a determination of the risk of jeopardy from a federal agency project. Herbicide treatments were addressed in the the *Biological Opinion on the Effects of U.S. Air force Ongoing Actions at Juniper Butte Range and in Owyhee County, Idaho on the Slickspot Peppergrass (Lepidium papilliferum)* (USFWS 2010) and a number of conservation measures were identified. Both the Proposed Action and No Action Alternative would be consistent with these measures.

4.4.2 Proposed Action

Sensitive Species

Various MHAFFB sites support numerous species that have been given a special status based on their rarity or sensitivity. Special status species include one species, slickspot peppergrass, that is federally listed as threatened and 53 special status species that are either BLM type 2 wildlife species; BLM type 2, 3, or 4 plant species; IDFG SGCN; or USFWS BMC (see **Table 3-4**).

Potential risks to sensitive species from the proposed chemical herbicides were analyzed in the *Final PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Land Management Lands in 17 Western States* (BLM 2016a) and the *Final PEIS for Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States* (BLM 2007). Under the Proposed Action, herbicide use would be associated with risks to special status plant species. Risks, however, would be minimal as pretreatment surveys would be conducted and herbicide application would not be conducted within a 25-ft buffer area around identified sensitive plant species populations. Aerial spray applications would not be conducted at JBR or emitter sites where slickspots and slickspot peppergrass are known to occur.

PFD7 treatments are not expected to harm sensitive plant species because the bacterium has been found to only suppress root growth in seedlings of specific annual grasses and to not harm dicotyledonous (broadleaf) species (Kennedy et al. 2001; Stubbs and Kennedy 2012). PFD7 produces a phytotoxin that inhibits root elongation and is specific to cheatgrass, Japanese brome, medusahead, and jointed goatgrass. Sensitive wildlife species are also not expected to be adversely affected by the application of PFD7 as there are no known adverse effects to wildlife species or habitat with its use. Because the activity level of the bacterium is reduced in hot, dry summers and it becomes dormant, and because it only moves in soil by traveling on the growing root or with water, there is little risk of PFD7 moving off site to non-treatment areas.

Additionally, the USEPA Biopesticide Registration Action Document for PFD7 (USEPA 2014a) concluded “Adverse effects to non-target organisms, including federally listed threatened and endangered species, are not expected to result from the proposed registration of *P. fluorescens* strain D7 when applied in accordance with the directions on the proposed label”.

Benefits to sensitive plant and wildlife species from implementation of the Proposed Action would include reduced risk of wildfire and reduced competition from annual invasive grasses and noxious weeds. Reduced use of chemical herbicides that is expected to result from the introduction of PFD7 would further reduce impacts to non-target native vegetation and improve habitat resulting in long-term benefits for sensitive wildlife species.

Wildlife

Possible modes of wildlife exposure to chemical herbicides include direct spray, dermal contact with treated vegetation, and ingestion of plant materials or prey items that have been exposed to the active ingredient. Indirect adverse effects could result from the temporary loss of vegetation in treated areas. Risks associated with use of aminopyralid, rimsulfuron, sulfometuron methyl, and chlorsulfuron were assessed in the *Final PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Land Management Lands in 17 Western*

States (BLM 2016a) and the *Final PEIS for Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States* (BLM 2007).

These PEISs concluded that use of these chemical herbicides would not pose a risk to any type of terrestrial wildlife and that the short-term impacts of vegetation cover should be offset by long-term improvements to habitat if treatment programs effectively reduce cover of target plant species and promote the establishment of native plant species (BLM 2016a).

Use of PFD7 is not expected to result in any adverse impacts to wildlife since studies submitted in support of USEPA registration found no impact on the growth and development of daphnia, ladybugs, honeybees, fish, birds, or mice. The USEPA Biopesticide Registration Action Document for PFD7 (USEPA 2014a) concluded risk to birds, mammals, insects, and fish is low to minimal.

Vegetation

Under the Proposed Action, herbicide treatments would occur in areas that have been impacted by wildfire and/or non-native annual grass and noxious weed infestations and have little natural vegetation. Treatments would therefore have minimal direct effect on native species relative to non-native target species. Impacts to native vegetation would also be minimized by a fall application of pre-emergent herbicides at low rates when mature perennial grass species and forbs are dormant.

Herbicide treatments would likely have some effect on plant species composition and diversity and could potentially adversely affect non-target vegetation. Potential risks to native vegetation associated with the use of aminopyralid, rimsulfuron, sulfometuron methyl, and chlorsulfuron were assessed in the *Final PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Land Management Lands in 17 Western States* (BLM 2016a) and the *Final PEIS for Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States* (BLM 2007). These analyses concluded that long-term benefits to native plant communities from management of invasive plants would likely continue to outweigh any short-term negative impacts to native plants associated with herbicide use.

Application of PFD7 is not expected to have an adverse effect on native vegetation because the bacterium's ability to suppress the growth of downy brome is due to the production of a phytotoxin that specifically targets root cell elongation in cheatgrass (Tranel et al. 1993), other brome grass species, medusahead, and jointed goatgrass with no significant affect to other species (Kennedy et al. 2001; Stubbs and Kennedy 2012). The introduction of PFD7 is expected to reduce the abundance of cheatgrass and other annual grasses over a period of 3 to 5 years (Kennedy et al. 2015). With a decrease in cheatgrass perennial grasses, sagebrush, and forbs are expected to increase in vigor because of reduced competition at treatment sites.

4.4.3 No Action Alternative

Sensitive Species

Under the No Action Alternative, herbicide use would continue to be associated with risks to special status plant species although treatments would be designed to avoid or minimize risks to

these species. Regardless of measures to avoid sensitive plant populations, there would be some risk of accidental exposure to herbicides.

Under this alternative, populations of special status plant species would continue to benefit from herbicide treatments that reduce fuels and control non-native annual grasses and noxious weeds that compete with native plants and special status wildlife species would benefit from habitat improvement; however, long-term reduction in herbicide use from increased control of cheatgrass and other annual grasses would not occur.

Wildlife

Under the No Action Alternative, the Air Force would continue its ongoing vegetation treatment programs, using the currently approved herbicides. These treatments would be likely to benefit wildlife habitats; however, new alternative chemical herbicides and PFD7 would not be used, limiting treatment options. In addition, benefits from reduced long-term use of chemical herbicides, as expected from the introduction of PFD7, would not be achieved.

Vegetation

As with the Proposed Action, the No Action Alternative could potentially adversely affect non-target vegetation and would likely have some effect on plant species composition and diversity. Without the use of rimsulfuron and PFD7, in particular, treatment options for cheatgrass would be limited to currently used imazapic formulations, which could lead to increased herbicide resistance. Benefits from reduced long-term use of chemical herbicides, as expected from the introduction of PFD7, would also not be achieved.

4.4.4 Measures to Reduce Impacts to Sensitive Species

Sensitive Species

Under either alternative, the Air Force would continue to implement avoidance measures to reduce potential impacts to sensitive species from herbicide use as follows:

- Survey for special status species before treating an area.
- Make herbicide spray applicators aware of the location of any sensitive species with potential to be affected by treatment.
- Use a selective herbicide and spot treat to minimize risks to special status plants.
- Avoid treating vegetation during time-sensitive periods (e.g., nesting and migration, sensitive life stages) for special status species in area to be treated.
- To prevent disturbance to sensitive bird species such as sage grouse, all vehicles are required to stay on existing roads during ground based spray operations and mowing. Sagebrush must also be avoided to the maximum extent practicable.

Additionally, aerial spraying of chemical herbicides does not occur at JBR and specific avoidance of slickspot peppergrass, and slickspots in general, is a requirement of all vegetation management contracts at MHAFB, which include the following:

- For ROWs and emitter sites AA, AC, AF, AG, AI, AH, AK, BA, BB, BC, and on JBR: Slickspot peppergrass and slickspots shall be avoided by a distance of 25 ft and the

application may proceed only if the slickspot or slickspot peppergrass is upwind of the application.

- For ROW AE and BJ and emitter site AE and BJ: BLM Section 7 consultations with the USFWS for slickspot peppergrass prohibit use of Tordon[®], Krovar[®] or other persistent herbicides within Elemental Occurrences. Spot spraying is the only method of application permissible, wind speeds must be less than 7 mph, applications must be greater than 10 ft from slickspots, and droplet size should be large to avoid drift. Only the ROW to emitter site AE and emitter site AE fall within an Elemental Occurrence.

Wildlife

The Air Force would continue to implement general SOPs for herbicide that would help reduce potential impacts to wildlife from herbicide including:

- Use herbicides with low toxicity to wildlife.
- Use spot applications or low-boom broadcast operations where possible to limit the probability of contaminating non-target food and water sources, and non-target vegetation over areas larger than the treatment area.
- Use timing restrictions (e.g., do not treat during critical wildlife breeding or staging periods) to minimize impacts to wildlife.

Vegetation

The Air Force would continue to implement general SOPs for herbicide that would help reduce potential impacts to vegetation from herbicide including:

- Use drift reduction agents to reduce the drift hazard to non-target species, and colorants to obtain a uniform coverage.
- Establish herbicide-specific buffer zones, limiting aerial applications of certain active ingredients
- Turn off aerially applied treatments at the completion of spray runs and during turns to start another spray run during aerial application.
- Refer to the herbicide label when planning revegetation to ensure that subsequent vegetation will not be injured following application of the herbicide.

4.5 Soils

4.5.1 Evaluation Criteria

Minimization of soil erosion is considered when evaluating potential impacts of proposed and no action on soils. Generally, impacts can be avoided or minimized if erosion control measures, and project design elements are incorporated into project development.

Effects on soils would be adverse if they would alter the lithology, stratigraphy, and geological structure that control groundwater quality, distribution of aquifers and confining beds, and groundwater availability or change the soil composition, structure, or function within the environment.

Adverse impacts would result if

- soils classified as prime and unique farmland were affected; and
- soils affected were considered unsuitable for development.

4.5.2 Proposed Action

Herbicide fate in soil and the potential for transport of the herbicide from the treatment site are environmental concerns associated with herbicide use. Potential impacts from the three new herbicides proposed for use are analyzed in the *Final PEIS for Vegetation Treatments Using Aminopyralid, Fluroxypyr, and Rimsulfuron on BLM Land Management Lands in 17 Western States* (BLM 2016a) and the *Final PEIS for Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States* (BLM 2007). The PEISs concluded that herbicide treatments would have both beneficial and adverse effects on soil.

Studies have shown both positive and negative effects to biological soil crusts as a result of herbicide treatments. Cyanobacteria, lichen, and moss constituents may be impacted to varying degrees; however, use of herbicides can also benefit biological soil crusts by reducing the occurrence of invasive annual grasses and wildfire, which reduce biological crust cover. Soil can also be damaged by fire through changes to its structure, particularly through the loss of organic matter. Therefore, reducing wildfire risk could also benefit soil structure.

Use of PFD7 is not expected to have adverse effect on soils, soil crusts, or other soil organisms as the suppressive phytotoxin produced by PFD7 decomposes readily and does not persist in the soil or the soil solution (Gurusiddaiah et al. 1994). It also has low mobility in soils, so would not move far from the treatment site. Additionally, *Pseudomonas* is a naturally occurring soil bacterium, so it is expected that soil-dwelling non-target organisms are likely to have some exposure to this bacterium. The USEPA found that the non-target organism data requirements, including impacts to soil-dwelling non-target organisms, were adequately addressed during the USEPA registration process based on the submitted data, rationales, and limited anticipated exposure to non-target organisms (USEPA 2014a).

4.5.3 No Action Alternative

As with the Proposed Action, the No Action Alternative is expected to have both beneficial and adverse effects on soil. Continued use of imazapic herbicides would control cheatgrass and other invasive species in the short-term, which would reduce wildfire risk. Long-term reduced wildfire risk, which expected to result from the use of PFD7, would not be realized. Continued high wildfire potential would pose a risk for biological soil crusts and soil texture, which could lead to reduced soil productivity and stability. Reduced long-term herbicide use as the result of biologic control of cheatgrass would also not be achieved.

4.5.4 Measures to Reduce Impacts to Soil

Under either alternative, the Air Force would continue to implement avoidance measures to reduce potential impacts to soil from herbicide use as follows:

Caution should be used when applying herbicides to soils that support biological crusts.

- Conduct mixing and loading operations in areas where an accidental spill would not contaminate soil.
- Minimize treatments in areas where herbicide runoff is likely, such as steep slopes when heavy rainfall is expected.
- Minimize use of herbicides that have high soil mobility, particularly in areas where soil properties increase the potential for mobility.
- Do not apply granular herbicides on slopes of more than 15 percent where there is the possibility of runoff carrying the granules into non-target areas.

4.6 Hazardous Materials/Waste

4.6.1 Evaluation Criteria

Impacts to HAZMAT management would be considered adverse if the federal action resulted in noncompliance with applicable federal and state regulations, or increased the amounts generated or procured beyond current waste management procedures and capacities at each installation. Impacts on the ERP would be considered adverse if the federal action disturbed (or created) contaminated sites resulting in negative effects on human health or the environment.

4.6.2 Proposed Action

Under the Proposed Action, demolition or earthmoving are not included in the activities described in **Section 2.4.1**. Existing procedures for centralized management of the procurement, handling, storage, and issuing of HAZMAT, hazardous wastes, and toxic substances are adequate to handle any storage and disposal of the approved herbicides and PFD7. No significant impacts (adverse or beneficial) to hazardous materials/wastes are expected from the Proposed Action.

Hazardous Materials and Wastes

All HAZMAT and hazardous wastes would be handled, stored, and disposed of in accordance with federal, state, and local regulations and laws; therefore, no adverse effects are anticipated.

ERP

Demolition and earthmoving that would disturb ERP sites are not included in the Proposed Action and proper handling of herbicides and PFD7 would not create a contaminated site; therefore, no adverse effects are anticipated.

Asbestos

Demolition or other activities that would expose ACM is not included in the Proposed Action; therefore, no adverse effects are anticipated.

Lead-based Materials

Demolition or other activities that would expose lead-based materials is not included in the Proposed Action; therefore, no adverse effects are anticipated.

Radon

Even though this area has a high potential for radon accumulation, construction that could increase or confine radon emissions is not included in the Proposed Action; therefore, no adverse effects are anticipated.

Polychlorinated Biphenyls

Demolition or other activities that would expose PCBs is not included in the Proposed Action; therefore, no adverse effects are anticipated.

4.6.3 *No Action Alternative*

Under the No Action Alternative, general risks associated with herbicide treatments would be much the same as under the Proposed Action. As a result, there would be no impact on hazardous materials or wastes, ERP sites, or toxic substances under the No Action Alternative.

4.6.4 *Measures to Reduce Impacts*

Under either alternative, the Air Force would continue to implement avoidance measures to reduce potential impacts to HAZMAT, hazardous waste, or toxic substances from herbicide use as follows:

- Any contractor or Base personnel that brings HAZMAT to the site needs to inspect their equipment and HAZMAT containers on a regular basis to reduce the likelihood of contamination. The Air Force has measures in place for HAZMAT handling and those measures are strictly enforced and would be enforced during any of the Alternatives. See each installations Hazardous Waste Management Plan for further instruction on emergency response procedures.
- PFD7, in its current powdered form, must be stored in its original container at 32 degrees Fahrenheit or less (0 degrees is optimal to increase shelf life) so a dedicated freezer is required in a HAZMAT storage facility.
- Any hazardous waste generated by the Proposed Action should be handled, stored, transported, disposed of, or recycled in accordance with the respective Hazardous Waste Management Plan. Disposal of PFD7 would follow existing procedures.

4.7 Cultural Resources

4.7.1 *Evaluation Criteria*

Section 106 of the NHPA requires all federal agencies to assess the effects of their undertakings on Historic Properties and seek to avoid, minimize or mitigate adverse effects to these properties (36 CFR 800.1[a]). Undertakings are defined as any “project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval” (36 CFR 800.16[y]). The APE is defined as the “geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist,” (36 CFR 800.16[d]) and thereby diminish their historic integrity.

Direct effects include demolition, alteration, or damage during construction activities. Indirect effects include the introduction of visual, audible, or atmospheric elements that are out of character with a property or that alter its historic setting. Direct and indirect effects are considered adverse if a project would cause a change in the quality of a property that qualifies it for inclusion in the NRHP.

4.7.2 *Proposed Action*

The Proposed Action at MHAFB involves ground-based and aerial spray application of a variety of authorized and approved herbicides as well as the bioherbicide PFD7 for cheatgrass and noxious weed control. MHAFB currently has a PA with the Idaho SHPO developed in accordance with 36 CFR 800.14. The PA provides streamlined compliance for undertakings with effects that are similar, repetitive, foreseeable, and likely to be minimal or not adverse to historic properties as determined by a qualified installation Cultural Resources Manager (CRM). As defined in Section I. (c) of the PA, undertakings eligible for streamlined review by the qualified CRM include the application of pesticides and herbicides and landscaping, seeding, mowing, and grounds maintenance on MHAFB landholdings.

The Proposed Action qualifies as undertaking eligible for streamlined review by the qualified CRM. MHAFB CRM reviewed the project for NHPA Section 106 compliance and defined the APE in accordance with 36 CFR 800.16(d). The APE consists of all areas where the herbicide would be applied either manually or aerially on MHAFB and the MHRC. Consistent with Section I. b (5) of the MHAFB 2015 PA and 36 CFR 800.5(3)(b), the CRM has made a determination of No Adverse Effect for the undertaking.

4.7.3 *No Action Alternative*

Under the No Action Alternative, noxious weed and cheatgrass control would be limited to currently used herbicides. Herbicide treatments would continue to be conducted over the same geographic area and with the same program goals and so would have no additional effects to cultural resources.

4.8 Human Health and Safety

4.8.1 *Proposed Action*

The use of herbicides under a variety of application methods involves potential risk or the perception of risk to workers and members of the public living or engaging in activities in or near herbicide treatment areas; therefore, as part the two PEISs to which this EA is tiered, the BLM conducted a human health risk assessment (HHRA) to evaluate potential human health risks that may result from herbicide exposure both during and after treatment of public lands. The HHRA was conducted to be scientifically defensible and to be consistent with currently available guidance where appropriate. The HHRA determined most of the herbicides do not present a risk to human receptors when applied at the typical application rate. Specific summaries for the herbicides being considered for use at MHAFB, aminopyralid, rimsulfuron, sulfometuron methyl, and chlorsulfuron follow.

Aminopyralid

Based on the hazard identification presented in the HHRA, aminopyralid has low acute toxicity via oral, dermal, and inhalation routes of exposure but may cause severe eye irritation in some forms. At mid- and high-level doses, adverse effects to the digestive system have been noted. Developmental and reproduction studies indicate no evidence that fetuses or offspring have increased susceptibility to aminopyralid. Aminopyralid has been classified as “not likely to be carcinogenic to humans,” and there is no evidence that it is mutagenic or an endocrine disrupter. Dermal studies indicate that aminopyralid does not have significant toxicity via the dermal route of exposure, as it is either not absorbed or poorly absorbed through the skin (BLM 2016).

Rimsulfuron

Based on the hazard identification presented in the HHRA, rimsulfuron has low acute toxicity orally, by dermal exposure, and by inhalation but is a moderate eye irritant. It is not a dermal sensitizer. Based on subchronic and chronic toxicity studies, long-term exposures to rimsulfuron can cause a variety of adverse health effects targeting multiple organs. No developmental toxicity has been observed at high doses, and there is no evidence that rimsulfuron is an endocrine disruptor. Rimsulfuron is classified as “Not Likely a Human Carcinogen” (BLM 2016).

Sulfometuron Methyl

Sulfometuron methyl applications do not present risk to any receptors when applied in routine use situations at either the typical or maximum application rate. Sulfometuron methyl has not been shown to have acute dietary or dermal effects in hazard analyses conducted by the USEPA and sulfometuron methyl is not acutely toxic via dermal, inhalation, and oral routes of inhalation. Because it is not an agricultural herbicide, carcinogenicity studies were not required (USEPA 2008b).

Chlorsulfuron

Typical exposures to chlorsulfuron at the typical or maximum application rates do not present a risk to workers or the general public. Ground broadcast applications at the maximum application rate would pose a low risk to workers (BLM 2007). Chlorsulfuron has low toxicity if individuals accidentally eat, touch, or inhale residues. Chlorsulfuron is a mild eye and skin irritant but not a skin sensitizer. Based on average exposure and extremely conservative conditions of maximum exposure scenarios, chlorsulfuron was determined to pose a negligible risk of adverse non-cancer effects to workers or the public (Washington Department of Transportation 2006).

The PEISs concluded that use of these herbicides does not present an unacceptable risk to human health and safety and that their use would increase the options for appropriately managing vegetation while minimizing the risk to human receptors. Benefits to human health and safety could be realized through the reduction in use of herbicides with greater human health risks, such as 2,4-D, bromacil, and diuron, with these low-risk herbicides.

PFD7

For an herbicide, including bioherbicides, to be registered by the USEPA, a body of toxicological, environmental fate, and ecotoxicity data submitted by the pesticide manufacturer to support its registration application. During the registration process, the USEPA reviewed the available scientific data and other relevant information on PFD7 and considered its validity, completeness, and reliability, as well as the relationship of this information to human risk. The USEPA also considered available information concerning the variability of the sensitivities of major identifiable subgroups of consumers, including infants and children. The toxicity and pathogenicity tests (dermal, toxicity) and irritation tests (acute eye and primary dermal irritation) that address potential routes of exposure to the active ingredient revealed little to no toxicity attributed to PFD7. Repeated exposures to the PFD7 microorganism from pesticidal applications were also found not to exceed USEPA's level of concern, particularly in light of available data that demonstrate PFD7 is not toxic (acute dermal toxicity and acute pulmonary toxicity/pathogenicity), is non-irritating (primary dermal irritation), and is not pathogenic when used as labeled in accordance with good agricultural practices (acute pulmonary toxicity/pathogenicity and acute injection toxicity/pathogenicity). Further, the USEPA granted a waiver from food tolerance levels (the legal limit for a pesticide chemical residue in or on a food) for PFD7 in 2014 (USEPA 2014b).

Under the Proposed Action, no adverse effects on human health and safety are expected from the use of PFD7 to control cheatgrass and other invasive annual grasses at MHAFB. Benefits from the reduction of herbicide use are expected long-term with the introduction of PFD7. Additionally, treatment of species that increase the risk of wildfire, such as cheatgrass, would reduce the risk of wildfire and the associated public health and safety risks.

4.8.2 *No Action Alternative*

Under the No Action Alternative, general risks associated with herbicide treatments would be much the same as under the Proposed Action. The benefits associated with reduced use of 2,4-D, bromacil, and diuron and application of PFD7 would not be realized.

4.8.3 *Measures to Reduce Impacts*

Human health risks from these chemicals would be minimized by following all label instructions and SOPs to prevent accidental exposures and protect human health:

- Use the lowest effect application rate where feasible to reduce risk to occupational and public receptors.
- Do not apply sulfometuron methyl aerially.
- Limit application of chlorsulfuron via ground broadcast applications at the maximum application rate.
- Use protective equipment as directed by the herbicide label.
- Post treated areas with appropriate signs at common public access areas.
- Observe restricted entry intervals specified by the herbicide label.

- Provide public notification in newspapers or other media where the potential exists for public exposure.
- Have a copy of SDSs at work sites.
- Notify local emergency personnel of proposed treatments.
- Contain and clean up spills and request help as needed.
- Secure containers during transport.
- Follow label directions for use and storage.
- Dispose of unwanted herbicides promptly and correctly.

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Chapter 5

Cumulative Impacts and Other Environmental
Considerations

5.0 CUMULATIVE IMPACTS AND OTHER ENVIRONMENTAL CONSIDERATIONS

This section includes an analysis of the potential cumulative impacts by considering past, present, and reasonably foreseeable future actions; potential unavoidable adverse impacts; the relationship between short-term uses of resources and long-term productivity; and irreversible and irretrievable commitment of resources.

5.1 Cumulative Effects

The CEQ regulations stipulate that the cumulative effects analysis consider the potential environmental consequences resulting from “the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR 1508.7).

The baseline conditions for each resource were discussed in **Chapter 3**. The potential for environmental consequences related to the Proposed Action were discussed in **Chapter 4**. Environmental commitments, BMPs, and SOPs are described in each resources section in **Chapter 4**. This section identifies and evaluates past, present, and reasonably foreseeable other projects, which could cumulatively affect environmental resources in conjunction with the Proposed Action.

Assessing cumulative effects begins with defining the scope of other actions and their potential interrelationship with the proposed or alternative actions. Other activities or projects that coincide with the location and timetable of the Proposed Action and other actions are evaluated. Actions not identified in **Chapter 2** as part of the proposed or alternative actions, but that could be considered as actions connected in time or space (40 CFR 1508.25) may include projects that affect areas on or near the project area.

An effort has been made to identify actions that are being considered or are in the planning phase at this time. To the extent that details regarding such actions exist and the actions have a potential to interact with the Proposed Action, these actions are included in this cumulative analysis. This approach enables decision makers to have the most current information available in order that they can evaluate the potential environmental consequences of the Proposed Action.

Past, Present, and Reasonably Foreseeable Actions

Past, present, and reasonably foreseeable actions by the Air Force at MHAFB and MHRC as well as in the region were considered.

The largest federal land management agency in the region is the BLM. BLM lands are managed primarily for grazing, hunting, prospecting, and recreating. State grazing and timber lands are managed for school endowments. Federal and state agencies would continue to implement their land management policies accordingly and would not be impacted by implementing of the Proposed Action. Vegetation management, including use of herbicides, is widely practiced on state and federal lands. Both BLM and the State follow strict herbicide use guidelines and SOPs that are designed to ensure that the natural and human environments are protected during implementation of herbicide treatments. Herbicide use is further regulated by the ISDA, which

ensures the proper training and licensing of all herbicide applicators in the state. In addition, BLM, the Air Force, state, and local governments implement resource management and monitoring programs to protect environmental resources. The assessment of cumulative impacts recognizes the existence of these programs and assumes that the mandate under which each program was established will continue. Under the Proposed Action, the Air Force would continue long-term and ongoing coordination with federal and state agencies that have land management responsibilities in the region to ensure Air Force activities do not conflict with their management objectives.

Recent past and ongoing military actions were considered as part of the baseline or existing condition for each resource. The projects summarized in this section were reviewed to consider the implication of each action with the Proposed Action. Potential overlap in affected area and project timing were considered.

MHAFB is an active military installation and MHRC is an active range complex experience with continuous evolution of mission and operational requirements. As such, training, new construction, facilities improvements, infrastructure upgrades as well as ongoing environmental management occur. Specific reasonably foreseeable actions with potential overlap in implementation or in location include

- **Operational Changes and Range Improvements in the Mountain Home Range Complex Draft EA (2016).** The purpose of this project is to provide up to date air-to-air and air-to-ground support training opportunities and long-term viability of MHRC associated airspace and ranges for 366 FW and other DoD aircrews. Operational changes would involve upgrading ground-based 12 operations, facilities, targets, and munitions to enhance integrated ground-based and airspace training 13 within the MHRC. The Proposed Action would meet training requirements associated with air strike 14 control missions, SERE training, JTAC training, Combined Arms Training missions, and Close Air Support 15 missions. To better aircrew air-to-ground training, the Air Force proposes improvements and additions to 16 facilities in the SCR, improvements to targets on JBR, changes in ground-based operations in the MHRC, and increases in existing and new use of munitions.
- **JBR Legislative EIS.** This project includes extension of the JBR land withdrawal (Juniper Butte Range Withdrawal Act, 112 Statute 2226) that expires in 2023. Per the Act, prior to the extension, the Air Force must evaluate the potential environmental effects of extending the withdrawal.

The following analysis considers how the reasonably foreseeable projects identified above could cumulatively result in environmental consequences in conjunction with the Proposed Action.

Air Quality

The region is in air quality conformity and the cumulative consequences would not be expected to result in significant changes that could affect regional air quality. No cumulative impacts resulting from the implementation of the Proposed Action in conjunction with past, present, and reasonably foreseeable future actions are expected. Herbicide treatments would have a small short-term impact on air quality, predominantly associated with use of vehicles during

applications; however, as much of the focus of treatments is on reducing hazardous fuels and reducing the occurrence of wildfires, the proposed vegetation treatments should reduce smoke emissions over the long-term.

Land Use

No change to land use or land use management will result from the Proposed Action. No cumulative consequences are expected to occur to land use in conjunction with the Proposed Action or past, present, or reasonably foreseeable future actions.

Water Resources

As discussed in **Chapter 4**, an accidental herbicide spill could cause damage to water bodies lasting for several months, depending on the chemical's degradation rate. It is expected that these impacts would be reversed over time. Furthermore, no cumulative consequences are expected to occur to water resources in conjunction with the Proposed Action or past, present, or reasonably foreseeable future actions.

Biological Resources

Sensitive Species. Herbicide treatments would have potential to impact sensitive species; however, the BLM, Air Force, and other agencies' survey and monitoring programs would continue to be implemented under the Proposed Action and would minimize any potential cumulative impacts.

Vegetation. All treatments could have short-term adverse impacts to non-target desirable vegetation; however, treatments that remove or control invasive vegetation would benefit native vegetation by reducing competition with invasive species. Over the long term, control of cheatgrass and other fire-adapted species on Air Force, BLM, and other lands would benefit the health of plant communities throughout the region and also reduce the occurrence of large, wildfires across the western US.

Wildlife. Some wildlife may be exposed to herbicides as a result of treatments though the three new herbicides and PFD7 are of lower risk to wildlife than some of the currently approved herbicides. Treatments that improve habitat on Air Force, BLM, and other lands would provide long-term benefits to wildlife by restoring wildlife habitat and reducing the risk of catastrophic wildfire. Treatments that control populations of nonnative species would also be expected to benefit most wildlife over the long term by aiding in the reestablishment of native vegetation.

Soils

Herbicide use could impact soil biota and productivity, although it is unclear to what degree these effects would be irreversible or irretrievable. It is expected that soil functions would eventually return with the establishment of native vegetation and a reduced risk of wildfire and that there would be no cumulative consequences.

Hazardous Materials/Wastes

There would be no significant changes to the quantities of hazardous wastes stored or generated at MHAFB, and any additional waste generation or handling areas that are established due to the

Proposed Action would be managed in accordance with the installation's Hazardous Waste Management Plan. Cumulative impacts as a result of the Proposed Action in conjunction with past, present, and reasonably foreseeable future actions at MHAFB would not be significant.

Cultural Resources

Cumulative impacts to cultural resources would not be significant under the Proposed Action and from past, present, and reasonably foreseeable actions at MHAFB. Current range management plans that protect existing cultural resources will remain in effect throughout the duration of the Proposed Action. Compliance with Section 106 of the NHPA, including SHPO and Native American consultation to identify any known archaeological/historic resources would be accomplished prior to implementation of any action.

Health and Safety

Herbicide treatments would continue to have potential to harm workers and to a lesser degree on military lands, the public, through accidental exposures. The three new herbicides have no to low health risks under most exposure scenarios. Adverse reactions to herbicides could cause temporary minor to severe discomfort to sensitive individuals. No adverse effects are known to be caused by PFD7 in humans. Additionally, the Cumulative Effects from Substances with a Common Mechanism of Toxicity Section 408(b)(2)(D)(v) of Federal Food, Drug, and Cosmetic Act requires that, when considering whether to establish, modify, or revoke a tolerance exemption, the USEPA consider the cumulative effects of a particular pesticide's residues and other substances that have a common mechanism of toxicity. The USEPA has not found PFD7 to share a common mechanism of toxicity with other substances. PFD7 does not appear to be toxic to humans via dietary, dermal, and pulmonary exposure. For the purposes of the tolerance action, therefore, the USEPA has assumed that PFD7 does not have a common mechanism of toxicity with other substances.

Plans and programs implemented by the Air Force to manage risks to human health and personnel safety would continue to minimize those risks during the execution of the Proposed Action and in conjunction with past, present, or reasonably foreseeable actions.

5.2 Relationship of the Short-Term Use of the Environment and Long-Term Productivity

CEQ regulations (Section 1502.16) specify that analysis must address "...the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity." Attention should be given to impacts that narrow the range of beneficial uses of the environment in the long term or pose a long-term risk to human health or safety. This section evaluates the short-term benefits of the Proposed Action compared to the long-term productivity derived from not pursuing the Proposed Action.

Short-term effects to the environment are generally defined as a direct consequence of a project in its immediate vicinity. For example, short-term effects could include localized disruptions from application of the herbicide. Environmental commitments, BMPs, and SOPs in place should reduce potential impacts or disruptions. Under the Proposed Action, these short-term uses would have a negligible cumulative effect.

The proposed project would not significantly impact the long-term productivity of the land. The Proposed Action through treatments that control populations of nonnative species may improve habitat and reduce the risk of catastrophic wildfire. No negative cumulative effects to long-term productivity or uses are anticipated.

5.3 Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the uses of these resources have on future generations. Irreversible effects result primarily from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable timeframe. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action.

Impacts anticipated from the Proposed Action are short-term and temporary (such as air emissions from vehicles during application). None of the activities associated with the Proposed Action would be expected to significantly decrease the availability of minerals or petroleum resources or have cumulative environmental consequences.

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Chapter 6

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Chapter 7

References

7.0 REFERENCES

- Air Force. 2011. Environmental Assessment for Addressing the Privatization of Military Family Housing at Mountain Home Air Force Base, Idaho. Final Report. Prepared by HDR, Inc. October.
- Air Force. 2014. Environmental Assessment for A-29 Light Air Support (LAS) Training Beddown. Final Report. August.
- Air Force. 2016a. Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide - Fundamentals. Air Force Civil Engineer Center, Lackland Air Force Base, Texas. March.
- Air Force. 2016b. Air Quality Environmental Impact Analysis Process (EIAP) Guide Volume II – Advanced Assessments Fundamentals Volume 1 of 2. Air Force Civil Engineer Center, Lackland Air Force Base, Texas. August.
- AirNav, LLC. 2016. KMUO: Mountain Home Air Force Base, Mountain Home, Idaho, USA. <<https://www.airnav.com/airport/KMUO>>. Accessed 25 January 2017.
- Amundson, R. 2015. Cheatgrass Control Efforts Completed by the Wyoming Game and Fish Department 2000 – 2014. <https://wgfd.wyo.gov/WGFD/media/content/PDF/Habitat/Habitat%20Information/Invasive%20Species/Final_Cheatgrass-White-paper.pdf>. Accessed 3 January 2017.
- Bailey, R. 1995. Ecosystems of the world. Rocky Mountain Research Station US Forest Service. <<http://www.fs.fed.us/land/ecosysgmt/>>. Accessed 7 December 2016.
- Baun, C. 2016. Conservation Branch Manager, Environmental Management Office. Personal communication concerning results of *Pseudomonas fluorescens* treatment at Idaho Army National Guard Orchard Combat Training Center. 22 December.
- Belnap, J., J. Hilty Kaltenecker, R. Rosentreter, J. Williams, S. Leonard, and D. Eldridge. 2001. Biological Soil Crusts: Ecology and Management. Bureau of Land Management National Science and Technology Center Technical Reference 1730-2 2001.
- BLM. 2001. Idaho BLM Information Memorandum #050.
- BLM. 2007. Final Programmatic Environmental Impact Statement for Vegetation Treatments using Herbicides on Bureau of Land Management Lands in 17 Western States. Bureau of Land Management Rangeland, Soils, Water, and Air Group, Washington, DC.
- BLM. 2015a. Fire Perimeters Historic 1878-2015 (Polygon), GIS Data. <<http://cloud.insideidaho.org/index.html>>. Accessed on 8 February 2017.
- BLM. 2015b. Instruction Bulletin No. ID-IB-2016-003, BLM – Idaho Special Status Animal Species: October 2015. Bureau of Land Management, Idaho.
- BLM. 2016a. Final Programmatic Environmental Impact Statement for Vegetation Treatments using Aminopyralid, Fluroxypyr, and Rimsulfuron on Bureau of Land Management Lands in 17 Western States. Bureau of Land Management Forest, Rangeland, Riparian, and Plant Conservation Division, Washington, DC.
- BLM. 2016b. Instruction Bulletin No. ID-IB-2016-017, BLM – Idaho Special Status Plant List – Final: 12 August. Bureau of Land Management, Idaho.

- BLM. 2017. Instruction Memorandum No. IM 2017-078 – Instructions for Implementing the Final Programmatic Environmental Impact Statement Using Aminopyralid, Fluroxypyr, and Rimsulfuron on the Bureau of Land Management Lands in 17 Western States. Bureau of Land Management, Washington, DC. May.
- Burkett, D. 2016. Cheatgrass – Invasive Scourge of Western Military Training Lands. Natural Selections, DoD Natural Resources Program. Fall 2016. <<https://www.fedcenter.gov/admin/itemattachment.cfm?attachmentid=1045>>. Accessed 22 December 2016.
- Carpenter, A.T., and T.A. Murray. 1999. Element Stewardship Abstract for *Bromus tectorum*. <<http://www.invasive.org/weedcd/pdfs/tncweeds/bromtec.pdf>>. Accessed 5 January 2017.
- CH2MHILL. 2007. Mountain Home Air Force Base Wetland Determination and Request for Jurisdictional Determination. Prepared for US Army Corps of Engineers, on behalf of US Air Force Environmental Management, 366 CES/CEVA Mountain Home Air Force Base, Idaho.
- CH2MHILL. 2013. Adaptive Management Monitoring. Prepared for United States Air Force Environmental Management 3366 CES/CEIE, Mountain Home Air Force Base. Idaho.
- Department of Energy. 2017. *Pseudomonas fluorescens* Pf0-1. DOE Joint Genome Institute Portal. <<http://genome.jgi.doe.gov/psefl/psefl.home.html>>. Accessed 5 August 2017.
- DiTomaso, J.M. 2000. Invasive Weeds in Rangelands: Species, Impacts, and Management. Weed Science, Vol. 48, No. 2, pp. 255-265.
- Ehlert, K.A, J.M. Mangold, and R.E. Engel. 2014. Integrating the Herbicide Imazapic and the Fungal Pathogen *Pyrenophora semeniperda* to Control *Bromus tectorum*. Weed Research.
- Elmore County. 2017. Elmore County Comprehensive Plan. Adopted 2015, amended 2017. <<http://www.elmorecounty.org/Land%20Use/comp-plan2014.html>>. Accessed 1 August 2017.
- Espeland, E., and R. Kilian. 2015. Low-Dose Glyphosate Does Not Control Annual Bromes in the Northern Great Plains. Invasive Plant Science and Management, Vol. 8, No. 3, pp. 334-340.
- FEMA. 2014. FEMA National Flood Insurance Program. National Flood Hazard Layer ID number NFHL_16_20161208. <<https://msc.fema.gov/portal/availabilitySearch?addcommunity=160212&communityName=ELMORE%20COUNTY%20UNINCORPORATED%20AREAS#searchresultsanchor>>. Accessed 13 February 2017.
- Fishhound. 2017. C.J. Strike Reservoir, ID Fishing Report. <<http://fishhound.scout.com/fishing-reports/cj-strike-reservoir-id>>. Accessed 15 July 2017.
- Governor's Office of Species Conservation. 2017. Listed Species in Idaho. <https://species.idaho.gov/thr_endgr.html>. Accessed 25 January 2017.
- Gurusiddaiah, S, D.R. Gealy, A.C. Kennedy, and A.G. Ogg, Jr. 1994. Isolation and Characterization of Metabolites from *Pseudomonas fluorescens* – D7 for Control of Downy Brome (*Bromus tectorum*). Weed Science, Vol. 42, No. 3, pp. 492-501.

- Heap, I. 2016. The international survey of herbicide resistant weeds. <<http://weedsociety.org/default.aspx>>. Accessed 22 December 2016.
- Idaho Power Company. 2006. C.J. Strike Wildlife Management Area Brochure.
- IDEQ. 2017. Mountain Home Air Force Base and Strike Dam Recreational Center Drinking Water Quality Consumer Confidence Report (CCR) for 2016 Reporting Period. IDEQ Drinking Water Program.
- IDFG. 2017. Idaho State Wildlife Action Plan. <<https://idfg.idaho.gov/swap>>. Accessed 15 July 2017.
- IDFG. 2017b. Wildlife Management Areas: C.J. Strike Reservoir. <<https://idfg.idaho.gov/visit/wildlife-management-areas>>. Accessed 15 July 2017.
- IDFG. n.d. C.J. Strike Reservoir Wildlife Management Area. <<https://fishandgame.idaho.gov/ifwis/ibt/site.aspx?id=70>>. Accessed 15 July 2017.
- ISDA. 2016. Invasive Species/Terrestrial Plants. <<http://invasivespecies.idaho.gov/terrestrial-plants>>. Accessed 28 December 2017.
- Kaweck, M. and K. Launchbaugh. Effectiveness Vegetation Monitoring Mountain Home AFB. University of Idaho Rangeland Center. INRMP Appendix 4.
- Keeley, J.E. and T.W. McGinnis. 2007. Impact of Prescribed Fire and Other Factors on Cheatgrass Persistence in a Sierra Nevada Ponderosa Pine Forest. *International Journal of Wildland Fire*, Vol. 16, pp. 96-106.
- Kennedy, A.C., B.N. Johnson, and T.L. Stubbs. 2001. Host Range of a Deleterious Rhizobacterium for Biological Control of Downy Brome. *Weed Science*, Vol. 49, No. 6, pp. 792-797.
- Kennedy, A.C., J.C. Hansen, T.L. Stubbs, and R.E. Schultheis. 2013. Weed-Suppressive Bacteria in Rangeland Restoration. Land Management and Water Conservation Research Unit, USDA-ARS; Dept. of Crop and Soil Sciences, WSU.
- Kennedy, A.C., T.L. Stubbs, and J.C. Hansen. 2015. Survival of a Rifampicin-Resistant *Pseudomonas fluorescens* Strain in Nine Mollisols. *Applied and Environmental Soil Science* Volume 2014 (2014), Article ID 306348.
- Mack, R. 1981. Invasion of *Bromus tectorum* L. into Western North America: An Ecological Chronicle. *Agro-Ecosystems*, Vol. 7, No. 2, pp. 145-165.
- Mangold, J, H. Parkinson, C. Duncan, P. Rice, E. Davis, and F. Menalled. 2013. Downy Brome (*Bromus tectorum*) Control with Imazapic on Montana Grasslands. *Invasive Plant Science and Management*, Vol. 6, No. 4, pp. 554-558.
- McGrath, C.L., A.J. Woods, J.M. Omernik, S.A. Bryce, M. Edmondson, J.A. Nesser, J. Shelden, R.C. Crawford, J.A. Comstock, and M.D. Plocher. 2002. Ecoregions of Idaho (Color Poster with Map, Descriptive Text, Summary Tables, and Photographs): Reston, Virginia, US Geological Survey (map scale 1:1,350,000).
- Merrill, K.T. 2010. Apparent Competition with *Bromus tectorum* through *Pyrenophora semeniperda* Reduces Establishment of Native Grasses. Brigham and Young University. All Theses and Dissertations. Paper 2956.

- Meyer, S., D. Nelson, S. Clement, and J. Beckstead. 2008. Cheatgrass (*Bromus tectorum*) Biocontrol Using Indigenous Fungal Pathogens. <https://www.fs.fed.us/rm/pubs/rmrs_p052/rmrs_p052_061_067.pdf>. Accessed 5 January 2017.
- MHAFB. 1999. Final Rare Plant Management Plan, Davis' Peppergrass, Small Arms Range and Mountain Home Air Force Base. Contract Number: DACA63-97-P-0878.
- MHAFB. 2000. Environmental Assessment Saylor Creek Air Force Range Exclusive Use Area Cheatgrass Reduction Plan Implementation. Mountain Home Air Force Base, Idaho.
- MHAFB. 2002. Final Survey and Mapping Report for Slickspot Peppergrass Habitat and Slickspot Peppergrass at Juniper Butte Range.
- MHAFB. 2003. Slickspot Peppergrass (*Lepidium papilliferum*) Survey, Enhanced Training in Idaho, Juniper Butte Range and Saylor Creek Range. Prepared for the U.S. Air Force Environmental Management 366 CES/CEVA, Mountain Home Air Force Base. Prepared by CH2MHILL.
- MHAFB. 2004. Final Integrated Natural Resources Management Plan for Mountain Home Air Force Base, Small Arms Range, Saylor Creek Range, Juniper Butte Range, and Mountain Home Training Range Complex Sites. Prepared by CH2MHILL, Boise, Idaho. January.
- MHAFB. 2006. Wildlife Data Summary Report for Mountain Home Air Force Base and Mountain Home Range Complex. US Air Force, Mountain Home Air Force Base, Idaho.
- MHAFB. 2007a. Burrowing Owl Banding Activities Technical Memorandum. Mountain Home Air Force Base and Mountain Home Range Complex. US Air Force, Mountain Home Air Force Base, ID.
- MHAFB. 2007b. Wildlife Survey Report, Mountain Home Air Force Base, Idaho.
- MHAFB. 2011. Final Draft Mountain Home Air Force Base Idaho Integrated Cultural Resources Management Plan.
- MHAFB. 2012a. 366 FW Plan 3211-12, Installation Pest Management Plan. Mountain Home Air Force Base, Idaho.
- MHAFB. 2012b. Integrated Natural Resources Management Plan for Mountain Home, Small Arms Range, SCR, JBR, and MHRC sites. Mountain Home Air Force Base, Idaho.
- MHAFB. 2015. 2015 Noxious Weed Survey and Spray Book. 366 CES/CEAN - DSN 728-6351.
- MHAFB. 2016a. 2016 Noxious Weed Survey and Spray Book. 366 CES/CEAN - DSN 728-6351.
- MHAFB. 2017a. Hazardous Waste Management Plan. June.
- MHAFB. 2017b. Integrated Contingency Plan (ICP) for Oil Spill Prevention and Emergency Response. January.
- Noss, R.F., E.T. LaRoe, III, and J.M. Scott. 1995. Endangered Ecosystems of the United States: A Preliminary Assessment of Loss and Degradation. Reed F. Noss Lab at the University of Central Florida. <<http://noss.cos.ucf.edu/papers/Noss%20et%20al%201995.pdf>>. Accessed 7 December 2016.

- Owyhee County. 2010. Owyhee County Comprehensive Plan. Adopted 2004, amended 2010. <<http://owyheecounty.net/departments/community-development>>. Accessed 1 July 2017.
- Paschke, M.W. 2005. Integrated Control and Assessment of Knapweed and Cheatgrass on DoD Installations. Colorado State University Department of Rangeland Ecosystem Science, Fort Collins, Colorado.
- Pellant, M., J. Kaltenecker, and S. Jirik. 1999. Use of OUST Herbicide to Control Cheatgrass in the Northern Great Basin. In: USDA Forest Service Proceedings RMRS pp. 322 – 326. Accessed 2 January 2017.
- Rinella M.J., R.A. Masters, and S.E. Bellows. 2013. Effects of Growth Regulator Herbicide on Downy Brome (*Bromus tectorum*) Seed Production. Invasive Plant Science and Management, Vol. 6, No. 1, pp. 60-64.
- Robertson, S.B. 2011. Statement of Need for Aerial Dispersal of Herbicide for Saylor Creek Range. Command Entomologist, HQ ACC/A700. Langley Air Force Base, Virginia.
- Rosentreter, R., M. Bowker, J. Belnap. 2007. A Field Guide to Biological Soil Crusts of Western U.S. Drylands. US Government Printing Office, Denver, Colorado.
- SAIC. 1990. Rare Plant Surveys on MHAFB and the Small Arms Range. Prepared for MHAFB by Science Applications International Corporation.
- Sleeter, B.M., C.E. Soulard, T.S. Wilson, and D.G. Sorenson. 2012. Status and Trends of Land Change in the Western United States—1973 to 2000. Edited by Benjamin M. Sleeter, Tamara S. Wilson, and William Acevedo. US Geological Survey Professional Paper 1794–A.
- Sperling's. 2017. Mountain Home AFB, Idaho, Climate. <http://www.bestplaces.net/climate/city/idaho/mountain_home_afb>. Accessed 10 August 2017.
- St. John, L. and D.G. Ogle. Plant Guide for Slickspot Peppergrass (*Lepidium papilliferum*). USDA Natural Resources Conservation Service, Plant Materials Center, Aberdeen, Idaho.
- Stubbs T.L. and A.C. Kennedy. 2012. Chapter 8: Microbial Weed Control and Microbial Herbicides, Herbicides. In: Environmental Impact Studies and Management Approaches, Dr. Ruben Alvarez-Fernandez (Ed.), ISBN: 978-953-307-892-2.
- Tranel, P.J., D.R. Gealy, and A.C. Kennedy. 1993. Inhibition of Downy Brome (*Bromus tectorum*) Root Growth by a Phytotoxin from *Pseudomonas fluorescens* Strain D7. Weed Technology, Vol. 7, No. 1, pp 134-139.
- Tu, M., C. Hurd, and J. Randall. 2001. Weed Control Methods Handbook: Tools and Techniques for Use in Natural Areas. The Nature Conservancy. <<http://www.invasive.org/gist/products/handbook/methods-handbook.pdf>>. Accessed 29 December 2016.
- USDA NRCS. 2016. *Bromus tectorum*. Plants Database. <<http://plants.usda.gov/core/profile?symbol=BRTE>>. Accessed 22 December 2016.
- USDA NRCS. 2017 Web Soil Survey. <<https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>>. Accessed 6 July 2017.

- USEPA. 2008a. PCBs—Basic Information. <<http://www.epa.gov/wastes/hazard/tsd/pcbs/pubs/about.htm>>. Accessed 15 June 2015.
- USEPA. 2008b. Registration Eligibility Decision, Sulfometuron methyl. List D, Case No. 3136.
- USEPA. 2014a. Biopesticide Registration Action Document, *Pseudomonas Fluorescens* strain D7. Pesticide Chemical (PC) Code: 016418. US Environmental Protection Agency Office of Pesticide Programs, Biopesticide and Pollution Prevention Division.
- USEPA. 2014b. *Pseudomonas Fluorescens* strain D7; Exemption from the Requirement of a Tolerance; Final Rule. Federal Register 79 (195): 60748-60750.
- USEPA. 2017a. Green Book: Ohio Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants. <https://www3.epa.gov/airquality/greenbook/anayo_oh.html>. Accessed 9 August 2017.
- USEPA. 2017b. Radon: Where You Live. <<https://www.epa.gov/radon/find-information-about-local-radon-zones-and-state-contact-information#radonmap>>. Accessed 14 August 2017.
- USEPA. 2017c. Sole Source Aquifer Program. Region 10: the Pacific Northwest. <<https://yosemite.epa.gov/r10/water.nsf/Sole+Source+Aquifers/SSA/>>. Accessed 2 January 2017.
- USFWS 2017a. ECOS Environmental Conservation Online System, Slickspot Peppergrass (*Lepidium papilliferum*). <<https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=Q34X>>. Accessed 27 February 2017.
- USFWS 2017b. ECOS Environmental Conservation Online System, Snake River Physa snail (*Physa natrica*). <<https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=G01L>>. Accessed 27 February 2017.
- USFWS 2017c. IPaC Information for Planning and Conservation. <<https://ecos.fws.gov/ipac/location/index>>. Accessed 27 February 2017.
- USFWS. 2010. Biological Opinion on the Effects of US Air Forces Ongoing Actions at Juniper Butte Range and in Owyhee County, Idaho on the Slickspot Peppergrass (*Lepidium papilliferum*). Idaho Fish and Wildlife Office, Boise, Idaho.
- USFWS. 2011a. Birds of Management Concern and Focal Species. USFWS Migratory Bird Program. <<https://www.fws.gov/birds/management/managed-species/birds-of-management-concern.php>>. Accessed 2 January 2017.
- USFWS. 2011b. Recovery Outline for *Lepidium papilliferum* (Slickspot Peppergrass). Portland, Oregon.
- USFWS. 2014a. Fairy Shrimp Inventory Technical Memorandum. Mid-Columbia River National Wildlife Refuge Complex, US Fish and Wildlife Service, Burbank, Washington.
- USFWS. 2014b. Why Care about America's Sage Brush? Region 6. <https://www.fws.gov/mountain-prairie/factsheets/Sage-steppe_022814.pdf>. Accessed 13 December 2016.
- USFWS. 2016. Endangered and Threatened Wildlife and Plants; Threatened Status for *Lepidium papilliferum* (Slickspot Peppergrass) Throughout Its Range; Final Rule. Federal Register 81 (159): 55058-55084.

- USGS. 2014. Groundwater Level and Nitrate Concentration Trends on Mountain Home Air Force Base, Southwestern Idaho. Open File Report 2014-1022.
- USGS. 2005. Surgeon General Releases National Health Advisory on Radon. United States Department of Health and Human Services. January.
- Vallentine, J.F. and A.R. Stevens. 1994. Use of Livestock to Control Cheatgrass--A Review. In: Monsen, Stephen B.; Kitchen, Stanley G., compilers. Proceedings--ecology and management of annual rangelands; 18-22 May 1992; Boise, Idaho. Gen. Tech. Rep. INT-GTR-313. Ogden, Utah: USDA, Forest Service, Intermountain Research Station: 202-206. [24281]
- Verdesian Life Science. 2016. *Pseudomonas fluorescens* Strain D7 Specimen Label.
- Warwick, S.I., C.A. Sauder, and H.J. Beckie. 2010. Acetolactate Synthase (ALS) Target-Site Mutations in ALS Inhibitor-Resistant Russian Thistle (*Salsola tragus*). *Weed Science*, Vol. 58, No. 3, pp. 244-251.
- Washington Department of Transportation. 2006. Sulfometuron-methyl Roadside Vegetation Management Herbicide Fact Sheet.
- Weitze, K.J., M. Prior, and M.D. Wurtz. 2009. Mountain Home Air Force Base Cold War-Era Historic Property Survey. Geo-Marine, Inc., Plano, Texas.
- Whisenant, S.G. 1989. Changing Fire Frequencies on Idaho's Snake River Plains: Ecological Management Implications. Presented at the Symposium on Cheatgrass Invasion, Shrub Die-Off, and Other Aspects of Shrub Biology and Management, Las Vegas, Nevada. 5-7 April 1989.
- Wisdom, M.J., and M.M. Rowland. 2007. Science Findings: Sagebrush in Western North America, Habitats and Species in Jeopardy. Pacific Northwest Research Station. <<http://www.fs.fed.us/pnw/science/scifi91.pdf>>. Accessed 6 December 2016.
- Zouhar, K. 2003. *Bromus tectorum*. In: Fire Effects Information System, USDA, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). <<http://www.fs.fed.us/database/feis/plants/graminoid/brotec/all.html>>. Accessed 13 December 2016.

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Appendix A

Bureau of Land Management-Approved Herbicides

APPENDIX A: Bureau of Land Management-Approved Herbicides

<i>Herbicides Formulations Approved for Use on Lands The BLM Administers in the 17 Western States</i>
Update: January 6, 2017
Restrictions associated with existing Environmental Impact Statements and individual Environmental Assessments (EA), particularly in Oregon, at the present time, may restrict the use of individual herbicide active ingredients allowed for a particular project within that state. Refer to current EAs prior to selecting the active ingredient(s) and subsequent formulation(s).
Refer to the complete label prior to considering the use of any herbicide formulation. Just because it has a Federal registration, it may not be registered in a particular State, for example California. Label changes can also impact the intended use through, such things as, creation or elimination of Special Local Need (SLN) or 24 (C) registrations, changes in application sites, rates and timing of application, county restrictions, etc.

ACTIVE INGREDIENT	TRADE NAME	MANUFACTURER	EPA REG. NUMBER
Aminopyralid	Milestone	Dow AgroSciences	62719-519
Aminopyralid + 2,4-D	ForeFront HL	Dow AgroSciences	62719-630
	GrazonNext HL	Dow AgroSciences	62719-628
Aminopyralid + Clopyralid	Sendero	Dow AgroSciences	62719-645
Aminopyralid + Metsulfuron Methyl	Chaparral	Dow AgroSciences	62719-597
	Opensight	Dow AgroSciences	62719-597
Aminopyralid + Triclopyr	Capstone	Dow AgroSciences	62719-572
Bromacil	Bromacil 80DF	Alligare, LLC	81927-4
	Bromacil 80WG	Alligare, LLC	81927-4
	Ceannard Bromacil 80DF	Ceannard, Inc.	58035-19
	Hyvar X	Bayer Environmental Science	432-1546
	Hyvar X	DuPont Crop Protection	352-287
	Hyvar X-L	Bayer Environmental Science	432-1548
	Hyvar X-L	DuPont Crop Protection	352-346
Bromacil + Diuron	Bromacil/Diuron 40/40	Alligare, LLC	81927-3
	Ceannard Diuron/Bromacil 80DF	Ceannard, Inc.	58035-18
	DiBro 2+2	Nufarm Americas Inc.	228-227
	DiBro 4+2	Nufarm Americas Inc.	228-386
	DiBro 4+4	Nufarm Americas Inc.	228-235
Bromacil + Diuron - cont.	Krovar I DF	Bayer Environmental Science	432-1551
	Krovar I DF	DuPont Crop Protection	352-505
	Weed Blast 4G	SSI Maxim Co., Inc.	34913-19

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ACTIVE INGREDIENT	TRADE NAME	MANUFACTURER	EPA REG. NUMBER
	Weed Blast Res. Weed Cont.	Loveland Products, Inc.	34704-576
Chlorsulfuron	Alligare Chlorsulfuron	Alligare, LLC	81927-43
	Chlorsulfuron 75	Alligare, LLC	81927-43
	Chlorsulfuron E-Pro 75 WDG	Nufarm Americas Inc.	79676-72
	Nufarm Chlorsulf SPC 75 WDG Herbicide	Nufarm Americas Inc.	228-672
	Telar DF	DuPont Crop Protection	352-522
	Telar XP	Bayer Environmental Science	432-1561
	Telar XP	DuPont Crop Protection	352-654
Clopyralid	CleanSlate	Nufarm Americas Inc.	228-491
	Clopyralid 3	Alligare, LLC	42750-94-81927
	Clopyralid 3	Alligare, LLC	81927-14
	Pyramid R&P	Albaugh, Inc.	42750-94
	Reclaim	Dow AgroSciences	62719-83
	Spur	Albaugh, Inc.	42750-89
	Stinger	Dow AgroSciences	62719-73
	Transline	Dow AgroSciences	62719-259
Clopyralid + 2,4-D	Cody Herbicide	Alligare, LLC	81927-28
	Commando	Albaugh, Inc.	42750-92
	Curtail	Dow AgroSciences	62719-48
	Cutback	Nufarm Americas Inc.	71368-72
2,4-D	2,4-D 4# Amine Weed Killer	UAP-Platte Chem. Co.	34704-120
	2,4-D Amine	Helena Chemical Company	5905-72
	2,4-D Amine	Setre (Helena)	5905-72
	2,4-D Amine 4	Albaugh, Inc./Agri Star	42750-19
	2,4-D Amine 4	Helena Chemical Company	42750-19-5905
	2,4-D LV 4	Albaugh, Inc./Agri Star	42750-15
	2,4-D LV4	Setre (Helena)	5905-90
2,4-D - cont.	2,4-D LV 6	Albaugh, Inc./Agri Star	42750-20
	2,4-D LV6	Helena Chemical Company	4275-20-5905
	2,4-D LV6	Setre (Helena)	5905-93
	2,4-D LV 6 Ester	Nufarm Americas Inc.	228-95
	Agrisolution 2,4-D Amine 4	Agriliance, LLC	1381-103
	Agrisolution 2,4-D Amine 4	Winflied Solutions, LLC	1381-103
	Agrisolution 2,4-D LV4	Agriliance, LLC	1381-102
	Agrisolution 2,4-D LV4	Winflied Solutions, LLC	1381-102
Agrisolution 2,4-D LV6	Agriliance, LLC	1381-101	

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ACTIVE INGREDIENT	TRADE NAME	MANUFACTURER	EPA REG. NUMBER
	Agrisolution 2,4-D LV6	Winfield Solutions, LLC	1381-101
	Alligare 2,4-D Amine	Alligare, LLC	81927-38
	Alligare 2,4-D LV 6	Alligare, LLC	81927-39
	Amine 4	Wilbur-Ellis Co.	2935-512
	Aqua-Kleen	Nufarm Americas Inc.	228-378
	Aqua-Kleen	Nufarm Americas Inc.	71368-4
	Barrage HF	Helena Chemical Company	5905-529
	Barrage LV Ester	Setre (Helena)	5905-504
	Base Camp Amine 4	Wilbur-Ellis Co.	71368-1-2935
	Base Camp LV6	Wilbur-Ellis Co.	2935-553
	Broadrange 55	Wilbur-Ellis Co.	2217-813-2935
	Clean Amine	Loveland Products, Inc.	34704-120
	Clean Crop Amine 4	UAP-Platte Chem. Co.	34704-5 CA
	Clean Crop Low Vol 6 Ester	UAP-Platte Chem. Co.	34704-125
	Clean Crop LV-4 ES	UAP-Platte Chem. Co.	34704-124
	Cornbelt 4 lb. Amine	Van Diest Supply Co.	11773-2
	Cornbelt 4# LoVol Ester	Van Diest Supply Co.	11773-3
	Cornbelt 6# LoVol Ester	Van Diest Supply Co.	11773-4
	D-638	Albaugh, Inc./Agri Star	42750-36
	De-Amine 4	Drexel Chemical Company	19713-650
	De-Amine 6	Drexel Chemical Company	19713-651
	De-Ester LV4	Drexel Chemical Company	19713-345
	De-Ester LV6	Drexel Chemical Company	19713-655
2,4-D - cont.	Esteron 99C	Nufarm Americas Inc.	62719-9-71368
	Five Star	Albaugh, Inc./Agri Star	42750-49
	Formula 40	Nufarm Americas Inc.	228-357
	HardBall	Helena Chemical Company	5905-549
	Hi-Dep	PBI/Gordon Corporation	2217-703
	Lo Vol-4	Wilbur-Ellis Co.	228-139-2935
	Low Vol 4 Ester Weed Killer	Loveland Products, Inc.	34704-124
	Lo Vol-6 Ester	Wilbur-Ellis Co.	228-95-2935
	Low Vol 6 Ester Weed Killer	Loveland Products, Inc.	34704-125
	Opti-Amine	Helena Chemical Company	5905-501
	Phenoxy 088	Winfield Solutions, LLC	42750-36-9779
	Platoon	Nufarm Americas Inc.	228-145
	Rugged	Winfield Solutions, LLC	1381-247
	Saber	Loveland Products, Inc.	34704-803
	Salvo	Loveland Products, Inc.	34704-609
	Salvo LV Ester	UAP-Platte Chem. Co.	34704-609

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ACTIVE INGREDIENT	TRADE NAME	MANUFACTURER	EPA REG. NUMBER
	Savage DS	Loveland Products, Inc.	34704-606
	Savage DS	UAP-Platte Chem. Co.	34704-606
	Shredder 2,4-D LV4	Winfield Solutions, LLC	1381-102
	Shredder Amine 4	Winfield Solutions, LLC	1381-103
	Shredder E-99	Winfield Solutions, LLC	1381-195
	Solution Water Soluble	Nufarm Americas Inc.	228-260
	Solve 2,4-D	Albaugh, Inc./Agri Star	42750-22
	Unison	Helena Chemical Company	5905-542
	Weedar 64	Nufarm Americas Inc.	71368-1
	WEEDestroy AM-40	Nufarm Americas Inc.	228-145
	Weedone LV-4	Nufarm Americas Inc.	228-139-71368
	Weedone LV-4 Solventless	Nufarm Americas Inc.	71368-14
	Weedone LV-6	Nufarm Americas Inc.	71368-11
2,4-D - cont.	Whiteout 2,4-D	Loveland Products, Inc.	34704-1032
Dicamba	Banvel	Arysta LifeScience N.A. Corp.	66330-276
	Banvel	Micro Flo Company	51036-289
	Clarity	BASF Corporation	7969-137
	Cruise Control	Alligare, LLC	42750-40-81927
	Diablo	Nufarm Americas Inc.	228-379
	Dicamba DMA	Albaugh, Inc./Agri Star	42750-40
	Kam-Ba	Drexel Chemical Company	19713-624
	Rifle	Loveland Products, Inc.	34704-861
	Sterling Blue	Winfield Solutions, LLC	7969-137-1381
	Vanquish	Syngenta Professional Products	100-884
	Vanquish Herbicide	Nufarm Americas Inc.	228-397
	Vision	Albaugh, Inc.	42750-98
	Vision	Helena Chemical Company	5905-576
Dicamba + 2,4-D	Brash	Winfield Solutions, LLC	1381-202
	Brush-Rhap	Helena Chemical Company	5905-568
	Dicamba + 2,4-D DMA	Alligare, LLC	81927-42
	KambaMaster	Nufarm Americas Inc.	71368-34
	Latigo	Helena Chemical Company	5905-564
	Outlaw	Helena Chemical Company	5905-574
	Range Star	Albaugh, Inc./Agri Star	42750-55
	Rifle-D	Loveland Products, Inc.	34704-869
	Weedmaster	BASF Ag. Products	7969-133
	Weedmaster	Nufarm Americas Inc.	71368-34
	Veteran 720	Nufarm Americas Inc.	228-295

ACTIVE INGREDIENT	TRADE NAME	MANUFACTURER	EPA REG. NUMBER
Dicamba + Diflufenzopyr	Distinct	BASF Corporation	7969-150
	Overdrive	BASF Corporation	7969-150
NOTE: In accordance with the Record of Decision for the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (PEIS), the aerial application of this herbicide is prohibited.			
Diquat	Alligare Diquat	Alligare, LLC	81927-35
	Diquat E-Ag 2L	Nufarm Americas Inc.	79676-75
	Diquat E-Pro 2L	Nufarm Americas Inc.	79676-75
	Diquat SPC 2 L Herbicide	Nufarm Americas Inc.	79676-75
	NuFarm Diquat SPC 2 L Herbicide	Nufarm Americas Inc.	228-675
	Reward	Syngenta Professional Products	100-1091
Diuron	Ceannard Diuron 80DF	Ceannard, Inc.	58035-16
	Direx 4L	DuPont Crop Protection	352-678
	Direx 4L	Griffin Company	1812-257
	Direx 4L	Makhteshim Agan of N. A.	66222-54
	Direx 80DF	Griffin Company	1812-362
	Diuron 4L	Alligare, LLC	81927-44
	Diuron 4L	Drexel Chemical Company	19713-36
	Diuron 4L	Loveland Products, Inc.	34704-854
	Diuron 4L	Makteshim Agan of N.A.	66222-54
	Diuron 80	Drexel Chemical Company	19713-274
	Diuron 80DF	Agriliance, LLC	9779-318
	Diuron 80DF	Alligare, LLC	81927-12
	Diuron 80DF	Winfield Solutions, LLC	9779-318
	Diuron 80 WDG	Loveland Products, Inc.	34704-648
	Diuron 80WDG	UAP-Platte Chem. Co.	34704-648
	Diuron-DF	Wilbur-Ellis Co.	00352-00-508-02935
	Karmex DF	DuPont Crop Protection	352-692
	Karmex DF	Makhteshim Agan of N. A.	66222-51
	Karmex IWC	DuPont Crop Protection	352-692
	Karmex XP	DuPont Crop Protection	352-692
	Parrot DF	Makhteshim Agan of N. A.	66222-51
Parrot 4L	Makhteshim Agan of N. A.	66222-54	
Vegetation Man. Diuron 80 DF	Vegetation Man., LLC	66222-51-74477	
Fluridone	Alligare Fluridone	Alligare, LLC	81927-45
	Avast!	SePRO Corporation	67690-30
	Fluridone 4L	Albaugh, LLC	42750-280
	Sonar AS	SePRO Corporation	67690-4

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ACTIVE INGREDIENT	TRADE NAME	MANUFACTURER	EPA REG. NUMBER
	Sonar Precision Release	SePRO Corporation	67690-12
	Sonar Q	SePRO Corporation	67690-3
	Sonar SRP	SePRO Corporation	67690-3
Fluroxypyr	Alligare Fluroxypyr	Alligare, LLC	66330-385-81927
	Comet Selective	Nufarm Americas Inc.	71368-87
	Vista XRT	Dow AgroSciences	62719-586
Fluroxypyr + Clopyralid	Truslate Selective Herbicide	Nufarm Americas Inc.	71368-86
Fluroxypyr + Picloram	Surmount	Dow AgroSciences	62719-480
	Trooper Pro	Nufarm Americas Inc.	228-599
Fluroxypyr + Triclopyr	PastureGard	Dow AgroSciences	62719-637
Fluroxypyr + 2,4-D + Dicamba	E-2 Herbicide	Nufarm Americas Inc.	228-442
Glyphosate	Accord Concentrate	Dow AgroSciences	62719-324
	Accord SP	Dow AgroSciences	62719-322
	Accord XRT	Dow AgroSciences	62719-517
	Accord XRT II	Dow AgroSciences	62719-556
	Agrisolutions Cornerstone	Winfield Solutions, LLC	1381-191
	Agrisolutions Cornerstone 5 Plus	Winfield Solutions, LLC	1381-241
	Agrisolutions Cornerstone Plus	Winfield Solutions, LLC	1381-192
	Agrisolutions Rascal	Winfield Solutions, LLC	1381-191
	Agrisolutions Rascal Plus	Winfield Solutions, LLC	1381-192
	Aqua Neat	Nufarm Americas Inc.	228-365
	Aqua Star	Albaugh, Inc./Agri Star	42750-59
	Aquamaster	Monsanto	524-343
	AquaPro Aquatic Herbicide	SePRO Corporation	62719-324-67690
Glyphosate – cont.	Buccaneer	Tenkoz	55467-10
	Buccaneer Plus	Tenkoz	55467-9
	ClearOut 41 Plus	Chem. Prod. Tech., LLC	70829-3
	Credit Xtreme	Nufarm Americas Inc.	71368-81
	Foresters	Nufarm Americas Inc.	228-381
	Forest Star	Albaugh, Inc./Agri Star	42570-61
	Four Power Plus	Loveland Products, Inc.	34704-890
	Gly Star Gold	Albaugh, Inc./Agri Star	42750-61
	Gly Star Original	Albaugh, Inc./Agri Star	42750-60

ACTIVE INGREDIENT	TRADE NAME	MANUFACTURER	EPA REG. NUMBER
	Gly Star Plus	Albaugh, Inc./Agri Star	42750-61
	Gly Star Pro	Albaugh, Inc./Agri Star	42750-61
	Gly-4	Universal Crop Protection Alliance, LLC	42750-60-72693
	Gly-4 Plus	Universal Crop Protection Alliance, LLC	72693-1
	Gly-4 Plus	Universal Crop Protection Alliance, LLC	42750-61-72693
	Glyfos	Cheminova	4787-31
	Glyfos Aquatic	Cheminova	4787-34
	Glyfos PRO	Cheminova	67760-57
	GlyphoMate 41	PBI/Gordon Corporation	2217-847
	Glyphosate 4	Vegetation Man., LLC	73220-6-74477
	Glyphosate 4 +	Alligare, LLC	81927-9
	Glyphosate 4 PLUS	Alligare, LLC	81927-9
	Glyphosate 5.4	Alligare, LLC	81927-8
	Glypro	Dow AgroSciences	62719-324
	Glypro Plus	Dow AgroSciences	62719-322
	Honcho	Monsanto	524-445
	Honcho Plus	Monsanto	524-454
	Imitator 25% Concentration	Drexel Chemical Company	19713-628
	Imitator Aquatic	Drexel Chemical Company	19713-623
	Imitator DA	Drexel Chemical Company	19713-586
Imitator Plus	Drexel Chemical Company	19713-526	
Imitator RTU	Drexel Chemical Company	19713-607	
Glyphosate – cont.	KleenUp Pro	Loveland Products, Inc.	34704-890
	Mad Dog Plus	Loveland Products, Inc.	34704-890
	Makaze	Loveland Products, Inc.	34704-890
	Mirage	Loveland Products, Inc.	34704-889
	Mirage Herbicide	UAP-Platte Chem. Co.	524-445-34704
	Mirage Plus	Loveland Products, Inc.	34704-890
	Mirage Plus Herbicide	UAP-Platte Chem. Co.	524-454-34704
	Rattler	Setre (Helena)	524-445-5905
	Razor	Nufarm Americas Inc.	228-366
	Razor Pro	Nufarm Americas Inc.	228-366
	Rodeo	Dow AgroSciences	62719-324
	Roundup Custom	Monsanto	524-343
	Roundup Original	Monsanto	524-445
	Roundup Original II	Monsanto	524-454
	Roundup Original II CA	Monsanto	524-475
	Roundup PRO	Monsanto	524-475
	Roundup PRO Concentrate	Monsanto	524-529

ACTIVE INGREDIENT	TRADE NAME	MANUFACTURER	EPA REG. NUMBER
	Roundup PRO Dry	Monsanto	524-505
	Roundup PROMAX	Monsanto	524-579
	Showdown	Helena Chemical Company	71368-25-5905
Glyphosate + 2,4-D	Campaign	Monsanto	524-351
	Imitator Plus D	Drexel Chemical Company	19713-635
	Landmaster BW	Albaugh, Inc./Agri Star	42570-62
	Landmaster BW	Monsanto	524-351
Hexazinone	Pronone 10G	Pro-Serve	33560-21
	Pronone 25G	Pro-Serve	33560-45
	Pronone MG	Pro-Serve	33560-21
	Pronone Power Pellet	Pro-Serve	33560-41
	Velossa	Helena Chemical Company	5905-579
	Velpar DF	DuPont Crop Protection	352-581
	Velpar DF VU	Bayer Environmental Science	432-1576
Hexazinone – cont.	Velpar L	DuPont Crop Protection	352-392
	Velpar L VU	Bayer Environmental Science	432-1573
Hexazinone + Sulfometuron methyl	Velpar ULW	DuPont Crop Protection	352-450
	Oustar	Bayer Environmental Science	432-1553
	Oustar	DuPont Crop Protection	352-603
	Westar	Bayer Environmental Science	432-1558
	Westar	DuPont Crop Protection	352-626
NOTE: In accordance with the Record of Decision for the <i>Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (PEIS)</i>, the aerial application of this herbicide is prohibited.			
Imazapic	Nufarm Imazapic 2SL	Nufarm Americas Inc.	71368-99
	Panoramic 2SL	Alligare, LLC	66222-141-81927
	Plateau	BASF	241-365
Imazapic +Glyphosate	Journey	BASF	241-417
Imazapyr	Arsenal	BASF	241-346
	Arsenal Applicators Conc.	BASF	241-299
	Arsenal PowerLine	BASF	241-431
	Arsenal Railroad Herbicide	BASF	241-273
	Chopper	BASF	241-296
	Ecomazapyr 2SL	Alligare, LLC	81927-22
	Ecomazapyr 2 SL	Vegetation Man., LLC	74477-6
	Habitat	BASF	241-426

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ACTIVE INGREDIENT	TRADE NAME	MANUFACTURER	EPA REG. NUMBER
	Habitat Herbicide	SePRO Corporation	241-426-67690
	Imazapyr 2 SL	Vegetation Man., LLC	74477-4
	Imazapyr 2SL	Alligare, LLC	81927-23
	Imazapyr 4 SL	Vegetation Man., LLC	74477-5
	Imazapyr 4SL	Alligare, LLC	81927-24
	Polaris	Nufarm Americas Inc.	228-534
	Polaris AC	Nufarm Americas Inc.	241-299-228
	Polaris AC	Nufarm Americas Inc.	228-480
	Polaris AC Complete	Nufarm Americas Inc.	228-570
	Polaris AQ	Nufarm Americas Inc.	241-426-228
Imazapyr – cont.	Polaris Herbicide	Nufarm Americas Inc.	241-346-228
	Polaris RR	Nufarm Americas Inc.	241-273-228
	Polaris SP	Nufarm Americas Inc.	228-536
	Polaris SP	Nufarm Americas Inc.	241-296-228
	Rotary 2 SL	Alligare, LLC	81927-6
	SSI Maxim Arsenal 0.5G	SSI Maxim Co., Inc.	34913-23
	SSI Maxim Arsenal 5.0G	SSI Maxim Co., Inc.	34913-24
	Stalker	BASF	241-398
Imazapyr + Diuron	Imazuron E-Pro	Etigra, LLC	79676-54
	Mojave 70 EG	Alligare, LLC	74477-9-81927
	Mojave 70 EG	Alligare, LLC	81927-25
	Sahara DG	BASF	241-372
	SSI Maxim Topside 2.5G	SSI Maxim Co., Inc.	34913-22
Imazapyr + Metsulfuron methyl	Lineage Clearstand	Bayer Environmental Science	432-1578
	Lineage Clearstand	DuPont Crop Protection	352-766
Imazapyr + Sulfometuron methyl + Metsulfuron methyl	Lineage HWC	Bayer Environmental Science	432-1577
	Lineage HWC	DuPont Crop Protection	352-765
	Lineage Prep	Bayer Environmental Science	432-1579
	Lineage Prep	DuPont Crop Protection	352-767
NOTE: In accordance with the Record of Decision for the <i>Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (PEIS)</i>, the aerial application of this herbicide is prohibited.			
Metsulfuron methyl	AmTide MSM 60DF Herbicide	AmTide, LLC	83851-3
	Escort DF	DuPont Crop Protection	352-439
	Escort XP	Bayer Environmental Science	432-1549

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ACTIVE INGREDIENT	TRADE NAME	MANUFACTURER	EPA REG. NUMBER
	sEscort XP	DuPont Crop Protection	352-439
	Metsulfuron Methyl DF	Vegetation Man., LLC	74477-2
	MSM 60	Alligare, LLC	81927-7
	MSM E-AG 60 EG Herbicide	Etigra, LLC	81959-14
	MSM E-Pro 60 EG Herbicide	Etigra, LLC	81959-14
	Patriot	Nufarm Americas Inc.	228-391
Metsulfuron methyl – cont.	PureStand	Nufarm Americas Inc.	71368-38
Metsulfuron methyl + Chlorsulfuron	Cimarron Plus	Bayer Environmental Science	432-1572
	Cimarron Plus	DuPont Crop Protection	352-670
	Cimarron X-tra	DuPont Crop Protection	352-669
Metsulfuron methyl + Dicamba + 2,4-D	Cimarron MAX	Bayer Environmental Science	432-1555
	Cimarron MAX	DuPont Crop Protection	352-615
Picloram	Grazon PC	Dow AgroSciences	62719-181
	OutPost 22K	Dow AgroSciences	62719-6
	Picloram 22K	Alligare, LLC	81927-18
	Picloram K	Alligare, LLC	81927-17
	Tordon 22K	Dow AgroSciences	62719-6
	Tordon K	Dow AgroSciences	62719-17
	Triumph 22K	Albaugh, Inc.	42750-79
	Triumph K	Albaugh, Inc.	42750-81
	Trooper 22K	Nufarm Americas Inc.	228-535
Picloram + 2,4-D	Graslan L	Dow AgroSciences	62719-655
	Grazon P+D	Dow AgroSciences	62719-182
	GunSlinger	Albaugh, Inc.	42750-80
	HiredHand P+D	Dow AgroSciences	62719-182
	Pathway	Dow AgroSciences	62719-31
	Picloram + D	Alligare, LLC	81927-16
	Tordon 101 R Forestry	Dow AgroSciences	62719-31
	Tordon 101 Mixture	Dow AgroSciences	62719-5
	Tordon RTU	Dow AgroSciences	62719-31
	Trooper 101	Nufarm Americas Inc.	228-561
	Trooper P + D	Nufarm Americas Inc.	228-530
Picloram + 2,4-D + Dicamba	Trooper Extra	Nufarm Americas Inc.	228-586
Rimsulfuron	Laramie 25DF	Alligare, LLC	81927-57
	Matrix SG	Dupont Crop Protection	352-768

ACTIVE INGREDIENT	TRADE NAME	MANUFACTURER	EPA REG. NUMBER
Sulfometuron methyl	Oust DF	DuPont Crop Protection	352-401
	Oust XP	Bayer Environmenatl Science	432-1552
	Oust XP	DuPont Crop Protection	352-601
	SFM 75	Alligare, LLC	81927-26
	SFM 75	Vegetation Man., LLC	72167-11-74477
	SFM E-Pro 75EG	Etigra, LLC	79676-16
	Spyder	Nufarm Americas Inc.	228-408
NOTE: In accordance with the Record of Decision for the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (PEIS), the aerial application of this herbicide is prohibited.			
Sulfometuron methyl + Chlorsulfuron	Landmark XP	Bayer Environmental Science	432-1560
	Landmark XP	DuPont Crop Protection	352-645
NOTE: In accordance with the Record of Decision for the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (PEIS), the aerial application of this herbicide is prohibited.			
Sulfometuron methyl + Metsulfuron methyl	Oust Extra	Bayer Environmental Science	432-1557
	Oust Extra	DuPont Crop Protection	352-622
	SFM Extra	Alligare, LLC	81927-5
	Spyder Extra Selective	Nefarm Americas Inc.	228-690
NOTE: In accordance with the Record of Decision for the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement (PEIS), the aerial application of this herbicide is prohibited.			
Tebuthiuron	Alligare Tebuthiuron 80 WG	Alligare, LLC	81927-37
	Alligare Tebuthiuron 20 P	Alligare, LLC	81927-41
	Spike 20P	Dow AgroSciences	62719-121
	Spike 80DF	Dow AgroSciences	62719-107
	SpraKil S-5 Granules	SSI Maxim Co., Inc.	34913-10
Tebuthiuron + Diuron	SpraKil SK-13 Granular	SSI Maxim Co., Inc.	34913-15
	SpraKil SK-26 Granular	SSI Maxim Co., Inc.	34913-16
Triclopyr	Boulder 6.3	Alligare, LLC	81927-54
	Ecotriclopyr 3 SL	Vegetation Man., LLC	72167-49-74477
	Element 3A	Dow AgroSciences	62719-37
	Element 4	Dow AgroSciences	62719-40
Triclopyr - cont.	Forestry Garlon XRT	Dow AgroSciences	62719-553
	Garlon 3A	Dow AgroSciences	62719-37
	Garlon 4	Dow AgroSciences	62719-40

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ACTIVE INGREDIENT	TRADE NAME	MANUFACTURER	EPA REG. NUMBER
	Garlon 4 Ultra	Dow AgroSciences	62719-527
	Pathfinder II	Dow AgroSciences	62719-176
	Relegate	Nufarm Americas Inc.	228-521
	Relegate RTU	Nufarm Americas Inc.	228-522
	Remedy	Dow AgroSciences	62719-70
	Remedy Ultra	Dow AgroSciences	62719-552
	Renovate 3	SePRO Corporation	62719-37-67690
	Renovate OTF	SePRO Corporation	67690-42
	Tahoe 3A	Nufarm Americas Inc.	228-384
	Tahoe 3A	Nufarm Americas Inc.	228-518
	Tahoe 3A	Nufarm Americas Inc.	228-520
	Tahoe 4E	Nufarm Americas Inc.	228-385
	Tahoe 4E Herbicide	Nufarm Americas Inc.	228-517
	Triclopyr 4	Alligare, LLC	81927-11
	Triclopyr 3	Alligare, LLC	81927-13
	Triclopyr 3 SL	Vegetation Man., LLC	72167-53-74477
	Triclopyr RTU	Albaugh, LLC	42750-173
	Triclopyr RTU	Alligare, LLC	81927-33
	Trycera	Helena Chemical Company	5905-580
	Vastlan	Dow AgroSciences	62719-687
Triclopyr + 2,4-D	Aquasweep	Nufarm Americas Inc.	228-316
	Candor	Nufarm Americas Inc.	228-565
	Crossbow	Dow AgroSciences	62719-260
	Everett	Alligare, LLC	81927-29
Triclopyr + Clopyralid	Brazen	Nufarm Americas Inc.	228-564
	Prescott Herbicide	Alligare, LLC	81927-30
	Redeem R&P	Dow AgroSciences	62719-337

Source: BLM 2017



DuPont™ Landmark® XP
herbicide



DuPont™ Landmark® XP

herbicide

Dispersible Granules

Active Ingredient	By Weight
Sulfometuron methyl {Methyl 2-[[[(4,6-dimethyl-2-pyrimidinyl)amino]-carbonyl]amino]sulfonyl]benzoate}	50%
Chlorsulfuron 2-Chloro-N-[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)aminocarbonyl]benzenesulfonamide	25%
Other Ingredients	25%
TOTAL	100%

EPA Reg. No. 352-645 EPA Est. No. _____

Nonrefillable Container

Net: _____

OR

Refillable Container

Net: _____

E. I. duPont de Nemours and Company
1007 Market Street
Wilmington, DE 19898

KEEP OUT OF REACH OF CHILDREN

CAUTION

FIRST AID

IF SWALLOWED: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first five minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

IF ON SKIN OR CLOTHING: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call poison control center or doctor for treatment advice.

Have the product container label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-441-3637 for emergency medical treatment information.

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION! Harmful if swallowed. Causes moderate eye irritation. Avoid contact with skin, eyes or clothing.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Some materials that are chemical-resistant to this product are polyethylene and polyvinylchloride. If you want more options, follow the instructions for category A on an EPA chemical-resistant category selection chart.

All mixers, loaders, applicators and other handlers must wear:

- Long-sleeved shirt and long pants.
- Shoes plus socks.
- Chemical resistant gloves made of any waterproof material such as polyethylene or polyvinyl chloride.

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

Discard clothing and other absorbent materials that have been drenched or heavily contaminated with this product's concentrate. Do not reuse them.

Engineering Control Statement: When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240 (d) (4- 6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

USER SAFETY RECOMMENDATIONS

USERS SHOULD: Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.

Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. If no such instructions for washables exist, use detergent and hot water.

ENVIRONMENTAL HAZARDS

Do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water by cleaning of equipment or disposal of equipment washwaters or rinsate.

Exposure to LANDMARK® XP can injure or kill plants. Damage to susceptible plants can occur when soil particles are blown or washed off target onto cropland.

DIRECTIONS FOR USE

It is a violation of federal law to use this product in a manner inconsistent with its labeling.

DuPont™ LANDMARK® XP must be used only in accordance with instructions on this label or separately published DuPont labeling.

DuPont will not be responsible for losses or damages resulting from the use of this product in any manner not specified by DuPont. User assumes all risks associated with such unspecified use.

Do not exceed a rate of 8.0 ounces of LANDMARK® XP per acre per year.

Do not apply more than 6.0 ounces (0.375 pounds active) active ingredient sulfometuron methyl per acre per year when using this product or any other product containing sulfometuron methyl.

Do not apply more than 3.18 ounces active ingredient (0.199 pounds active) sulfometuron methyl per acre per single application to an Agricultural site when using this product alone or in combination with any other product containing sulfometuron methyl.

Do not apply more than 4.5 ounces active ingredient (0.281 pounds active) sulfometuron methyl per acre per single application to a Non-Agricultural site when using this product alone or in combination with any other product containing sulfometuron methyl.

Do not apply more than 2.0 ounces active ingredient (0.125 pounds active) chlorsulfuron per acre per year. Do not make more than three applications of chlorsulfuron per year when using this product or any other product containing chlorsulfuron.

Do not use on food or feed crops.

Do not use on sod farms.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency in your State responsible for pesticide regulation.

PRODUCT INFORMATION

LANDMARK® XP herbicide is a dispersible granule that is mixed in water and applied as a spray.

LANDMARK® XP controls many annual and perennial grasses and broadleaf weeds in rangeland restoration and in non-crop sites. LANDMARK® XP may be used for general weed control on terrestrial non-crop sites and for selective weed control in certain types of unimproved turf grasses on these same sites. LANDMARK® XP can be tank mixed with other herbicides registered for use in non-crop sites; when tank mixing, use the most restrictive limitations from the labeling of both products.

LANDMARK® XP controls weeds by both preemergence and postemergence activity. The best results are obtained when the application is made at or before the early stages of

weed growth; before weeds develop an established root system. Moisture is required to move LANDMARK® XP into the root zone of weeds for preemergence control.

This product may be applied on terrestrial sites that contain areas of temporary surface water caused by collection of water in equipment ruts, or in other depressions created by management activities. It is permissible to treat intermittently flooded low lying areas, seasonal dry flood plains and transitional areas between upland and lowland areas when no water is present. It is also permissible to treat marshes, swamps and bogs after water has receded, as well as seasonally dry flood deltas. DO NOT make applications to natural or man-made bodies of water such as lakes, reservoirs, ponds, streams and canals.

A drift control agent may be used at the manufacturer's listed rate in the application of LANDMARK® XP.

LANDMARK® XP is noncorrosive, nonflammable, nonvolatile and does not freeze.

For best postemergence results, apply LANDMARK® XP to young, actively growing weeds. The degree and duration of control may depend on the following:

- weed spectrum and infestation intensity
- weed size at application
- environmental conditions at and following treatment
- soil pH, soil moisture, and soil organic matter

ENVIRONMENTAL CONDITIONS AND BIOLOGICAL ACTIVITY

When applied as a spray, LANDMARK® XP is absorbed by both the roots and foliage of plants, rapidly inhibiting the growth of susceptible weeds. When applied on dry fertilizer, LANDMARK® XP is absorbed primarily by the roots. Two to three weeks after application to weeds, plant growth slows, and the growing points turn reddish-purple. Within 4 to 6 weeks of application, leaf veins and leaves become discolored, and the growing points subsequently die.

Warm, moist conditions following application accelerate the herbicidal activity of LANDMARK® XP; cold, dry conditions delay the herbicidal activity. In addition, weeds hardened-off by drought stress are less susceptible to LANDMARK® XP. Moisture is needed to move LANDMARK® XP into the soil for preemergence weed control.

INVASIVE SPECIES MANAGEMENT

This product may be considered for use on public, private, and tribal lands to treat certain weed species infestations that have been determined to be invasive, consistent with the Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW) National Early Detection and Rapid Response (EDRR) System for invasive plants. Effective EDRR systems address invasions by eradicating the invader where possible, and controlling them when the invasive species is too established to be feasibly eradicated. Once an EDRR assessment has been completed and action is recommended, a Rapid Response needs to be taken to quickly contain, deny reproduction, and if possible eliminate the invader. Consult your appropriate state extension service, forest service, or regional multidisci-

plinary invasive species management coordination team to determine the appropriate Rapid Response provisions and allowed treatments in your area.

RESISTANCE

When herbicides that affect the same biological site of action are used repeatedly over several years to control the same weed species in the same field, naturally-occurring resistant biotypes may survive a correctly applied herbicide treatment, propagate, and become dominant in that field.

Adequate control of these resistant weed biotypes cannot be expected. If weed control is unsatisfactory, it may be necessary to retreat the problem area using a product affecting a different site of action.

To better manage herbicide resistance through delaying the proliferation and possible dominance of herbicide resistant weed biotypes, it may be necessary to change cultural practices within and between crop seasons such as using a combination of tillage, retreatment, tank-mix partners and/or sequential herbicide applications that have a different site of action. Weed escapes that are allowed to go to seed will promote the spread of resistant biotypes.

It is advisable to keep accurate records of pesticides applied to individual fields to help obtain information on the spread and dispersal of resistant biotypes. Consult your agricultural dealer, consultant, applicator, and/or appropriate state agricultural extension service representative for specific alternative cultural practices or herbicide recommendations available in your area.

INTEGRATED PEST MANAGEMENT

This product may be used as part of an Integrated Pest Management (IPM) program that can include biological, cultural, and genetic practices aimed at preventing economic pest damage. IPM principles and practices include field scouting or other detection methods, correct target pest identification, population monitoring, and treating when target pest populations reach locally determined action thresholds. Consult your state cooperative extension service, professional consultants or other qualified authorities to determine appropriate action treatment threshold levels for treating specific pest/crop systems in your area.

PREPARING FOR USE - Site Specific Considerations

Understanding the risks associated with the application of DuPont™ LANDMARK® XP is essential to aid in preventing off-site injury to desirable vegetation and agricultural crops. The risk of off-site movement both during and after application may be affected by a number of site specific factors such as the nature, texture and stability of the soil, the intensity and direction of prevailing winds, vegetative cover, site slope, rainfall, drainage patterns, and other local physical and environmental conditions. A careful evaluation of the potential for off-site movement from the intended application site, including movement of treated soil by wind or water erosion, must be made prior to using LANDMARK® XP. This evaluation is particularly critical

where desirable vegetation or crops are grown on neighboring land for which the use of LANDMARK® XP is not labeled. If prevailing local conditions may be expected to result in off-site movement and cause damage to neighboring desirable vegetation or agricultural crops, do not apply LANDMARK® XP.

Before applying LANDMARK® XP the user must read and understand all label directions, precautions and restrictions completely, including these requirements for a site specific evaluation. If you do not understand any of the instructions or precautions on the label, or are unable to make a site specific evaluation yourself, consult your local agricultural dealer, cooperative extension service, land managers, professional consultants, or other qualified authorities familiar with the area to be treated. If you still have questions regarding the need for site specific considerations, please call 1-888-6-DUPONT.

AGRICULTURAL USES

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 4 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

Coveralls.

Chemical resistant gloves made of any waterproof material, such as, polyethylene or polyvinylchloride.
Shoes plus socks.

RANGELAND RESTORATION WEST OF THE MISSISSIPPI RIVER

PRODUCT INFORMATION

LANDMARK® XP herbicide is a dispersible granule that is mixed in water and applied as a spray. A restoration management program that includes LANDMARK® XP herbicide may be used when rangeland has become severely infested with invasive weed species, and deteriorated to where it is no longer suitable for grazing or forage production. To reclaim these lands, the invasive weed species must first be controlled to either allow native grasses

to reestablish or to be replanted where practical with other desirable perennial grasses. The grasses must be allowed time to reestablish before grazing or forage production is resumed. A typical restoration management program will take one to two years.

In order to establish and/or release desirable, perennial grass species for rangeland restoration, DuPont™ LANDMARK® XP may be used to control the undesirable grasses and broadleaf weeds listed in the Weeds Controlled section of this label. The residual activity of LANDMARK® XP will also help prevent the reemergence of many of these weeds while desirable grasses are being reestablished.

At the higher rates, any remaining rangeland perennial grasses in the treated area may exhibit a temporary chlorosis following application of LANDMARK® XP. The use of an adjuvant with LANDMARK® XP may increase perennial grass injury.

RESTORATION PROGRAM

An effective restoration program may include one or more of the following steps (A through E):

- A. Identifying and inventorying the weed infestation and desired grass densities.
- B. Consulting and planning the entire program with personnel experienced in herbicide programs and range restoration.
- C. Making applications of LANDMARK® XP prior to soil freeze up or after spring thaw. All label instructions, precautions, and restrictions on this label or in separately published DuPont labeling must be followed.
- D. Planting grass seed as needed to improve the site, per the Grass Replant Interval section of this label.
 - Planting to obtain the highest possible grass stand establishment.
 - Planting a selected grass mixture to improve the desired stand.
 - Using a properly fitted drill to help ensure correct seed placement and depth is suggested.
 - Seeding in late fall to best ensure moisture for seed germination. Seeding in the spring has the highest risk of stand failure.
 - Consulting with a knowledgeable grass seed supplier to select the best-suited varieties for your area.
- E. Treating for second year forbs control (if necessary):
 - Treat with DuPont™ TELAR® XP (0.25 to 1 ounce per acre)+ bromoxynil (1 pint per acre). Make applications to small, early growth stage weeds.
 - 2,4-D amine or ester (0.5 to 1 pint per acre of 4 pound active ingredient product) added as a safener.

GRASS REPLANT INTERVALS

The replant intervals listed below are for soils with a pH of less than 7.5. Soils having a pH greater than 7.5 will require longer intervals. The specified intervals are for applications made in the spring. Because LANDMARK® XP

degradation is slowed by cold or frozen soils, applications made in the fall must consider the replant intervals as beginning in the spring following treatment.

Following a treatment with LANDMARK® XP at use rates up to 2.25 ounces of product per acre, the following grasses may be replanted at least 3 months after a spring application:

Brome, meadow	<i>Bromus erectus</i>
Needlegrass, green	<i>Stipa viridula</i>
Rye, Russian wild	<i>Elymus sp.</i>
Switchgrass	<i>Panicum virgatum</i>

The following grasses may be replanted at least 6 months after a spring application:

Brome, smooth	<i>Bromus inermis</i>
Fescue, alta	<i>Festuca arundinacea</i>
Fescue, sheep	<i>Festuca ovina</i>
Foxtail, meadow	<i>Alopecurus pratensis</i>
Orchardgrass	<i>Dactylis glomerata</i>
Wheatgrass, western	<i>Agropyron smithii</i>

Testing has indicated that there is considerable variation in response among species and types of grasses when seeded into areas treated with LANDMARK® XP. If species other than those listed above are to be planted into areas treated with LANDMARK® XP either a bioassay must be performed, or previous experience may be used to determine the feasibility of replanting treated areas. To conduct a field bioassay, grow to maturity test strips of the grass species you plan to grow the following year. The test strips must cross the entire field including knolls and low areas. Crop response to the bioassay will indicate whether or not to plant the grass species grown in the test strips.

APPLICATION INFORMATION

LANDMARK® XP may be applied with ground equipment or by helicopter.

Apply LANDMARK® XP at 0.75 to 2.25 ounces per acre in the fall or spring, prior to moisture expectation and plant growth. Do not apply when soil is frozen. For residual activity, moisture is required to activate LANDMARK® XP herbicide.

WEEDS CONTROLLED

When applied at 0.75 ounce per acre, LANDMARK® XP controls the following weeds:

BROADLEAF WEEDS

Chamomile, false	<i>Matricaria maritima</i>
Falseflax, smallseed	<i>Camelina microcarpa</i>
Fleabane	<i>Conyza sp.</i>
Lambsquarter, common	<i>Chenopodium album</i>
Mustard, tumble (Jim Hill)	<i>Sisymbrium altissimum</i>
Mustard, blue	<i>Chorispora tenella</i>
Pennycress, field	<i>Thlaspi arvense</i>
Pigweed, redroot	<i>Amaranthus retroflexus</i>
Purslane, common	<i>Portulaca oleracea</i>
Tansymustard	<i>Descurainia pinnata</i>
Tarweed, common	<i>Archillea millefolium</i>

GRASSES

Bluegrass, bulbous	<i>Poa bulbosa</i>
Brome, downy (cheatgrass)	<i>Bromus tectorum</i>
Cheat	<i>Bromus secalinus</i>

When applied at 1.5 ounces per acre, DuPont™
LANDMARK® XP controls the following additional
weeds:

BROADLEAF WEEDS

Buckwheat, wild	<i>Polygonum convolvulus</i>
Buttercup	<i>Petasites hybridus</i>
Carrot, wild	<i>Daucus carota</i>
Chickweed, common	<i>Stellaria media</i>
Clover	<i>Trifolium sp.</i>
Cocklebur	<i>Xanthium sp.</i>
Cockle, cow	<i>Vaccaria pyramidata</i>
Coontail, prickly	<i>Ceratophyllum echinatum</i>
Dandelion	<i>Taraxacum officinale</i>
Dyer's woad	<i>Isatis tinctoria</i>
Eveningprimrose, cutleaf	<i>Oenothera laciniata</i>
Fiddleneck	<i>Amsinckia lycopsoides</i>
Filaree, whitestem	<i>Erodium moschatum</i>
Flixweed	<i>Descurainia sophia</i>
Geranium, carolina	<i>Geranium carolinianum</i>
Goldenrod	<i>Solidago sp.</i>
Groundsel, common	<i>Senecio vulgaris</i>
Henbit	<i>Lamium amplexicaule</i>
Knotweed, erect	<i>Polygonum erectum</i>
Marestail/horseweed	<i>Conyza canadensis</i>
Morningglory	<i>Ipomoea sp.</i>
Mustard, hill	<i>Bunias orientalis</i>
Mustard, wild	<i>Sinapis arvensis</i>
Pigweed, spiny	<i>Amaranthus spinosus</i>
Plantain, buckhorn	<i>Plantago lanceolata</i>
Rocket, London	<i>Sisymbrium irio</i>
Sesbania, hemp	<i>Sesbania exaltata</i>
Shepherd's purse	<i>Capsella bursa-pastoris</i>
Sicklepod	<i>Cassia obtusifolia</i>
Sida, prickly	<i>Sida spinosa</i>
Sowthistle, annual	<i>Sonchus oleraceus</i>
Speedwell, common	<i>Veronica officinalis</i>
Spikeweed, common	<i>Hemizonia pungens</i>
Sunflower, common	<i>Helianthus annuus</i>
Teasel, wild	<i>Dipsacus fullonum</i>
Thistle, musk	<i>Carduus nutans</i>
Velvetleaf	<i>Abutilon theophrasti</i>
Vetch, hairy	<i>Vicia villosa</i>

GRASSES

Barley, foxtail	<i>Hordeum jubatum</i>
Barley, little	<i>Hordeum pusillum</i>
Barnyardgrass	<i>Echinochloa crus-galli</i>
Bluegrass, annual	<i>Poa annua</i>
Brome, Japanese	<i>Bromus japonicus</i>
Foxtails (except green)	<i>Setaria sp.</i>
Goatgrass, jointed	<i>Aegilops cylindrical</i>
Medusahead	<i>Taeniatherum caput-medusae</i>
Oats, wild	<i>Avena fatua</i>
Rye (volunteer)	<i>Secale cereale</i>
Ryegrass, annual	<i>Lolium sp.</i>
Signalgrass, broadleaf	<i>Brachiaria platyphylla</i>
Wheat (volunteer)	<i>Triticum aestivum</i>
Witchgrass	<i>Panicum capillare</i>

When applied at 2.25 ounces per acre, LANDMARK® XP
controls the following additional weeds:

BROADLEAF WEEDS

Bedstraw	<i>Galium spp.</i>
Cress, hoary (whitetop)	<i>Cardaria draba</i>
Garlic, wild	<i>Allium vineale</i>
Clover, sweet	<i>Melilotus spp.</i>
Groundsel, prairie	<i>Senecio plattensis</i>
Hemp	<i>Cannabis spp.</i>
Mustard, black	<i>Brassica nigra</i>
Needles, Spanish	<i>Bidens bipinnata</i>
Orach, spreading	<i>Atriplex patula</i>
Pepperweed	<i>Lepidium spp.</i>
Pigweed, tumble	<i>Amaranthus albus</i>

Ragwort, tansy
Salsify
Vetch, common

Senecio jacobaea
Tragopogon spp
Vicia sativa

GRASSES

Crabgrass	<i>Vulpia myuros</i>
Foxtail, green	<i>Setaria viridis</i>
Brome, red	<i>Bromus rubens</i>
Brome, ripgut	<i>Bromus diandrus</i>

USE PRECAUTIONS AND RESTRICTIONS RANGELAND RESTORATION

- Do not graze treated sites or cut for forage or hay for a minimum of 1 year after application. Allow newly emerged grasses sufficient time to become established prior to any grazing. Where practical, fencing or other measures are to be used to prevent early grazing of re-established sites to help promote active grass restoration.
- In order to reduce the potential for off-site movement of LANDMARK® XP from wind or water related soil erosion do not burn, disk, or otherwise disturb treated sites between the time of application and reseeding or reestablishment of native grasses.

NON-AGRICULTURAL USES

NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used produce agricultural plants on farms, forests, nurseries, or greenhouses. Use on noncrop sites and turf (unimproved) are not within the scope of the Worker Protection Standard.

Do not enter or allow worker entry into treated areas until sprays have dried.

NON-AGRICULTURAL SITES

APPLICATION INFORMATION

LANDMARK® XP is labeled for general weed control on private, public and military lands as follows: nonagricultural areas (including airports, highway, railroad and utility rights-of-way (ROW), sewage disposal areas); uncultivated agricultural areas--non-crop producing (including farmyards, fuel storage areas, fence rows, barrier strips); industrial sites--outdoor (including lumberyards, pipeline and tank farms).

LANDMARK® XP is not labeled for use on recreation areas, sod farms or for direct application to paved areas (surfaces).

Apply to non-agricultural areas by ground only, with the exception of rights-of-way which may be treated by helicopter. Applications may also be made as otherwise directed by Supplemental or Special Local Need Labeling.

APPLICATION TIMING

Apply DuPont™ LANDMARK® XP as a preemergence or early postemergence spray before or during the rainy season when weeds are actively germinating or growing.

APPLICATION RATES

Apply LANDMARK® XP at 4.5 to 8.0 ounces of product per year. When applied at lower rates, LANDMARK® XP provides short-term control of weeds listed; when applied at higher rates, weed control is extended.

Note: Use the higher level of listed dosage ranges under the following conditions:

- heavy weed growth
- soils with high organic matter
- high soil moisture areas, such as along road edges or railroad shoulders

WEEDS CONTROLLED

LANDMARK® XP effectively controls the following broadleaf weeds and grasses when applied at the rates shown.

When applied at 4.5 ounces of product per acre, LANDMARK® XP controls the following weeds:

BROADLEAF WEEDS

Annual sowthistle	<i>Sonchus oleraceus</i>
Bedstraw	<i>Galium sp.</i>
Black medic	<i>Medicago lupulina</i>
Black mustard	<i>Brassica nigra</i>
Blue mustard	<i>Chorispora tenella</i>
Bouncingbet	<i>Saponaria officinalis</i>
Buckhorn plantain	<i>Plantago lanceolata</i>
Burclover	<i>Medicago sp.</i>
Buttercup	<i>Petasites hybridus</i>
Canada thistle	<i>Cirsium arvense</i>
Carolina geranium	<i>Geranium carolinianum</i>
Clover	<i>Trifolium sp.</i>
Cocklebur	<i>Xanthium sp.</i>
Common chickweed	<i>Stellaria media</i>
Common groundsel	<i>Senecio vulgaris</i>
Common lambsquarter	<i>Chenopodium album</i>
Common mallow	<i>Malva neglecta</i>
Common purslane	<i>Portulaca oleracea</i>
Common ragweed	<i>Ambrosia elatior</i>
Common speedwell	<i>Veronica officinalis</i>
Common spikeweed	<i>Hemizonia pungens</i>
Common sunflower	<i>Helianthus annuus</i>
Common tarweed	<i>Madia sp.</i>
Common vetch	<i>Vicia sativa</i>
Common yarrow	<i>Achillea millefolium</i>
Cow cockle	<i>Vaccaria pyramidata</i>
Crimson clover	<i>Trifolium incarnatum</i>
Curly dock	<i>Rumex crispus</i>
Cutleaf eveningprimrose	<i>Oenothera laciniata</i>
Dandelion	<i>Taraxacum officinale</i>
Dogfennel	<i>Eupatorium capillifolium</i>
Dyer's woad	<i>Isatis tinctoria</i>
Erect knotweed	<i>Polygonum erectum</i>
False chamomile	<i>Matricaria maritima</i>
Fiddleneck	<i>Amsinckia lycopsoides</i>
Field pennycress	<i>Thlaspi arvense</i>
Fireweed	<i>Epilobium angustifolium</i>
Fleabane	<i>Conyza sp.</i>
Flixweed	<i>Descurainia sophia</i>
Goldenrod	<i>Solidago sp.</i>
Hairy vetch	<i>Vicia villosa</i>
Hemp	<i>Cannabis sp.</i>
Hemp sesbania	<i>Sesbania exaltata</i>
Henbit	<i>Lamium amplexicaule</i>
Hill mustard	<i>Bunias orientalis</i>
Hoary cress (whitetop)	<i>Cardaria draba</i>

Houndstongue	<i>Cynoglossum officinale</i>
London rocket	<i>Sisymbrium irio</i>
Marestail/horseweed	<i>Conyza canadensis</i>
Musk thistle	<i>Carduus nutans</i>
Ox-eye daisy	<i>Chrysanthemum leucanthemum</i>
Pepperweed	<i>Lepidium sp.</i>
Perennial pepperweed	<i>Lepidium latifolium</i>
Prairie groundsel	<i>Senecio plattensis</i>
Prickly coontail	<i>Ceratophyllum echinatum</i>
Prickly sida	<i>Sida spinosa</i>
Prostrate knotweed	<i>Polygonum aviculare</i>
Puncturevine	<i>Tribulus terrestris</i>
Redroot pigweed	<i>Amaranthus retroflexus</i>
Redstem filaree	<i>Erodium cicutarium</i>
Salsify	<i>Tragopogon sp.</i>
Scotch thistle	<i>Onopordum acanthium</i>
Seaside heliotrope	<i>Heliotropium curassavicum</i>
Shepherd's purse	<i>Capsella bursa-pastoris</i>
Sicklepod	<i>Cassia obtusifolia</i>
Smallseed falseflax	<i>Camelina microcarpa</i>
Spanish needles	<i>Bidens bipinnata</i>
Spiny pigweed	<i>Amaranthus spinosus</i>
Spreading orach	<i>Atriplex patula</i>
Sweetclover	<i>Melilotus sp.</i>
Tansymustard	<i>Descurainia pinnata</i>
Tansy ragwort	<i>Senecio jacobaea</i>
Tumble mustard (Jim Hill)	<i>Sisymbrium altissimum</i>
Tumble pigweed	<i>Amaranthus albus</i>
Turkey mullein	<i>Eremocarpus setigerus</i>
Velvetleaf	<i>Abutilon theophrasti</i>
Whitestem filaree	<i>Erodium moschatum</i>
Whitetop	<i>Cardaria sp.</i>
Wild buckwheat	<i>Polygonum convolvulus</i>
Wild carrot	<i>Daucus carota</i>
Wild garlic	<i>Allium vineale</i>
Wild parsnip	<i>Pastinaca sativa</i>
Wild teasel	<i>Dipsacus fullonum</i>

* Certain biotypes of marestail are less sensitive to LANDMARK® XP and may be controlled with a tank mixture of diuron, DuPont™ HYVAR® X or DuPont™ KROVAR® I DF.

GRASSES (UP TO 6-12" TALL)

Alta fescue	<i>Festuca arundinacea</i>
Annual bluegrass	<i>Poa annua</i>
Annual ryegrass	<i>Lolium sp.</i>
Bahiagrass	<i>Paspalum notatum</i>
Barnyardgrass	<i>Echinochloa crus-galli</i>
Bulbous bluegrass	<i>Poa bulbosa</i>
Cheat	<i>Bromus secalinus</i>
Crabgrass	<i>Digitaria sp.</i>
Downy brome (cheatgrass)	<i>Bromus tectorum</i>
Foxtails (except green)	<i>Setaria sp.</i>
Foxtail barley	<i>Hordeum jubatum</i>
Foxtail fescue	<i>Vulpia myuros</i>
Italian ryegrass	<i>Lolium multiflorum</i>
Itchgrass	<i>Rottboellia cochinchinensis</i>
Jointed goatgrass	<i>Aegilops cylindrica</i>
Little barley	<i>Hordeum pusillum</i>
Medusahead	<i>Taeniatherum caput-medusae</i>
Red brome	<i>Bromus rubens</i>
Red fescue	<i>Festuca rubra</i>
Ripgut brome	<i>Bromus diandrus</i>
Rye (volunteer)	<i>Secale cereale</i>
Seashore saltgrass	<i>Distichlis spicata</i>
Signalgrass (broadleaf)	<i>Brachiaria platyphylla</i>
Sprangletop (annual)	<i>Leptochloa sp.</i>
Wheat (volunteer)	<i>Triticum aestivum</i>
Wild oats	<i>Avena fatua</i>
Witchgrass	<i>Panicum capillare</i>
Yellow indiagrass	<i>Sorghastrum nutans</i>

When applied at 8.0 ounces of product per acre, DuPont™ LANDMARK® XP also controls the following additional weeds:

BROADLEAF WEEDS

Aster	<i>Aster sp.</i>
Carpetweed	<i>Mollugo verticillata</i>
Catsear	<i>Hypochoeris sp.</i>
Common cinquefoil	<i>Potentilla canadensis</i>
Common knapweed (black)	<i>Centaurea nigra</i>
Common mullein	<i>Verbascum thapsus</i>
Horsetail	<i>Equisetum sp.</i>
Morningglory	<i>Ipomoea sp.</i>
Russian knapweed	<i>Acroptilon repens</i>
St. Johnswort	<i>Hypericum perforatum</i>
White snakeroot	<i>Eupatorium rugosum</i>
Yellow rocket	<i>Barbarea vulgaris</i>
Yellow starthistle	<i>Centaurea solstitialis</i>

GRASSES

Broadleaf panicum	<i>Panicum novemnerve</i>
Green foxtail	<i>Setaria viridis</i>
Johnsongrass	<i>Sorghum halepense</i>
Junglerice	<i>Echinochloa colonum</i>

SPECIFIC WEED PROBLEMS NON-CROP SITES

Kochia, Russian Thistle, and Prickly Lettuce

Since biotypes of kochia, Russian thistle, and prickly lettuce are known to be resistant to LANDMARK® XP, tank mixture combinations with herbicides having different modes of action, such as DuPont™ HYVAR® X or DuPont™ KROVAR® I DF or diuron must be used. In areas where resistance is known to exist, these weeds must be treated postemergence with other herbicides registered for their control, such as 2,4-D or dicamba.

Kochia and Russian Thistle - Apply a tank mixture of LANDMARK® XP herbicide at 4.5 ounces per acre plus diuron at 8 pounds active ingredient per acre.

Do not tank mix LANDMARK® XP with HYVAR® X-L herbicide.

UNDER ASPHALT AND CONCRETE PAVEMENT

APPLICATION INFORMATION

LANDMARK® XP may be used to control weeds under asphalt and concrete pavement, such as that used in parking lots, highway shoulders, median strips, roadways, and other non-crop sites. LANDMARK® XP may not control tubers, rhizomes, woody vegetation such as small trees, brush or woody vines.

LANDMARK® XP must only be used in an area that has been prepared according to good construction practices. Use sufficient water to ensure uniform coverage.

APPLICATION TIMING

Apply LANDMARK® XP immediately before paving to avoid lateral movement of the herbicide as a result of soil movement due to weather or mechanical operations.

APPLICATION RATE

Apply LANDMARK® XP at 8.0 ounces of product per acre.

USE PRECAUTIONS AND RESTRICTIONS UNDER ASPHALT AND CONCRETE

- Do not use LANDMARK® XP under pavement in residential properties such as driveways, or in recreational areas, including jogging or bike paths, tennis courts, or golf cart paths.

INDUSTRIAL TURFGRASS

BERMUDAGRASS AND CENTIPEDEGRASS RELEASE

APPLICATION INFORMATION

LANDMARK® XP may be used to control weeds in industrial turfgrass, roadsides, or other non-crop sites where the turfgrass is well established as a ground cover. Applications may temporarily suppress turfgrass growth and inhibit seedhead formation (chemical mowing).

APPLICATION TIMING AND RATE

Apply LANDMARK® XP at 0.9 ounces of product per acre to established grasses after they have broken dormancy, usually 30 days after initial spring flush. If an additional application is necessary, apply LANDMARK® XP again at 0.9 ounces of product per acre during late spring to early summer. On established weeds, apply LANDMARK® XP one to two weeks after mowing for the best results.

LANDMARK® XP may also be applied in late fall or early winter.

WEEDS CONTROLLED

When applied at 0.9 ounces of product per acre, LANDMARK® XP controls the following weeds:

Annual bluegrass	<i>Poa annua</i>
Black mustard	<i>Brassica nigra</i>
Bulbous bluegrass	<i>Poa bulbosa</i>
Cheat	<i>Bromus secalinus</i>
Cocklebur	<i>Xanthium sp.</i>
Common chickweed	<i>Stellaria media</i>
Common lambsquarter	<i>Chenopodium album</i>
Common purslane	<i>Portulaca oleracea</i>
Common tarweed	<i>Madia sp.</i>
Common yarrow	<i>Achillea millefolium</i>
Dandelion	<i>Taraxacum officinale</i>
False chamomile	<i>Matricaria maritima</i>
Field pennycress	<i>Thlaspi arvense</i>
Fleabane	<i>Conyza sp.</i>
Flixweed	<i>Descurainia sophia</i>
Hill mustard	<i>Bunias orientalis</i>
Jointed goatgrass	<i>Aegilops cylindrica</i>
London rocket	<i>Sisymbrium irio</i>
Marestail/horseweed*	<i>Conyza canadensis</i>
Redroot pigweed	<i>Amaranthus retroflexus</i>
Shepherd's purse	<i>Capsella bursa-pastoris</i>
Smallseed falseflax	<i>Camelina microcarpa</i>
Tansymustard	<i>Descurainia pinnata</i>
Tumble mustard (Jim Hill)	<i>Sisymbrium altissimum</i>
Velvetleaf	<i>Abutilon theophrasti</i>
Wheat (volunteer)	<i>Triticum aestivum</i>
Wild mustard	<i>Sinapis arvensis</i>
Wild oats	<i>Avena fatua</i>

USE PRECAUTIONS AND RESTRICTIONS INDUSTRIAL TURFGRASS

- Excessive injury to turfgrass may result if a surfactant is used with DuPont™ LANDMARK® XP applications made to actively growing turfgrass. The user assumes all responsibility for turfgrass injury if a surfactant is used with LANDMARK® XP treatments applied to actively growing turfgrass.
- LANDMARK® XP may temporarily discolor or cause top kill of turfgrass. Applications made while turfgrass is dormant may delay green-up in the spring.
- LANDMARK® XP application on turfgrass that is under stress from drought, insects, disease, cold temperatures or late spring frost, may result in injury.
- Application of LANDMARK® XP to turfgrass less than 1 year old may cause unacceptable turf injury.
- For broadcast applications, do not exceed 2 applications of 0.9 ounces of product per acre LANDMARK® XP within a 12 month period.
- Annual retreatments may reduce turfgrass vigor.

NON-CROPLAND RESTORATION

APPLICATION INFORMATION

LANDMARK® XP may be used to control downy brome (cheatgrass), cheat, jointed goatgrass, medusahead and certain broadleaf weeds on non-agricultural sites, to allow for the restoration of desirable perennial grass species.

Note: In order to reduce the potential for off-site movement of LANDMARK® XP from wind or water related soil erosion do not burn, disk, or otherwise disturb treated sites between the time of application and reseeding or reestablishment of native grasses.

APPLICATION TIMING AND RATES

Apply LANDMARK® XP at 0.75 to 2.25 ounces of product per acre in the fall, within 6 weeks before the expected date when the soil freezes, or in the Spring within 6 weeks after the soil thaws. When applied at lower rates, LANDMARK® XP provides short-term control of weeds listed; when applied at higher rates, weed control spectrum is broadened and extended.

When applied at 0.75 to 2.25 ounces of product per acre, LANDMARK® XP controls the following weeds:

BROADLEAF WEEDS

Blue mustard	<i>Chorispora tenella</i>
Common lambsquarter	<i>Chenopodium album</i>
Common purslane	<i>Portulaca oleracea</i>
Common tarweed	<i>Madia sp.</i>
Common yarrow	<i>Archillea millefolium</i>
False chamomile	<i>Matricaria maritima</i>
Field pennycress	<i>Thlaspi arvense</i>
Fleabane	<i>Conyza sp.</i>
Redroot pigweed	<i>Amaranthus retroflexus</i>
Smallseed falseflax	<i>Camelina microcarpa</i>
Tansymustard	<i>Descurainia pinnata</i>
Tumble mustard (Jim Hill)	<i>Sisymbrium altissimum</i>

GRASSES

Bulbous bluegrass	<i>Poa bulbosa</i>
Cheat	<i>Bromus secalinus</i>
Downy brome (cheatgrass)	<i>Bromus tectorum</i>

When applied at 1.5 to 2.25 ounces of product per acre, LANDMARK® XP controls the following additional weeds:

BROADLEAF WEEDS

Annual sowthistle	<i>Sonchus oleraceus</i>
Buckhorn plantain	<i>Plantago lanceolata</i>
Buttercup	<i>Petasites hybridus</i>
Carolina geranium	<i>Geranium carolinianum</i>
Clover	<i>Trifolium sp.</i>
Cocklebur	<i>Xanthium sp.</i>
Common chickweed	<i>Stellaria media</i>
Common groundsel	<i>Senecio vulgaris</i>
Common speedwell	<i>Veronica officinalis</i>
Common spikeweed	<i>Hemizonia pungens</i>
Common sunflower	<i>Helianthus annuus</i>
Cow cockle	<i>Vaccaria pyramidata</i>
Cutleaf eveningprimrose	<i>Oenothera laciniata</i>
Dandelion	<i>Taraxacum officinale</i>
Dyer's woad	<i>Isatis tinctoria</i>
Erect knotweed	<i>Polygonum erectum</i>
Fiddleneck	<i>Amsinckia lycopsoides</i>
Flixweed	<i>Descurainia sophia</i>
Goldenrod	<i>Solidago sp.</i>
Hairy vetch	<i>Vicia villosa</i>
Hemp sesbania	<i>Sesbania exaltata</i>
Henbit	<i>Lamium amplexicaule</i>
Hill mustard	<i>Bunias orientalis</i>
London rocket	<i>Sisymbrium irio</i>
Marestail/horseweed	<i>Conyza canadensis</i>
Morningglory	<i>Ipomoea sp.</i>
Musk thistle	<i>Carduus nutans</i>
Prickly coontail	<i>Ceratophyllum echinatum</i>
Prickly sida	<i>Sida spinosa</i>
Shepherd's purse	<i>Capsella bursa-pastoris</i>
Sicklepod	<i>Cassia obtusifolia</i>
Spiny pigweed	<i>Amaranthus spinosus</i>
Velvetleaf	<i>Abutilon theophrasti</i>
Whitstem filaree	<i>Erodium moschatum</i>
Wild buckwheat	<i>Polygonum convolvulus</i>
Wild carrot	<i>Daucus carota</i>
Wild mustard	<i>Sinapis arvensis</i>
Wild teasel	<i>Dipsacus fullonum</i>

GRASSES

Annual bluegrass	<i>Poa annua</i>
Annual ryegrass	<i>Lolium sp.</i>
Barnyardgrass	<i>Echinochloa crus-galli</i>
Foxtails (except green)	<i>Setaria sp.</i>
Foxtail barley	<i>Hordeum jubatum</i>
Japanese brome	<i>Bromus japonicus</i>
Jointed goatgrass	<i>Aegilops cylindrical</i>
Little barley	<i>Hordeum pusillum</i>
Medusahead	<i>Taeniatherum caput-medusae</i>
Rye (volunteer)	<i>Secale cereale</i>
Signalgrass (broadleaf)	<i>Brachiaria platyphylla</i>
Wheat (volunteer)	<i>Triticum aestivum</i>
Wild oats	<i>Avena fatua</i>
Witchgrass	<i>Panicum capillare</i>

When applied at 2.25 ounces of product per acre, LANDMARK® XP controls the following additional weeds:

BROADLEAF WEEDS

Bedstraw	<i>Galium sp.</i>
Black mustard	<i>Brassica nigra</i>
Common vetch	<i>Vicia sativa</i>
Hemp	<i>Cannabis sp.</i>
Hoary cress (whitetop)	<i>Cardaria draba</i>
Pepperweed	<i>Lepidium sp.</i>
Prairie groundsel	<i>Senecio plattensis</i>
Salsify	<i>Tragopogon sp.</i>
Spanish needles	<i>Bidens bipinnata</i>

Spreading orach
Sweet clover
Tansy ragwort
Tumble pigweed
Wild garlic

Atriplex patula
Melilotus sp.
Senecio jacobaea
Amaranthus albus
Allium vineale

GRASSES

Crabgrass
Foxtail fescue
Green foxtail
Red brome
Rippgut brome

Digitaria sp.
Vulpia myuros
Setaria viridis
Bromus rubens
Bromus diandrus

GRASS REPLANT INTERVALS

Following a treatment with DuPont™ LANDMARK® XP at use rates up to 2.25 ounces of product per acre, the following grasses may be replanted at least 3 months after a spring application:

Green needlegrass
Meadow brome
Russian wild rye
Switchgrass

Stipa viridula
Bromus erectus
Elymus sp.
Panicum virgatum

The following grasses may be replanted at least 6 months after a spring application:

Alta fescue
Meadow foxtail
Orchardgrass
Smooth brome
Sheep fescue
Western wheatgrass

Festuca arundinacea
Alopecurus pratensis
Dactylis glomerata
Bromus inermis
Festuca ovina
Agropyron smithii

The intervals, 3 and 6 months, are for soils with a pH of less than 7.5 and only for applications made in the spring. Soils having a pH greater than 7.5 will require longer replant intervals.

Because LANDMARK® XP degradation is slowed by cold or frozen soils, applications made in the fall must consider the intervals as beginning in the spring following treatment.

Testing has indicated that there is considerable variation in response among species and types of grasses when seeded into areas treated with LANDMARK® XP. If species other than those listed above are to be planted into areas treated with LANDMARK® XP either a field bioassay must be performed, or previous experience may be used to determine the feasibility of replanting treated areas.

To conduct a field bioassay, grow to maturity test strips of the grass(es) you plan to grow the following year. The test strips must cross the entire field including knolls and low areas. Crop response to the bioassay will indicate whether or not to plant the grass(es) grown in the test strips.

ADDITIONAL INSTRUCTIONS, PRECAUTIONS AND RESTRICTIONS FOR AGRICULTURAL AND NON-AGRICULTURAL USES

- Injury to or loss of desirable species may occur if equipment is drained or flushed on or near desirable trees or other plants, or on areas where their roots may extend, or in locations where the chemical may be washed or moved into contact with their roots.
- Treatment of powdery, dry soil or light, sandy soil when there is little likelihood of rainfall soon after treatment may result in off target movement and possible damage to susceptible crops when soil particles are moved by wind or

water. Injury to crops may result if treated soil is washed, blown, or moved onto land used to produce crops. Exposure to LANDMARK® XP may injure or kill most crops. Injury may be more severe when the crops are irrigated. Do not apply LANDMARK® XP when these conditions are identified and powdery, dry soil or light or sandy soil are known to be prevalent in the area to be treated.

- Applications made where runoff water flows onto agricultural land may injure crops. Applications made during periods of intense rainfall, to soils saturated with water, surfaces paved with materials such as asphalt or concrete, or soils through which rainfall will not readily penetrate may result in runoff and movement of LANDMARK® XP.
- Do not treat frozen soil.
- Leave treated soil undisturbed to reduce the potential for LANDMARK® XP movement by soil erosion due to wind or water.
- Do not use on lawns, walks, driveways, tennis courts, or similar areas.
- Keep from contact with fertilizers, insecticides, fungicides, and seeds.
- Do not apply in or on irrigation ditches or canals including their outer banks.
- Do not apply through any type of irrigation system.
- Do not use this product in the following counties of Colorado: Saguache, Rio Grande, Alamosa, Costilla and Conejos.
- If non-crop sites treated with LANDMARK® XP are to be converted to a food, feed, or fiber agricultural crop, or to a horticultural crop, do not plant the treated sites for at least one year after the LANDMARK® XP application. A field bioassay must then be completed before planting to crops.

FIELD BIOASSAY

To conduct a field bioassay, grow to maturity test strips of the crop(s) you plan to grow the following year. The test strips should cross the entire field including knolls and low areas. Crop response to the bioassay will indicate whether or not to plant the crops(s) grown in the test strips. In the case of suspected offsite movement of LANDMARK® XP to cropland, soil samples may be quantitatively analyzed for LANDMARK® XP or any other herbicide which could be having an adverse effect on the crop, in addition to conducting the above-described bioassay.

TANK MIX COMBINATIONS

Combination with other herbicides broadens the spectrum of weeds controlled. In addition, total vegetation control can be achieved with higher rates of LANDMARK® XP plus residual type companion herbicides. To improve postemergence control of weeds, add surfactant at 0.25% by volume or at the manufacturer's labeled rate based on spray area.

LANDMARK® XP may be applied with the listed rates of other herbicides registered for this use. For application

method and other use specifications, use the most restrictive directions for the intended combination.

Do not tank mix DuPont™ LANDMARK® XP with DuPont™ HYVAR® X-L herbicide.

SPRAY EQUIPMENT

Low rates of LANDMARK® XP can kill or severely injure most crops. Following a LANDMARK® XP application, the use of spray equipment to apply other pesticides to crops on which LANDMARK® XP or its active ingredients are not registered may result in their damage. The most effective way to reduce this crop damage potential is to use dedicated mixing and application equipment.

APPLICATION

Use a sufficient volume of water to ensure thorough coverage when applying LANDMARK® XP as a broadcast or directed spray. Select a spray volume and delivery system that will ensure thorough coverage and a uniform spray pattern. Be sure the sprayer is calibrated before use. Avoid overlapping and shut off spray booms while starting, turning, slowing, or stopping to avoid injury to desired species.

MIXING INSTRUCTIONS

1. Fill spray tank 1/2 full of water.
2. With the agitator running, add the proper amount of LANDMARK® XP.
3. If using a companion product, add the directed amount.
4. For postemergent applications, add the proper amount of spray adjuvants.
5. Add the remaining water.
6. Agitate the spray tank thoroughly.

LANDMARK® XP spray preparations are stable if they are pH neutral or alkaline and stored at or below 100° F.

SPRAYER CLEANUP

Thoroughly clean all mixing and spray equipment following applications of LANDMARK® XP as follows:

1. Drain tank; thoroughly rinse spray tanks, boom, and hoses with clean water.
2. Fill the tank with clean water and 1 gal of household ammonia (contains 3% active) for every 100 gal of water. Flush the hoses, boom, and nozzles with the cleaning solution. Then add more water to completely fill the tank. Circulate the cleaning solution through the tank and hoses for at least 15 min. Flush the hoses, boom, and nozzles again with the cleaning solution, and then drain the tank. Equivalent amounts of an alternate-strength ammonia solution or a commercial cleaner can be used in the cleanout procedure. If a commercial cleaner is used, carefully read and follow the individual cleaner instructions.
3. Remove the nozzles and screens and clean separately in a bucket containing cleaning agent and water.
4. Repeat step 2.
5. Rinse the tank, boom, and hoses with clean water.

6. Dispose of the rinsate on a labeled site or at an approved waste disposal facility. If a commercial cleaner is used follow the directions for rinsate disposal on the label.

Notes:

1. **Caution:** Do not use chlorine bleach with ammonia as dangerous gases will form. Do not clean equipment in an enclosed area.
2. Steam-clean aerial spray tanks before performing the above cleanout procedure to facilitate the removal of any caked deposits.
3. When LANDMARK® XP is tank mixed with other pesticides, all required cleanout procedures must be examined and the most rigorous procedure followed.

SPRAY DRIFT MANAGEMENT

The interaction of many equipment and weather-related factors determines the potential for spray drift. The applicator is responsible for considering all these factors when making application decisions. Avoiding spray drift is the responsibility of the applicator.

IMPORTANCE OF DROPLET SIZE

The most effective drift management strategy is to apply the largest droplets which are consistent with pest control objectives. The presence of sensitive species nearby, the environmental conditions, and pest pressure may affect how an applicator balances drift control and coverage. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly or under unfavorable environmental conditions.

A droplet size classification system describes the range of droplet sizes produced by spray nozzles. The American Society of Agricultural and Biological Engineers (ASABE) provide a Standard that describes droplet size spectrum categories defined by a number of reference nozzles (fine, coarse, etc.). Droplet spectra resulting from the use of a specific nozzle may also be described in terms of volume mean diameter (VMD). Coarser droplet size spectra have larger VMD's and lower drift potential.

CONTROLLING DROPLET SIZE - GROUND TECHNIQUES

- **Nozzle Type** - Select a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. The use of low-drift nozzles will reduce drift potential.
- **Pressure** - The lowest spray pressures recommended for the nozzle produce the largest droplets. Higher pressure reduces droplet size and does not improve canopy penetration. When higher flow rates are needed, using a higher-capacity nozzle instead of increasing pressure results in the coarsest droplet spectrum.
- **Flow Rate/Orifice Size** - Using the highest flow rate nozzles (largest orifice) that are consistent with pest control objectives reduces the potential for spray drift. Nozzles with higher rated flows produce coarser droplet spectra.

CONTROLLING DROPLET SIZE - AIRCRAFT

- **Nozzle Type** - Solid stream, or other low drift nozzles produce the coarsest droplet spectra.

- **Number of Nozzles** - Using the minimum number of nozzles with the highest flow rate that provide uniform coverage will produce a coarser droplet spectrum
- **Nozzle Orientation** - Orienting nozzles in a manner that minimizes the effects of air shear will produce the coarsest droplet spectra. For some nozzles such as solid stream, pointing the nozzles straight back parallel to the airstream will produce a coarser droplet spectrum than other orientations.
- **Pressure** – Selecting the pressure that produces the coarsest droplet spectrum for a particular nozzle and airspeed reduces spray drift potential. For some nozzle types such as solid streams, lower pressures can produce finer droplet spectra and increase drift potential

BOOM LENGTH (AIRCRAFT) AND APPLICATION HEIGHT

- **Boom Length (aircraft)** - Using shorter booms decreases drift potential. Boom lengths are expressed as a percentage of an aircraft's wingspan or a helicopter's rotor blade diameter. Shorter boom length and proper positioning can minimize drift caused by wingtip or rotor vortices.
- **Application Height (aircraft)** - Applications made at the lowest height that are consistent with pest control objectives and the safe operation of the aircraft will reduce the potential for spray drift.
- **Application Height (ground)** - Applications made at the lowest height consistent with pest control objectives, and that allow the applicator to keep the boom level with the application site and minimize bounce, will reduce the exposure of spray droplets to evaporation and wind, and reduce spray drift potential.

WIND

Drift potential is lowest when applications are made in light to gentle sustained winds (2-10 mph), which are blowing in a constant direction. Many factors, including droplet size and equipment type also determine drift potential at any given wind speed. AVOID GUSTY OR WINDLESS CONDITIONS.

Local terrain can also influence wind patterns. Every applicator is expected to be familiar with local wind patterns and how they affect spray drift.

TEMPERATURE AND HUMIDITY

Setting up equipment to produce larger droplets to compensate for droplet evaporation can reduce spray drift potential. Droplet evaporation is most severe when conditions are both hot and dry.

SURFACE TEMPERATURE INVERSIONS

Drift potential is high during a surface temperature inversion. Surface inversions restrict vertical air mixing, which may cause small suspended droplets to remain close to the ground and move laterally in a concentrated cloud. Surface inversions are characterized by increasing temperature with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Mist or fog may indicate the presence of an inversion in humid areas. Inversions may also be identified by producing smoke and observing its behavior. Smoke that remains close to the ground, or moves laterally in a concentrated cloud under low wind conditions indicates a

surface inversion. Smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

SHIELDED SPRAYERS

Shielding the boom or individual nozzles can reduce the effects of wind. However, it is the responsibility of the applicator to verify that the shields are minimizing drift potential, and not interfering with uniform deposition of the product.

AIR ASSISTED (AIR BLAST) FIELD CROP SPRAYERS

Air assisted field crop sprayers carry droplets to the target via a downward directed air stream. Some may reduce the potential for drift, but if a sprayer is unsuitable for the application and/or set up improperly, high drift potential can result. It is the responsibility of the applicator to determine that a sprayer is suitable for the intended application, that it is configured properly, and that drift potential has been minimized.

Note: Air assisted field sprayers can affect product performance by affecting spray coverage and canopy penetration. Read the specific crop use and application equipment instructions to determine if an air assisted field crop sprayer can be used.

SENSITIVE AREAS

Making applications when there is a sustained wind moving away from adjacent sensitive areas (e.g., residential areas, bodies of water, known habitat for threatened or endangered species, non-target crops) is an effective way to minimize the effect of spray drift.

DRIFT CONTROL ADDITIVES

Using product compatible drift control additives can reduce drift potential. When a drift control additive is used, read and carefully observe cautionary statements and all other information on the additive's label. If using an additive that increases viscosity, ensure that the nozzles and other application equipment will function properly with a viscous spray solution. Preferred drift control additives have been certified by the Chemical Producers and Distributors Association (CPDA).

UPWIND SWATH DISPLACEMENT

When applications are made with a crosswind the swath will be displaced downwind. An adjustment for swath displacement is made on the downwind edge of the application site by shifting the path of the application equipment upwind.

SPRAY DRIFT RESTRICTIONS

- Where states have more stringent regulations they must be observed.

AERIAL APPLICATIONS

- Applicators are required to use upwind swath displacement, and displacement distance must increase with increasing drift potential.
- The boom length must not exceed 75% of the wing span or 80% of the rotor blade diameter.

- Applications with wind speeds greater than 10 miles per hour are prohibited.
- Applications into temperature inversions are prohibited.
- Liquid sprays must only be applied using rotary aircraft.
- Spray must be released at the lowest height consistent with pest control objectives and flight safety.
- When applying liquid sprays the following directional buffers are required to protect aquatic vegetation in sites (including lakes, reservoirs, rivers, streams, marshes, ponds, estuaries, commercial fish ponds), or water used as an irrigation source, or crops.

75 feet - All aerial applications.

- Applicators must consider the effects of nozzle orientation and flight speed when determining droplet size spectrum.
- Applications must be made using equipment delivering an extremely coarse or coarser droplet size spectrum as defined by ASABE S572.1.

GROUND APPLICATIONS

- Applications with wind speeds greater than 10 miles per hour are prohibited.
- Applications into temperature inversions are prohibited.
- Apply spray at the lowest height that is consistent with pest control objectives.
- When applying liquid sprays the following directional buffers are required to protect aquatic vegetation in sites (including lakes, reservoirs, rivers, streams, marshes, ponds, estuaries, commercial fish ponds), or water used as an irrigation source, or crops.

50 feet - All broadcast applications other than railroad and roadside rights-of-way.

25 feet - Broadcast applications to railroad and roadside rights-of-way.

15 feet - All handheld spot treatment applications.

- Applications must be made using equipment delivering an extremely coarse or coarser droplet size spectrum as defined by ASABE S572.1.

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage or disposal.

PESTICIDE STORAGE: Store product in original container only.

PESTICIDE DISPOSAL: Wastes resulting from the use of this product must be disposed of on site or at an approved waste disposal facility.

CONTAINER HANDLING: Refer to the Net Contents section of this product's labeling for the applicable "Nonrefillable Container" or "Refillable Container" designation.

Nonrefillable Plastic and Metal Containers (Capacity Equal to or Less Than 50 Pounds): Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then, for Plastic Containers, offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration. Do not burn, unless allowed by state and local ordinances. For Metal Containers, offer for recycling if available or reconditioning if appropriate, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

Nonrefillable Plastic and Metal Containers (Capacity Greater Than 50 Pounds): Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. Then, for Plastic Containers, offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration. Do not burn, unless allowed by state and local ordinances. For Metal Containers, offer for recycling if available or reconditioning if appropriate, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

Nonrefillable Plastic and Metal Containers, e.g., Intermediate Bulk Containers [IBC] (Size or Shape Too Large to be Tipped, Rolled or Turned Upside Down):

Nonrefillable container. Do not reuse or refill this container. Clean container promptly after emptying the contents from this container into application equipment or mix tank and before final disposal using the following pressure rinsing procedure. Insert a lance fitted with a suitable tank cleaning nozzle into the container and ensure that the water spray thoroughly covers the top, bottom and all sides inside the container. The nozzle manufacturer generally provides instructions for the appropriate spray pressure, spray duration and/or spray volume. If the manufacturer's instructions are not available, pressure rinse the container for at least 60 seconds using a minimum pressure of 30 PSI with a minimum rinse volume of 10% of the container volume. Drain, pour or pump rinsate into application equipment or rinsate collection system. Repeat this pressure rinsing procedure two more times. Then, for Plastic Containers, offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration. For Metal Containers, offer for recycling if available or reconditioning if appropriate or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

Nonrefillable Paper or Plastic Bags, Fiber Sacks including Flexible Intermediate Bulk Containers (FIBC) or Fiber Drums With Liners: Nonrefillable container. Do not reuse or refill this container. Completely empty paper or plastic bag, fiber sack or drum liner by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application or manufacturing equipment. Then offer for recycling if available or dispose of empty paper or plastic bag, fiber sack or fiber drum and liner in a sanitary landfill, or by incineration. Do not burn, unless allowed by state and local ordinances.

Refillable Fiber Drums With Liners: Refillable container (fiber drum only). Refilling Fiber Drum: Refill this fiber drum with DuPont™ LANDMARK® XP containing sulfometuron methyl and chlorsulfuron only. Do not reuse this fiber drum for any other purpose. Cleaning before refilling is the responsibility of the refiller. Completely empty liner by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application or manufacturing equipment.

Disposing of Fiber Drum and/or Liner: Do not reuse this fiber drum for any other purpose other than refilling (see preceding). Cleaning the container (liner and/or fiber drum) before final disposal is the responsibility of the person disposing of the container. Offer the liner for recycling if available or dispose of liner in a sanitary landfill, or by incineration. Do not burn, unless allowed by state and local ordinances. If drum is contaminated and cannot be reused, dispose of it in the manner required for its liner. To clean the fiber drum before final disposal, completely empty the fiber drum by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application or manufacturing equipment. Then offer the fiber drum for recycling if available or dispose of in a sanitary landfill, or by incineration. Do not burn, unless allowed by state and local ordinances.

All Other Refillable Containers: Refillable container.

Refilling Container: Refill this container with LANDMARK® XP containing sulfometuron methyl and chlorsulfuron only. Do not reuse this container for any other purpose. Cleaning before refilling is the responsibility of the refiller. Prior to refilling, inspect carefully for damage such as cracks, punctures, abrasions, worn out threads and closure devices. If damage is found, do not use the container, contact DuPont at the number below for instructions. Check for leaks after refilling and before transporting. If leaks are found, do reuse or transport container, contact DuPont at the number below for instructions. **Disposing of Container:** Do not reuse this container for any other purpose other than refilling (see preceding). Cleaning the container before final disposal is the responsibility of the person disposing of the container. To clean the container before final disposal, use the following pressure rinsing procedure. Insert a lance fitted with a suitable tank cleaning nozzle into the container and ensure that the water spray thoroughly covers the top, bottom and all sides inside the container. The nozzle manufacturer generally provides instructions for the appropriate spray pressure, spray duration and/or spray volume. If the manufacturer's instructions are not available, pressure rinse the container for at least 60 seconds using a minimum pressure of 30 PSI with a minimum rinse volume of 10% of the container volume. Drain, pour or pump rinsate into application equipment or rinsate collection system. Repeat this pressure rinsing procedure two more times. Then, for Plastic Containers, offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration. Do not burn, unless allowed by state and local ordinances. For Metal Containers, offer for recycling if available or reconditioning if appropriate or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

Outer Pouches of Water Soluble Packets (WSP): Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available or, dispose of the empty outer foil pouch in the trash as long as WSP as long as WSP is unbroken. If the outer pouch contacts the formulated product in any way, the pouch must be triple rinsed with clean water. Add the rinsate to the spray tank and dispose of the outer pouch as described previously.

Do not transport if this container is damaged or leaking. If the container is damaged, leaking or obsolete, or in the event of a major spill, fire or other emergency, contact DuPont at 1-800-441-3637, day or night.

NOTICE TO BUYER: Purchase of this material does not confer any rights under patents of countries outside of the United States.

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SL - 1719 111011 05-23-13

**LIMITATION OF
WARRANTY AND LIABILITY**

NOTICE: Read this Limitation of Warranty and Liability Before Buying or Using This Product. If the Terms Are Not Acceptable, Return the Product at Once, Unopened, and the Purchase Price Will Be Refunded.

It is impossible to eliminate all risks associated with the use of this product. Such risks arise from weather conditions, soil factors, off target movement, unconventional farming techniques, presence of other materials, the manner of use or application, or other unknown factors, all of which are beyond the control of DuPont. These risks can cause: ineffectiveness of the product, crop injury, or injury to non-target crops or plants. WHEN YOU BUY OR USE THIS PRODUCT, YOU AGREE TO ACCEPT THESE RISKS.

DuPont warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for the purpose stated in the Directions for Use, subject to the inherent risks described above, when used in accordance with the Directions for Use under normal conditions.

TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, DUPONT MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS OR OF MERCHANTABILITY OR ANY OTHER EXPRESS OR IMPLIED WARRANTY. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, IN NO EVENT SHALL DUPONT OR SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT. BUYER'S OR USER'S BARGAINED-FOR EXPECTATION IS CROP PROTECTION. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, THE EXCLUSIVE REMEDY OF THE USER OR BUYER AND THE EXCLUSIVE LIABILITY OF DUPONT OR SELLER, FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY OR CONTRACT, NEGLIGENCE, TORT OR STRICT LIABILITY), WHETHER FROM FAILURE TO PERFORM OR INJURY TO CROPS OR OTHER PLANTS, AND RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, SHALL BE THE RETURN OF THE PURCHASE PRICE OF THE PRODUCT, OR AT THE ELECTION OF DUPONT OR SELLER, THE REPLACEMENT OF THE PRODUCT.

To the extent consistent with applicable law that allows such requirement, DuPont or its Ag Retailer must have prompt notice of any claim so that an immediate inspection of buyer's or user's growing crops can be made. Buyer and all users shall promptly notify DuPont or a DuPont Ag Retailer of any claims, whether based on contract, negligence, strict liability, other tort or otherwise, or be barred from any remedy.

This Limitation of Warranty and Liability may not be amended by any oral or written agreement.

For product information call: 1-888-6-DUPONT [1-888-638-7668]

Internet address: <http://cropprotection.dupont.com/>

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Du Pont
Material Safety Data Sheet

"DuPont" "Landmark" XP Herbicide
M0000620 Revised 27-MAR-2009

Substance ID :130000029429

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification

"LANDMARK", "OUST", "TELAR" are registered trademarks of DuPont.

"DuPont" is a trademark of DuPont.

Tradenames and Synonyms

- LANDMARK XP
OUST XP
TELAR DF
DPX-JHV52
B12038440

Company Identification

MANUFACTURER/DISTRIBUTOR
DuPont
1007 Market Street
Wilmington, DE 19898

PHONE NUMBERS

- Product Information : 1-800-441-7515 (outside the U.S.
302-774-1000)
Transport Emergency : CHEMTREC 1-800-424-9300(outside U.S.
703-527-3887)
Medical Emergency : 1-800-441-3637 (outside the U.S.
302-774-1000)

COMPOSITION/INFORMATION ON INGREDIENTS

Components

Table with 3 columns: Material, CAS Number, %
OUST XP (Sulfometuron Methyl) 74222-97-2 50.00
*TELAR DF (Chlorsulfuron) 64902-72-3 25.00
INERT INGREDIENTS 25.00

* Disclosure as a toxic chemical is required under Section 313 of

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Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372.

HAZARDS IDENTIFICATION

Emergency Overview

CAUTION! Harmful if swallowed or absorbed through skin. Causes moderate eye irritation. Avoid contact with skin, eyes or clothing.

Potential Health Effects

Based on animal data from components, eye contact with DuPont Landmark XP may cause eye irritation with discomfort, tearing, or blurring of vision.

Based on animal data of one of the components, ingestion of DuPont Landmark XP may lead to red blood cell destruction.

Carcinogenicity Information

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

FIRST AID MEASURES

First Aid

IF IN EYES: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.

IF SWALLOWED: Call poison control center or doctor immediately for treatment advice. Have a person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or doctor. Do not give anything by mouth to an unconscious person.

IF ON SKIN OR CLOTHING: Take off contaminated clothing. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

IF INHALED: No specific intervention is indicated as the product is not likely to be hazardous by inhalation. Consult a physician if necessary.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You

may also contact 1-800-441-3637 for emergency medical treatment information.

FIRE FIGHTING MEASURES

Flammable Properties

Flammable limits in Air, % by Volume
LEL : 0.092 g/L

Not a fire or explosion hazard.

Like most organic powders or crystals, under severe dusting conditions, this material may form explosive mixtures in air.

Extinguishing Media

Water Spray, Foam, Dry Chemical, CO2.

Fire Fighting Instructions

Wear self-contained breathing apparatus. Wear full protective equipment. Use water spray. Runoff from fire control may be a pollution hazard.

If area is exposed to fire and conditions permit, let fire burn itself out. Burning chemicals may produce by-products more toxic than the original material. If product is on fire, wear self-contained breathing apparatus and full protective equipment. Use water spray. Control runoff.

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Emergency Response - Chemical resistant coveralls, waterproof gloves, waterproof boots and face/eye protection. If dusting occurs, use NIOSH approved respirator protection.

Initial Containment

Dike spill. Prevent material from entering sewers, waterways, or low areas.

Follow applicable Federal, State/Provincial and Local laws/regulations.

Spill Clean Up

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Shovel or sweep up.

HANDLING AND STORAGE

Handling (Personnel)

USERS SHOULD: Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.

Do not get in eyes. Avoid breathing dust, vapors or mist. Avoid contact with eyes, skin or clothing. Wash thoroughly after handling. Wash clothing after use. Do not store or consume food, drink or tobacco in areas where they may become contaminated with this material.

Handling (Physical Aspects)

Avoid dust generation. Keep away from heat, sparks and flames.

Storage

Store product in original container only. Do not contaminate water, food or feed by storage.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Use only with adequate ventilation. Keep container tightly closed.

Personal Protective Equipment

Always follow the label instructions when handling this product.

No PPE is specified; however, avoid contact with skin, eyes and clothing.

Use of Landmark XP Herbicide on non-crop sites is not within the scope of the Worker Protection Standard. Do not enter or allow others to enter the treated area until sprays have dried.

Exposure Guidelines

Applicable Exposure Limits

OUST XP

PEL (OSHA)	:	None Established
TLV (ACGIH)	:	5 mg/m ³ , 8 Hr. TWA, A4
AEL * (DuPont)	:	10 mg/m ³ , 8 & 12 Hr. TWA total dust

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TELAR DF

PEL (OSHA) : None Established
TLV (ACGIH) : None Established
AEL * (DuPont) : 5 mg/m³, 8 & 12 Hr. TWA, respirable dust
10 mg/m³, 8 & 12 Hr. TWA, total dust

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Oust XP (Sulfometuron Methyl)

Solubility in water : Dispersible
Odor : None
Form : Solid
Color : Off-white
Bulk density (Loose) : 33 lb/cu ft
Bulk density (Packed) : 39 lb/cu ft

Telar DF (Chlorsulfuron)

Solubility in water : Dispersible
pH : 4.5 @ 1% suspension
Odor : None
Form : Solid
Color : Tan
Specific gravity : 0.69 @ 250C (770F)
Density : 0.64 - 0.74 g/mL

STABILITY AND REACTIVITY

Chemical Stability

Stable at normal temperatures and storage conditions.

Incompatibility with Other Materials

None reasonably foreseeable.

Decomposition

Decomposition will not occur.

Polymerization

Polymerization will not occur.

TOXICOLOGICAL INFORMATION

Animal Data

Oust XP

Inhalation 4 hour LC50: > 5.3 mg/L in rats
Skin absorption LD50 : > 5000 mg/kg in rabbits
Oral LD50 : > 5000 mg/kg in rats

Oust XP is a slight to mild skin irritant, and a mild eye irritant, but is not a skin sensitizer in animals.

Single inhalation exposure with Oust XP (Sulfometuron Methyl 75%) in rats caused slight to moderate body weight loss, nasal and ocular discharge, and other nonspecific effects.

Single high oral doses of Oust XP (Sulfometuron Methyl 75%) produced no clinical signs of toxicity and no lesions were observed during pathological examination of tissue.

SULFOMETURON METHYL

Repeated exposures to high doses resulted in decreased body weight gain, liver changes, red blood cell hemolysis, and altered white blood cell counts. Long-term exposure caused mild hemolytic anemia, decreased body weight, alteration of clinical chemical parameters, and changes in the bile duct.

Animal testing indicates that Sulfometuron Methyl does not have carcinogenic effects. Developmental toxicity was observed but only at maternally toxic dose levels. In a two generation rat reproduction study, decreased numbers of pups were observed at the 5000 ppm level, a dose that was also maternally toxic. No reproductive effects were observed at 500 ppm.

Sulfometuron Methyl does not produce genetic damage in bacterial or mammalian cell cultures.

Telar DF Herbicide

Oral LD50 : > 2000 mg/kg in rats
Skin Absorption LD50 : > 5000 mg/kg in rats
Inhalation 4 hour LC50: > 5.5 mg/L in rats
(Chlorsulfuron)

Telar DF Herbicide is a mild reversible skin irritant, and a very mild eye irritant, and is not a skin sensitizer in animals.

CHLORSULFURON

The effects in animals from repeated exposures by inhalation to Chlorsulfuron include decreased weight gain, reversible kidney and spleen effects, and bone marrow changes.

Repeated oral dosing caused decreased weight gain, and hematological and clinical chemistry changes. Long-term

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dosing resulted in decreased body weight gain, and slight hematological changes.

Not carcinogenic in mice and female rats; a slight increase in Leydig cell tumors was observed in male rats after lifetime exposure at high doses.

Animal testing indicates that Chlorsulfuron did not show reproductive effects. Developmental toxicity has been observed but only at maternally toxic dose levels.

Chlorsulfuron did not produce genetic damage in bacterial and mammalian cell cultures. It did not produce heritable genetic damage.

ECOLOGICAL INFORMATION

Ecotoxicological Information

AQUATIC TOXICITY:

(Sulfometuron Methyl)

48 hour NOEC - Daphnia magna: > 150 mg/L.

96 hour LC50 - Rainbow trout: > 148 mg/L.

96 hour LC50 - Bluegill sunfish: > 150 mg/L.

AVIAN TOXICITY:

(Sulfometuron Methyl)

Acute Dietary LC50 - Mallard Duck: > 5000 ppm.

Acute Dietary LC50 - Bobwhite Quail: > 5620 ppm.

AQUATIC TOXICITY:

(Chlorsulfuron)

96 hour LC50 - Sheepshead minnow: > 980 mg/L.

96 hour LC50 - Bluegill sunfish: > 128 ppm.

96 hour LC50 - Rainbow trout: > 122 ppm.

48 hour EC50 - Daphnia magna: > 112 ppm.

AVIAN TOXICITY:

(Chlorsulfuron)

Acute Oral LD50 - Mallard Duck: > 5000 mg/kg.

Acute Oral LD50 - Bobwhite Quail: > 5000 mg/kg > 112 ppm.

Aquatic Toxicity

Chlorsulfuron

120 hour EC50, Freshwater algae: 0.05 ppm.

Avian Toxicity

Chlorsulfuron

Short term Dietary LC50 - Mallard Duck: > 5000 ppm

Short term Dietary LC50 - Bobwhite Quail: > 5620 ppm

DISPOSAL CONSIDERATIONS

Waste Disposal

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Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations.

Do not contaminate water supply, food or feed by storage or disposal.

Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

ENVIRONMENTAL HAZARDS

Do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water by cleaning of equipment or disposal of equipment washwaters.

Container Disposal

For Plastic Containers: Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

For Fiber Sacks: Completely empty fiber sack by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into manufacturing or application equipment. Then dispose of sack in a sanitary landfill or by incineration if allowed by State and local authorities.

For Fiber Drums With Liners: Completely empty liner by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application equipment. Then dispose of liner in a sanitary landfill or by incineration if allowed by State and local authorities. If drum is contaminated and cannot be reused, dispose of in the same manner.

For Paper and Plastic Bags: Completely empty bag into application equipment. Then dispose of empty bag in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

TRANSPORTATION INFORMATION

Shipping Information

DOT/IMO
Proper Shipping Name : NOT REGULATED

REGULATORY INFORMATION

U.S. Federal Regulations

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TITLE III HAZARD CLASSIFICATIONS SECTIONS 311, 312

Acute : Yes
Chronic : No
Fire : No
Reactivity : No
Pressure : No

In the United States this product is regulated by the US Environmental Protection Agency under the Federal Insecticide, Fungicide and Rodenticide Act. It is a violation of federal law to use this product in a manner inconsistent with its labeling.

EPA Reg. No. 352-645

State Regulations (U.S.)

*****ATTENTION*****

CALIFORNIA PROPOSITION 65

THIS PRODUCT CONTAINS CHLORSULFURON, A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

OTHER INFORMATION

NFPA, NPCA-HMIS

NFPA Rating
Health : 1
Flammability : 1
Reactivity : 0

NPCA-HMIS Rating
Health : 1
Flammability : 1
Reactivity : 0

Personal Protection rating to be supplied by user depending on use conditions.

(Continued)

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsibility for MSDS: DuPont Crop Protection
Address : Wilmington, DE 19898
Telephone : 1-888-638-7668

Indicates updated section.



DuPont™ Matrix® SG
herbicide



DuPontTM Matrix[®] SG

herbicide

WATER SOLUBLE GRANULE

For Weed Control in Citrus Fruit, Stone Fruit, Tree Nuts, Pome Fruit, Grapes, Potatoes, Potatoes grown for seed, and field grown Tomatoes

For Use in Rangeland Restoration West of the Mississippi River

For Selective Weed Control and Invasive Species Management in Non-Crop Sites

<i>Active Ingredients</i>	<i>By Weight</i>
Rimsulfuron	
N-((4,6-dimethoxypyrimidin-2-yl)aminocarbonyl)-3-(ethylsulfonyl)-2-pyridinesulfonamide	25.0%
<i>Other Ingredients</i>	75.0%
TOTAL	100.0%

EPA REG. NO. 352-768 EPA Est. No. _____

Nonrefillable Container

Net: _____

OR

Refillable Container

Net: _____

KEEP OUT OF REACH OF CHILDREN

CAUTION

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand this label, find someone to explain it to you in detail.)

FIRST AID

IF IN EYES:

- Hold eye open and rinse slowly and gently with water for 15-20 minutes.
- Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye.
- Call a poison control center or doctor for treatment advice.

IF ON SKIN OR CLOTHING:

- Take off contaminated clothing.
- Rinse skin immediately with plenty of water for 15-20 minutes.
- Call a poison control center or doctor for treatment advice.

IF SWALLOWED: No specific intervention is indicated as this product is not likely to be hazardous by ingestion. However, consult a poison control center or doctor if necessary.

Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact 1-800-441-3637 for emergency medical treatment information.

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

CAUTION. Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco, or using the toilet.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Some of the materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category A on an EPA chemical-resistant category selection chart.

Applicators and other handlers must wear:

- Long-sleeve shirt and long pants.
- Chemical resistant gloves Category A (such as butyl rubber, natural rubber, neoprene rubber, or nitrile rubber), all > 14 mils.
- Shoes plus socks.

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

USER SAFETY RECOMMENDATIONS

USERS SHOULD: Wash hands before eating, drinking, chewing gum, using tobacco or using toilet.

ENVIRONMENTAL HAZARDS

Do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water by cleaning of equipment or disposal of equipment washwaters or rinsate.

PRODUCT INFORMATION

DuPont™ MATRIX® SG herbicide must be used only in accordance with instructions on this label or in separate published DuPont labeling. DuPont will not be responsible for losses or damage resulting from use of this product in any manner not specifically instructed by DuPont.

MATRIX® SG herbicide is a water soluble granule formulation that selectively controls certain broadleaf weeds and grasses in pome fruit, citrus fruit, tree nut, stone fruit, and grape crops which have been established for at least one full growing season. MATRIX® SG herbicide also selectively controls certain broadleaf weeds and grasses in potatoes, potatoes grown for seed, and field grown tomatoes (direct seeded and transplant).

The best control is obtained when MATRIX® SG is applied to young, actively growing weeds. The degree and duration of control may depend on the following:

- weed spectrum and infestation intensity
- weed size at application
- environmental conditions at and following treatment

MATRIX® SG is registered for use in most states. Check with your state extension service or Department of Agriculture before use, to be certain MATRIX® SG is registered in your state.

TANK MIXTURES

To broaden the weed control spectrum and /or extend the residual effectiveness of MATRIX® SG herbicide, MATRIX® SG may be tank mixed with other registered herbicides affecting a different site of action (mode of action) and /or adjuvants registered for use on the crops listed on MATRIX® SG labeling.

Refer to the label(s) of the tank mix partner(s) for any additional use instructions or restrictions.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with the terms of this label.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency in your State responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 4 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

Coveralls.

Chemical resistant gloves made of any water proof material such as polyethylene or polyvinylchloride. Shoes plus socks.

NON-AGRICULTURAL USES

NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses. Use on noncrop sites and turf (unimproved) are not within the scope of the Worker Protection Standard. Do not enter or allow worker entry into treated areas until sprays have dried.

CITRUS FRUIT, STONE FRUIT, TREE NUTS, POME FRUIT, GRAPES

APPLICATION INFORMATION

MATRIX® SG should be applied as a uniform broadcast application to the orchard or vineyard floor or as a uniform band application directed at the base of the trunk or vine.

For broadcast applications, make a single application of MATRIX® SG at 4 ounces per acre per year. For improved weed management, MATRIX® SG should be applied in tank mixture with other registered preemergence herbicides.

When applied as a banded treatment (50% band or less), MATRIX® SG may be applied twice per year. However, do not apply more than 4 ounces per acre on a broadcast application basis per year. Unless otherwise specified on this label, or in separate published DuPont labeling, allow a minimum of 30 days between applications.

To help ensure uniform coverage, use a minimum of 10 gallons of spray solution per acre. Nozzle selection should meet manufacturer's spray volume and pressure instructions for preemergence or postemergence herbicide applications.

Do not apply MATRIX® SG by air. Use ground application equipment only.

Apply only to crops that have been established for one full growing season and are in good health and vigor.

Best results are obtained when the soil is moist at the time of application, and 1/2 inch of rainfall or sprinkler irrigation occurs within 2 weeks after application. Time the application(s) to take advantage of normal rainfall patterns and cool temperatures. Moisture for activation should occur within 2-3 weeks after application.

DuPont™ MATRIX® SG may also be applied by certain chemigation methods, such as micro-sprinkler. However, do not apply by overhead, flood, or drip irrigation.

Avoid direct or indirect spray contact with crop foliage or fruit, except undesirable suckers.

Do not use MATRIX® SG in a spray solution with a pH of below 4.0 or above 8.0, or with spray additives that buffer the pH to below 4.0 or above 8.0, since degradation of MATRIX® SG may occur.

CROP GROUP / CROP	PRE-HARVEST INTERVAL (PHI)
Citrus Fruit: Calamondin; Citrus citron; Citrus hybrids (includes chironja, tangelo, tangor); Grapefruit; Kumquat; Lemon; Lime; Mandarin (tangerine); Orange (sweet and sour); Pummelo; Satsuma mandarin	3 days
Pome Fruit: Apple; Crabapple; Loquat; Mayhaw; Pear; Oriental pear; Quince	7 days
Tree Nuts: Almond; Beech nut; Brazil nut; Butternut; Cashew; Chestnut; Chinquapin; Filbert (hazelnut); Hickory nut; Macadamia nut (bush nut); Pecan; Pistachio; Walnut (black and English)	14 days
Stone Fruit: Apricot; Cherry (sweet and tart); Nectarine; Peach; Plum; Plum (Chickasaw); Plum (Damson); Plum (Japanese); Plumcot; Prune (fresh)	14 days
Grapes	14 days

WEEDS CONTROLLED

Rainfall or irrigation is needed for herbicide activation. Length of control is a function of moisture for activation, soil temperature, soil texture and amount of moisture after application.

When weeds are present at application, include a labeled burn down herbicide, such as glyphosate, paraquat, or glufosinate, with an appropriate adjuvant. MATRIX® SG will help provide postemergence control of the weeds listed in this label. For best results, make postemergence applications to young, actively growing weeds and include a spray adjuvant.

Residual weed control may be reduced when MATRIX® SG is applied where where heavy crop trash and/or weed residue exists.

Weed control may also be reduced when applications of MATRIX® SG are made to weeds under stress from drought, excessive water, temperature extremes, disease or low humidity.

PREEMERGENCE WEED CONTROL

Grasses

Barnyardgrass
Crabgrass, large
Foxtail, Giant
Foxtail, Green
Foxtail, Yellow
Quackgrass
Wheat, Volunteer

Echinochloa crus-galli
Digitaria sanguinalis
Setaria faberi
Setaria viridis
Setaria glauca
Agropyron repens
Triticum aestivum

Broadleaves

Chamomile, False
Dandelion, common (seedling)
Filaree, Redstem
Fleabane, hairy
Groundsel, common
Henbit
Kochia
Mallow, common
Marestail/horseweed
Mustard, Birdsraps
Mustard, Black
Pigweed, Redroot
Pigweed, Smooth
Puncturevine
Purslane, Common
Spurge, prostrate
Spurge, spotted

Matricaria maritima
Taraxacum officinale
Erodium cicutarium
Conyza bonariensis
Senecio vulgaris
Lamium amplexicaule
Kochia scoparia
Malva neglecta
Conyza canadensis
Brassica rapa
Brassica nigra
Amaranthus retroflexus
Amaranthus hybridus
Tribulus terrestris
Portulaca oleracea
Euphorbia prostrata
Euphorbia maculata

PREEMERGENCE PARTIAL WEED CONTROL

Grasses

Wild Oat

Avena fatua

Broadleaves/Sedges

Cocklebur
Dandelion, common (established)
Lambsquarters, common
Nightshade, Black
Nightshade, Hairy
Nutsedge, yellow
Pigweed, Prostrate
Ragweed, Common
Velvetleaf

Xanthium spp.
Taraxacum officinale
Chenopodium album
Solanum nigrum
Solanum sarrachoides
Cyperus esculentus
Amaranthus blitoides
Ambrosia artemisiifolia
Abutilon theophrasti

POSTEMERGENCE WEED CONTROL

Grasses (1-2 inches)

Barley, Volunteer
Barnyardgrass
Bluegrass, Annual
Crabgrass, large (1/2 inch)
Foxtail, Bristly
Foxtail, Giant
Foxtail, Green
Foxtail, Yellow
Panicum, Fall

Hordeum vulgare
Echinochloa crus-galli
Poa annua
Digitaria sanguinalis
Setaria verticillata
Setaria faberi
Setaria viridis
Setaria glauca
Panicum
dichotomislorum
Triticum aestivum

Wheat, Volunteer

Broadleaves (1-3 inches)

Chamomile, False
Chickweed, common
Henbit
Kochia
Mustard, Black
Mustard, Wild
Pigweed, Redroot
Pigweed, Smooth
Purslane, common
Shepherd's-purse
Wild Radish

Matricaria maritima
Stellaria media
Lamium amplexicaule
Brassica rapa
Brassica nigra
Sinapis arvensis
Amaranthus retroflexus
Amaranthus hybridus
Portulaca oleracea
Capsella bursa-pastoris
Raphanus raphanistrum

POSTEMERGENCE PARTIAL WEED CONTROL

Grasses

Johnsongrass, seedling	<i>Sorghum halepense</i>
Millet, wild-proso	<i>Panicum miliaceum</i>
Oat, wild	<i>Avena fatua</i>
Quackgrass	<i>Agropyron repens</i>
Stinkgrass	<i>Eragrostis cilianensis</i>

Broadleaves/Sedges

Cocklebur	<i>Xanthium spp.</i>
Dandelion, common (>6 inches in diameter)	<i>Taraxacum officinale</i>
Lambsquarters, common	<i>Chenopodium album</i>
Mallow, common	<i>Malva neglecta</i>
Nightshade, hairy	<i>Solanum sarrachoides</i>
Nutsedge, yellow	<i>Cyperus esculentus</i>
Pigweed, prostrate	<i>Amaranthus blitoides</i>
Ragweed, common	<i>Ambrosia artemisiifolia</i>
Smartweed, Pennsylvania	<i>Polygonum pennsylvanicum</i>
Thistle, Canada	<i>Cirsium arvense</i>
Velvetleaf	<i>Abutilon theophrasti</i>

SPECIFIC WEED PROBLEMS

COMMON DANDELION AND MALLOW: DuPont™ MATRIX® SG provides excellent preemergence control of common dandelion and mallow germinating from seed. In high rainfall areas or where sprinkler irrigation is used, a second application may be needed to extend residual control throughout the growing season. When applications are made postemergence to these weeds, always add a suitable burndown herbicide such as glyphosate or paraquat. Small and medium sized plants (up to 6 inches in diameter) are controlled by postemergence applications of MATRIX® SG plus a burndown herbicide; however, plants that are larger than 6 inches in diameter may only be suppressed and may require a second application 4 to 6 weeks later.

MARESTAIL AND FLEABANE: Where marestail and fleabane are the target weeds, applications prior to emergence provide best results. This may require a fall application to help prevent fall germinated seedlings from becoming established during the winter. A foliar active herbicide with activity on fleabane and marestail (such as paraquat, glyphosate, and glufosinate) must be tank mixed with MATRIX® SG for best control and resistance management. After Fall application, a second application in the spring may be required to provide extended weed control into the summer. Where MATRIX® SG is applied for control of Marestail and Fleabane, it is also recommended that another soil residual herbicide be included as a tank mix or rotational partner to aid in resistance management.

PUNCTUREVINE: For best results, apply early in the spring when you can expect rainfall or overhead irrigation to move MATRIX® SG into the weed root zone before puncturevine germinates. Puncturevine emerges over a long period of time and late season germinations may not be controlled.

YELLOW NUTSEDGE: MATRIX® SG provides suppression of yellow nutsedge. To obtain the most effective results, use the highest rate allowed based on the width of your spray band and make two applications. For applications made postemergence to nutsedge, always add the appropriate rate of glyphosate and an effective adjuvant. On soils with high organic matter (6% or higher) always

apply postemergence to weeds since preemergence applications are not as effective on these soils.

Application Timing - Yellow Nutsedge

Preemergence plus Early Postemergence: Make the preemergence application when you can expect rainfall or overhead irrigation to move MATRIX® SG into the nutsedge root zone prior to nutsedge emergence. Make a second application when emerging nutsedge is 2 to 4 inches tall. **Postemergence plus Postemergence:** Make first application when emerging nutsedge is 2 to 4 inches tall. Repeat application 14 days later. **Note:** If yellow nutsedge is greater than 6 inches tall at the first application, weed control effectiveness will be greatly reduced.

ANNUAL SUMMER GRASSES (such as Barnyardgrass, Green foxtail, and Crabgrass): Where sprinkler irrigation is used, a fall or early spring application of MATRIX® SG will not provide season-long control of summer grasses like foxtail, barnyardgrass and crabgrass. For best results, use MATRIX® SG with a suitable tank-mix herbicide such as oryzalin or pendimethalin. A second application may be needed to provide extended control of summer grasses.

USE PRECAUTIONS

- Direct sprays to minimize spray contact with fruit or foliage.

Diuron Containing Products (Washington and Oregon): On coarse textured soils where crops are grown under sprinkler irrigation, avoid using diuron containing products (such as, Karmex XP or Direx 4L) as a tank-mix partner with MATRIX® SG between June 1 and September 30 since crop injury may result. MATRIX® SG tank-mixed with diuron products can be used in the fall (after September 30), or early spring when temperatures are cool to moderate.

CROP ROTATION - Fruit, Nut, and Vine Crops

Do not plant any crops, except field corn, tomatoes, potatoes, and those listed on this label in the "APPLICATION INFORMATION Section", within one year of the last MATRIX® SG application. Prior to planting, fields to be rotated to the above crops should have a thorough soil mixing - for example, two diskings, or a plowing and a disking. To help ensure rotational crop safety, a field bioassay should be completed prior to planting any other desired crops. The results of this bioassay may require the crop rotation interval to be extended. A successful field bioassay means growing to maturity a test strip of the crop(s) intended for production. The test strip should cross the entire field including knolls and low areas.

MICRO-SPRINKLER CHEMIGATION - Fruit, Nut, and Vine Crops

MATRIX® SG may be applied via micro-sprinkler chemigation. The chemigation system must contain a functional check valve, vacuum relief valve, and low pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from backflow. The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump. The pesticide injection pipeline must also contain a functional

(normally closed) solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops. The irrigation line or water pump must include a functional pressure switch which will stop the water pump motor when the water pressure decreases to the point where pesticide distribution is adversely affected. Systems must use a metering pump, such as a positive displacement injection pump (e.g., diaphragm pump) effectively designed and constructed of materials that are compatible with pesticide(s) and capable of being fitted with a system interlock. Do not apply DuPont™ MATRIX® SG through any other chemigation equipment.

USE PRECAUTIONS FOR CHEMIGATION - Fruit, Nut, and Vine Crops

- Do not connect an irrigation system used for MATRIX® SG Herbicide application to a public water system.
- Distributing treated water in an uneven manner can result in crop injury, lack of effectiveness, or over-tolerance pesticide residues in the crop. Therefore, to ensure that the mixture is applied evenly at the labeled rate, use sufficient water, apply the mixture for the proper length of time and ensure sprinkler produces a uniform water pattern.
- Do not permit run-off during chemigation.
- Continuous agitation in the mix tank is needed to keep the product from settling. If settling does occur, thoroughly re-agitate the tank mixture before using.

POTATOES

APPLICATION INFORMATION

PRE-EMERGENCE APPLICATIONS

For best results, apply MATRIX® SG at 1 to 1-1/2 oz product per acre, immediately after hilling, drag-off, or reservoir tillage (dam/dike operation), to a clean, newly prepared seedbed.

To activate MATRIX® SG in the soil, supply moisture by a single rainfall event, or apply sprinkler irrigation of 1/3 to 1" (sandy soils apply at least 1/3", sandy loams apply at least 1/2", silt soils apply at least 3/4", clay soils apply at least 1"), within 5 days after application, to move MATRIX® SG 2 to 3" deep into the soil profile. Activating sprinkler irrigation is required regardless of the soil moisture level at planting, or the cumulative precipitation that occurs over the next 5 days (unless rainfall occurs in a single event and equals the activation moisture requirement). If rainfall or sprinkler activation cannot be managed, waiting for weeds to emerge and applying MATRIX® SG postemergence would result in better weed control.

If a clean, newly prepared seedbed, free of emerged or germinating weeds does not occur, and weeds are present at application, add a spray adjuvant to the spray mix (See the "Spray Adjuvant" section of this label for additional information). Control may not be adequate for weeds that

have an established root system before activation of MATRIX® SG. Do not apply MATRIX® SG within 30 days of potato harvest. Do not exceed 2.5 oz of MATRIX® SG per acre per crop season.

TANK MIXTURES - PREEMERGENCE APPLICATIONS

MATRIX® SG may be tank mixed with pesticide products labeled for use on potatoes (such as "Eptam 7E", "Prowl", "Lorox" DF, DuPont™ CINCH® or "Dual II Magnum", "Roundup" or glyphosate-containing products registered for potatoes) in accordance with the most restrictive of label limitations and precautions. When tank mixing MATRIX® SG with another potato pesticide(s), read and follow all use directions, restrictions, and precautions of both MATRIX® SG and the tank mix partner(s).

MATRIX® SG may also be used in three-way tank mix combinations with the above pesticide(s). If these instructions conflict with this MATRIX® SG label, do not use as a tank mix with MATRIX® SG.

MATRIX® SG plus Metribuzin (Such as "Sencor")

Apply a tank mix combination of MATRIX® SG at 1 to 1-1/2 oz per acre and Metribuzin at 1/3 to 1 1/3 lb per acre for better control of such weeds as kochia, Russian thistle and common lambsquarters. For best results apply after hilling or drag-off to a clean, newly prepared seedbed, before potatoes emerge and weeds germinate. Read and follow the Metribuzin label for your area.

MATRIX® SG plus "Eptam 7E"

Apply a tank mix of MATRIX® SG at 1 to 1-1/2 oz per acre and "Eptam 7E" at label rates for better control of weeds such as hairy nightshade and crabgrass. For best results apply after hilling or drag-off to a clean, newly prepared seedbed, before potatoes emerge and weeds germinate. Since the rates and incorporation methods of "Eptam 7E" vary by region, follow the instructions for your region. It is recommended to incorporate a tank mix of "Eptam 7E" + MATRIX® SG using irrigation, and not equipment, to prevent poor weed control from deep incorporation of the MATRIX® SG.

If your area does not allow incorporation using irrigation, then apply "Eptam 7E" and MATRIX® SG in a split application. Read and follow both product labels for your area.

MATRIX® SG plus Pendimethalin (Such as "Prowl")

Apply a tank mix combination of MATRIX® SG at 1 to 1-1/2 oz per acre and "Prowl" at label rates for better control of such weeds as kochia, crabgrass, and common lambsquarters. For best results apply after hilling or drag-off to a clean, newly prepared seedbed, before potatoes emerge and weeds germinate. Read and follow the "Prowl" label for your area.

MATRIX® SG plus Linuron (Such as "Lorox" DF)

Apply a tank mix combination of MATRIX® SG at 1 to 1-1/2 oz per acre and "Lorox" DF at 1 to 4 lb per acre for better control of such weeds as common lambsquarter and common ragweed. For best results apply after hilling or drag-off to a clean, newly prepared seedbed, before potatoes emerge and weeds germinate. Read and follow the "Lorox" DF label for your area.

DuPont™ MATRIX® SG Plus S-Metolochlor (Such as DuPont™ CINCH® or "Dual II Magnum")

Apply a tank mix combination of MATRIX® SG at 1 to 1-1/2 oz per acre and CINCH® or "Dual II Magnum" at 1 to 2 pt per acre for better control of such weeds as yellow nutsedge and black nightshade. For best results apply after hilling or drag-off to a clean, newly prepared seedbed, before potatoes emerge and weeds germinate. Read and follow both product labels for your area.

POSTEMERGENCE APPLICATIONS - POTATOES

For postemergence applications, apply MATRIX® SG at 1 to 1 1/2 oz per acre to young, actively growing weeds after crop emergence. Typically, small weeds (less than 1" in height or diameter) that are actively growing at application are most easily controlled (See the "Specific Weed Problem" section of this label for more information).

Under growing conditions that promote crop stress (such as drought, frost, cold temperatures, high temperatures, or extreme temperature variations), temporary chlorosis (lime green color) may occur after application of MATRIX® SG. Symptoms usually disappear within 5 to 15 days.

For best results with MATRIX® SG postemergence, rainfall or sprinkler irrigation of 1/3 to 1" (sandy soils apply at least 1/3", sandy loams apply at least 1/2", silt soils apply at least 3/4", clay soils apply at least 1"), no sooner than 4 hours, but not more than 5 days after application, will activate MATRIX® SG in the soil and help provide control of subsequent flushes of annual weeds.

TANK MIXTURES (POTATOES)- POSTEMERGENCE APPLICATIONS

MATRIX® SG may be tank mixed with pesticide products labeled for use on potatoes (such as "Eptam 7E" and metribuzin) in accordance with the most restrictive of label limitations and precautions. When tank mixing MATRIX® SG with another potato pesticide(s), read and follow all use directions, restrictions, and precautions of both MATRIX® SG and the tank mix partner(s).

MATRIX® SG may also be used in three-way tank mix combinations with the above pesticide(s). If these instructions conflict with this MATRIX® SG label, do not use as a tank mix with MATRIX® SG.

MATRIX® SG Plus Foliar Fungicides

MATRIX® SG may be tank mixed with other suitable registered fungicides on potatoes (such as DuPont™ CURZATE® 60DF, "Manzate", and "Bravo").

Read and follow all manufacturer's label instructions for the companion fungicide. If these instructions conflict with this MATRIX® SG label, do not use as a tank mix with MATRIX® SG.

MATRIX® SG Plus Metribuzin (Such as "Sencor")

Apply a tank mix combination of MATRIX® SG at 1 to 1-1/2 oz per acre and Metribuzin (such as "Sencor") at 1/4 to 2/3 lb per acre for improved weed control of such weeds as Russian thistle, common lambsquarters and triazine-resistant weeds. Use a nonionic surfactant (NIS) at 0.125 % v/v (1 pt/100 gal of water). The addition of adjuvants to post emergence metribuzin applications may reduce crop tolerance. Adjuvants should be used with caution.

When possible, avoid post emergence applications on metribuzin sensitive varieties or if the crop is under stress. Read and follow both product labels for your area.

Note: The use of crop oil concentrate (COC) or methylated seed oil (MSO) is not recommended for tank mix combinations with MATRIX® SG plus Metribuzin.

MATRIX® SG Plus "Eptam 7E"

Apply MATRIX® SG herbicide at 1 to 1.5 ounce per acre in tankmix with 1 pint per acre of "Eptam 7E" herbicide. Include 1% volume/volume (1 gal per 100 gal spray solution) of either of a modified seed oil adjuvant (MSO) or 0.5% volume/volume (0.5 gal per 100 gal spray solution) of a organo-silicon/modified seed oil blend (OS/MSO – such as "Dyne-Amic", "Rivet", or "Phase"). Include 2 lb/acre of a spray-grade ammonium sulfate (AMS).

For best results, rainfall or sprinkler irrigation of 1/3 to 1" (sandy soils apply at least 1/3", sandy loams apply at least 1/2", silt soils apply at least 3/4", clay soils apply at least 1"), no sooner than 4 hours after application, but not more than 1 day after application.

Additional "Eptam 7E" can be added during the water in process if desired (read and follow all use directions, restrictions, and precautions on the "Eptam 7E" label before use. If these instructions conflict with this MATRIX® SG label, do not use as a tank mix with MATRIX® SG.)

Precautions:

- Crop Injury can occur (leaf burn and temporary yellowing) when applications are made under high temperatures. Addition of fungicides may increase the level of crop injury.

In warm, moist conditions, the expression of herbicide symptoms is accelerated; in cold, dry conditions, expression of herbicide symptoms is delayed and may be more variable in weed control.

SEQUENTIAL APPLICATIONS - POTATOES

Depending upon rainfall or other environmental conditions, and the density of the top growth of the potato variety (those with poor top growth such as Norkotah), annual weeds may have a second flush of germinating seedlings, and treated perennials may produce new growth from underground roots or stems. To maximize control of such weeds, it may be necessary to apply MATRIX® SG a second time, 14 to 28 days after the first application (typically, make applications to small weeds that are less than 1" in height or diameter that are actively growing). The combined rate of the applications cannot exceed 2.5 oz MATRIX® SG per acre.

POTATOES GROWN FOR SEED

MATRIX® SG may be used on potatoes grown for seed that use field grown tubers as the planted seed piece, and are at least the progeny of the first field planting*.

Apply MATRIX® SG by any of the following methods:

- Preemergence 1.5 oz per acre
- Postemergence at 1.0 to 1.5 oz per acre
- In a sequential application Preemergence at 1.0-1.5 oz per acre, followed by Postemergence at 1.0 oz per acre
- Postemergence at 1.0 oz per acre followed by Postemergence at 1.0 oz per acre.

Do not exceed 2.5 oz per acre of DuPont™ MATRIX® SG in the same year.

To activate MATRIX® SG preemergence, supply moisture by a single rainfall event, or apply sprinkler irrigation of 1/3 to 1" (sandy soils apply at least 1/3", sandy loams apply at least 1/2", silt soils apply at least 3/4", clay soils apply at least 1"), within 5 days after application, to move MATRIX® SG 2" to 3" deep into the soil profile.

Restrictions

- Do not apply to plants suffering stress from lack of moisture, cold, herbicide injury, and insect or disease injury.
- Do not use on potatoes grown for seed if these are grown from microtubers or transplants. Depending on geography, these may be referred to as Generation 1, Nuclear, Elite 1, or Pre-Elite.
- The rotational crop interval for Spring Barley is extended to 18 months due to the generally shorter growing seasons and different cultural practices in seed production in the states of California, Idaho, Oregon, Montana, South Dakota, Washington, Colorado, and parts of North Dakota**.

Precautions

- The rotational crop interval listed in the MATRIX® SG label may need to be extended to 18 months if seed potato production practices decrease water and/or time for MATRIX® SG breakdown. Practices that may shorten the breakdown are late planting or less frequent irrigations as compared to commercial production practices. Potatoes can be planted at anytime.
 - Consider informing your state seed certification agency or inspector that MATRIX® SG has been applied. Under growing conditions that promote crop stress (such as drought, frost, cold temperatures, high temperatures, or extreme temperature variations), temporary chlorosis (lime green color) may occur after application. These symptoms may appear similar to virus like symptoms (such as chlorosis, leaf crinkling, pinching of terminal leaflet) but will usually disappear within 5 to 15 days of application.
- * First field planting utilizes laboratory tested stocks which may be tissue cultured plantlets, greenhouse produced microtubers, minitubers, stem cuttings, or line selections.
- ** All counties in North Dakota except Pembina, Towner, Walsh, Grand Forks, Trail and Cass.

WEEDS CONTROLLED - POTATO

PREEMERGENCE CONTROL

Grasses

Barnyardgrass	(Echinochloa crus-galli)
Foxtail, Giant	(Setaria faberi)
Foxtail, Green	(Setaria viridis)
Foxtail, Yellow	(Setaria glauca)
Wheat, Volunteer	(Triticum aestivum)

Broadleaves

Chamomile, False	(Matricaria maritima L.)
Filaree, Redstem	(Erodium cicutarium)
Henbit	(Lamium amplexicaule)
Kochia	(Kochia scoparia)
Mustard, Birdrape	(Brassica rapa L.)
Mustard, Black	(Brassica nigra)
Pigweed, Prostrate	(Amaranthus blitoides)
Pigweed, Redroot	(Amaranthus retroflexus)
Pigweed, Smooth	(Amaranthus hybridus)
Purslane, Common	(Portulaca oleracea)

PREEMERGENCE (PARTIAL CONTROL)

Grasses

Crabgrass	(Digitaria spp.)
Wild Oat	(Avena fatua)

Broadleaves

Cocklebur	(Xanthium spp.)
Lambsquarters, Common	(Chenopodium album)
Nightshade†, Black	(Solanum nigrum)
Nightshade, Hairy	(Solanum sarrachoides)
Pigweed, Prostrate	(Amaranthus blitoides)
Ragweed, Common	(Ambrosia artemisiifolia)
Velvetleaf	(Abutilon theophrasti)

† Eastern Black Nightshade (Solanum ptycanthum) is NOT Controlled or suppressed

POSTEMERGENCE CONTROL

Grasses

Barley, Volunteer	(Hordeum vulgare)
Barnyardgrass	(Echinochloa crus-galli)
Bluegrass, Annual	(Poa annua)
Crabgrass	(Digitaria spp)
Foxtail, Bristly	(Setaria verticillata)
Foxtail, Giant	(Setaria faberi)
Foxtail, Green	(Setaria viridis)
Foxtail, Yellow	(Setaria glauca)
Panicum, Fall	(Panicum dichotomislorum)
Wheat, Volunteer	(Triticum aestivum)

Broadleaves

Chamomile, False	(Matricaria maritima L.)
Chickweed, Common	(Stellaria media)
Henbit	(Lamium amplexicaule)
Kochia	(Kochia scoparia)
Mustard, Birdrape	(Brassica rapa L.)
Mustard, Black	(Brassica nigra)
Mustard, Wild	(Sinapis arvensis)
Pigweed, Redroot	(Amaranthus retroflexus)
Pigweed, Smooth	(Amaranthus hybridus)
Purslane, Common	(Portulaca oleracea)
Shepherd's purse	(Capsella bursa-pastoris)
Wild Radish	(Raphanus raphanistrum)

POSTEMERGENCE (PARTIAL CONTROL)‡

Grasses

Johnsongrass, Seedling	(Sorghum halepense)
Millet, Wild Proso	(Panicum miliaceum)
Stinkgrass	(Eragrostis cilianensis)
Wild Oat	(Avena fatua)
Yellow Nutsedge	(Cyperus esculentus)

Broadleaves

Thistle, Canada†	(Cirsium arvense)
Cocklebur	(Xanthium spp.)
Lambsquarters, Common	(Chenopodium album)
Morningglory, Ivyleaf	(Ipomoea hederacea)
Nightshade, Hairy	(Solanum sarrachoides)
Nightshade*†, Black	(Solanum nigrum)
Pigweed, Prostrate	(Amaranthus blitoides)
Quackgrass†	(Agropyron repens)
Ragweed, Common	(Ambrosia artemisiifolia)
Smartweed, Pennsylvania	(Polygonum pennsylvanicum)
Velvetleaf	(Abutilon theophrasti)
Volunteer Alfalfa**	(Medicago sativa)

* Eastern Black Nightshade (Solanum ptycanthum) is NOT Controlled or suppressed.

- ** Except in California
- ‡ Weed partial control is a reduction in weed competition (reduced population and/or vigor) as visually compared to an untreated area. The degree of partial control varies with the rate used, the size of the weeds, and the environmental conditions following treatment.
- † See Specific Weed Problems

AERIAL APPLICATION

(See Also SPRAY DRIFT)

- Use nozzle types and arrangements that will provide optimum spray distribution and maximum coverage at a minimum of 5 GPA. In California use a minimum of 10 GPA.
- Do not apply during a temperature inversion, when winds are gusty, or when conditions favor poor coverage and/or off-target spray movement.
- Do not apply by air in the state of California, except in Modoc or Siskiyou counties. Do not apply by air in the state of New York.

CHEMIGATION - POTATOES ONLY

DuPont™ MATRIX® SG can be applied using center pivot, lateral move, solid set, or hand move irrigation systems in potatoes. Do not apply MATRIX® SG using any other type of irrigation system. Check irrigation systems to insure uniform application of water to all areas. Failure to apply MATRIX® SG uniformly may result in crop injury and/or poor weed control.

For best results, use the highest labeled rate and apply preemergence to early postemergence to the weeds (weeds less than 1" tall). If weeds are present at application, add a nonionic surfactant containing at least 80% active ingredient to the spray mix at 1 to 2 pt/acre.

MATRIX® SG may be mixed in a supply tank with water, fertilizer, or other appropriate agricultural chemicals. Maintain continuous agitation in the injection nurse tanks during application.

For solid set and hand move irrigation systems, apply MATRIX® SG at the beginning of the set and then apply 1/3 to 1" of water for activation (sandy soils apply at least 1/3", sandy loams apply at least 1/2", silt soils apply at least 3/4", clay soils apply at least 1").

For center pivot and lateral move irrigation systems, apply MATRIX® SG in 1/3 to 1" of water for activation as a continuous injection (sandy soils apply at least 1/3", sandy loams apply at least 1/2", silt soils apply at least 3/4", clay soils apply at least 1").

If you have questions about calibrating chemigation equipment, contact State Extension Service specialists, equipment manufacturers, or other experts. If the chemigation equipment needs adjustment, only the custodian responsible for its operation, or someone under the supervision of that custodian, should make the necessary adjustments.

IRRIGATION SYSTEM REQUIREMENTS

The irrigation system must contain the following:

- a functional check valve
- vacuum relief valve
- a low pressure drain (to prevent water source contamination from backflow; should be located on the irrigation pipeline)
- functional interlocking controls (to automatically shut-off the pesticide injection pump when the water pump motor stops)

- a metering pump, such as a positive displacement injection pump (e.g., diaphragm pump) effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock

The pesticide injection pipeline must contain the following:

- a functional, automatic, quick-closing check valve (to prevent the flow of fluid back toward the injection pump)
- a functional, solenoid-operated valve (normally closed) located on the intake side of the injection pump (should be connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is shut down either automatically or manually)

The irrigation line or water pump must include a functional pressure switch that will stop the water pump motor when pesticide distribution is adversely affected by a decrease in water pressure.

CHEMIGATION PRECAUTIONS

Distributing treated water in an uneven manner can result in crop injury, lack of effectiveness, or over-tolerance pesticide residues in the crop. Therefore, to ensure that the mixture is applied evenly at the labeled rate, use sufficient water, and apply the mixture for the proper length of time.

- Do not permit run-off during chemigation.
- Do not apply when wind speed favors drift beyond the area intended for treatment.
- Do not connect an irrigation system (including greenhouse systems) used for MATRIX® SG application to a public water system.

MATRIX® SG ROTATIONAL CROP GUIDELINES - POTATO

For crops listed below, planting prior to the interval shown may result in crop injury when using MATRIX® SG. Rotation intervals may need to be extended to 18 months if drought conditions prevail after application and before the rotational crop is planted, unless supplemental sprinkler irrigation has been applied and totals greater than 15" during the growing season. For tank mixtures, follow the most restrictive rotational crop guideline

Rotation Crop	Interval (months)
Alfalfa**	4
Barley, Spring *	9
Beans, Dry	10
Beans, Succulent	10
Carrots (Kern County, CA)**	4
Carrots**	10
Corn, Field	Anytime
Corn, Popcorn	10
Corn, Sweet	10
Cotton	10
Cover Crops (erosion control)	4
Cucumber	10
Garlic	6
Grass, pasture, hay, seed**	4
Mint**	4
Oats, Spring	9
Onions**	10
Peas**	8
Potatoes	Anytime
Sunflowers	10
Soybeans	4
Tomatoes	Anytime
Wheat, Spring	9
Wheat, Winter	4
Crops Not Listed	18

* Idaho - 18 months for Teton county, Caribou county, Madison county east of Hwy 20, and Fremont county east of Hwy 20.

Colorado - Alamosa, Conejos, Costilla, Rio Grande and Saguache counties: 1.5 oz or less DuPont™ MATRIX® SG per acre per season--9 months; greater than 1.5 oz of MATRIX® SG per acre per season--18 months

**For the select counties listed below in OR and WA where potatoes are grown under a minimum of 18 inches of sprinkler irrigation per season, alfalfa may be rotated at 4 months after application. All other areas may be rotated to alfalfa at 18 months after application. This rotation interval is for sand, loamy sand and sandy loam soils having not more than 1.5% organic matter where a minimum of 18 inches of sprinkler irrigation is used on the previous potato crop. Injury to the rotated crop may occur if less than 18 inches of irrigation is used on the previous potato crop. For tank mixtures, follow the most restrictive rotational crop guideline.

For Rotation to Alfalfa: MATRIX® SG in potatoes not to exceed 1 ounce per use season in Adams, Grant, Douglas and Lincoln counties of Washington, and MATRIX® SG in potatoes not to exceed 1.5 ounces per acre per use season in Benton, Franklin, Klickitat, Walla Walla and Yakima counties in Washington and Morrow and Umatilla counties in Oregon.

For Rotation to Onions and Carrots: MATRIX® SG in potatoes not to exceed 1.5 ounces per acre per use season in Adams, Grant, Douglas and Lincoln counties of Washington, and MATRIX® SG in potatoes not to exceed 2.5 ounces per acre per season in Benton, Franklin, Klickitat, Walla Walla and Yakima counties in Washington and Morrow and Umatilla counties in Oregon.

For Rotation to Grass Crops Grown for Seed, Hay or Pasture: MATRIX® SG in potatoes not to exceed 1.5 ounces per acre per use season in Adams, Grant, Douglas and Lincoln counties of Washington, and MATRIX® SG in potatoes not to exceed 2.5 ounces per acre per use season in Benton, Franklin, Klickitat, Walla Walla and Yakima counties in Washington and Morrow and Umatilla counties in Oregon.

For Rotation to Peas and Mints: MATRIX® SG in potatoes not to exceed 1.5 ounces per acre per use season in all areas.

NOTE: MATRIX® SG should not be used in a tankmix or sequential application program with other soil residual ALS-inhibiting herbicides on potatoes as the combined effects of these herbicides on the planting of subsequent crops have not been thoroughly investigated and crop injury may occur.

RESTRICTIONS

Potatoes

- Do not apply MATRIX® SG on potatoes within 30 days of harvest.
- Do not exceed 2.5 oz MATRIX® SG per acre on potatoes during the same growing season.
- Do not apply to sweet potatoes or yams.
- Do not use MATRIX® SG on potatoes grown for seed, except as directed on this labeling or supplemental labeling.
- Do not apply to potatoes growing in Greenhouses, Cold Frames, Pot cultures, etc. Apply only to potatoes growing in fields.

TOMATOES (DIRECT SEEDED AND TRANSPLANT)

PREEMERGENCE APPLICATIONS

For preemergence applications to the crop, apply MATRIX® SG after seeding at 2.0-4.0 oz. product per acre.

To activate MATRIX® SG in the soil, supply moisture by a single rainfall event, or apply sprinkler irrigation of 1/2 to 1" (sandy soils apply at least 1/2", sandy loams apply at least 1/2", silt soils apply at least 3/4", clay soils apply at least 1"), within 5 days after application, to move MATRIX® SG 2 to 3" deep into the soil profile. Activating sprinkler irrigation is required regardless of the soil moisture level at planting, or

the cumulative precipitation that occurs over the next 5 days (unless rainfall occurs in a single event and equals the activation moisture requirement). If rainfall or sprinkler activation cannot be managed, waiting for weeds to emerge and applying MATRIX® SG postemergence may result in better weed control.

If a clean, newly prepared seedbed, free of emerged or germinating weeds does not occur, and weeds are present at application, the addition of a spray adjuvant may improve weed control (See the "Spray Adjuvant" section of this label for additional information). Control may not be adequate for weeds that are greater than 1" in height or diameter or weeds that have an established root system before activation of MATRIX® SG.

POSTEMERGENCE APPLICATIONS

For postemergence applications, apply MATRIX® SG at 1.0-2.0 oz product per acre (use 2.0 oz per acre for longer residual) to young, actively growing weeds after the crop has reached the cotyledon stage. Optimum performance is obtained when weeds are less than 1" in height or diameter and are actively growing.

Use a surfactant at a minimum rate of 0.25% V/V (2 pints/100 gallons of water). The use of crop oil concentrate, methylated seed oils, nitrogen fertilizer solution or nonionic surfactant rates above 0.25% V/V may result in temporary crop chlorosis (lime green color). Symptoms usually disappear within 5 to 15 days.

Under growing conditions that promote crop stress (such as drought, frost, cold temperatures, high temperatures, extreme temperature variations or saturated or water-logged soils), temporary crop chlorosis (lime green color) may occur after application of MATRIX® SG. Symptoms usually disappear within 5 to 15 days.

For best results with MATRIX® SG postemergence, rainfall or sprinkler irrigation of 1/2 to 1" (sandy soils apply at least 1/2", sandy loams apply at least 1/2", silt soils apply at least 3/4", clay soils apply at least 1"), no sooner than 4 hours, but not more than 5 days after application, will activate MATRIX® SG in the soil and help provide control of subsequent flushes of annual weeds.

Postemergence applications of MATRIX® SG should be made after the tomatoes reach the cotyledon stage.

SEQUENTIAL APPLICATIONS TOMATOES

Annual weeds at times may have multiple flushes of seedlings, or treated weeds may sometimes regrow from underground stems or roots, depending upon rainfall and other environmental conditions. To maximize control of such weeds, it may be necessary to use sequential applications of MATRIX® SG.

PREEMERGENCE FOLLOWED BY POSTEMERGENCE

Applications of MATRIX® SG may be applied Preemergence followed by single or multiple applications Postemergence.

Note : For sequential applications the total amount of MATRIX® SG cannot exceed 4.0 oz. product per acre per year on a broadcast basis.

POSTEMERGENCE FOLLOWED BY POSTEMERGENCE

Multiple applications of DuPont™ MATRIX® SG may be applied postemergence, optimum control is seen when the first application is made to small actively growing weeds, followed by a second application 7 to 14 days later.

Note : For sequential applications the total amount of MATRIX® SG cannot exceed 4.0 oz. product per acre per year on a broadcast basis.

BAND APPLICATIONS - TOMATOES

MATRIX® SG can be applied preemergence and postemergence as a banded application. Use proportionally less spray mixture based on the soil area actually sprayed. See the "Preemergence Applications" and "Postemergence Applications" sections of this label for additional details on the use of MATRIX® SG.

TANK MIXTURES - TOMATOES

MATRIX® SG may be tank mixed with pesticide products labeled for use on tomatoes in accordance with the most restrictive of label limitations and precautions. When tank mixing MATRIX® SG with another tomato pesticide(s), read and follow all use directions, restrictions, and precautions of both MATRIX® SG and the tank mix partner(s).

MATRIX® SG may also be used in three-way tank mix combinations with the above pesticide(s). If these instructions conflict with this MATRIX® SG label, do not use as a tank mix with MATRIX® SG. Tank mixtures with products that lower the spray solution pH may reduce weed control (such as LI700 surfactant).

MATRIX® SG Plus Foliar Fungicides

MATRIX® SG may be tank mixed with other suitable registered fungicides on tomatoes (such as "Manzate", and "Bravo"). Tank mixes with Copper containing fungicides may reduce weed control.

Read and follow all manufacturers' label instructions for the companion fungicide. If these instructions conflict with this MATRIX® SG label, do not use as a tank mix with MATRIX® SG.

TOMATOES: CALIFORNIA

PREEMERGENCE APPLICATIONS

For preemergence applications to the crop, apply MATRIX® SG after seeding at 2.0-4.0 oz. product per acre. To activate MATRIX® SG in the soil, supply moisture by a single rainfall event, or apply sprinkler irrigation of 1/2 to 1" (sandy soils apply at least 1/2", sandy loams apply at least 1/2", silt soils apply at least 3/4", clay soils apply at least 1"), within 5 days after application, to move MATRIX® SG 2 to 3" deep into the soil profile. Activating sprinkler irrigation is required regardless of the soil moisture level at planting, or the cumulative precipitation that occurs over the next 5 days (unless rainfall occurs in a single event and equals the activation moisture requirement). If rainfall or sprinkler activation cannot be managed, waiting for weeds to emerge and applying MATRIX® SG postemergence may result in better weed control.

If a clean, newly prepared seedbed, free of emerged or germinating weeds does not occur, and weeds are present at application, the addition of a spray adjuvant may improve

weed control (See the "Spray Adjuvant" section of this label for additional information). Control may not be adequate for weeds that are greater than 1" in height or diameter or weeds that have an established root system before activation of MATRIX® SG.

POSTEMERGENCE APPLICATIONS

For postemergence applications, apply MATRIX® SG at 2.0 oz. product per acre to young, actively growing weeds after the crop has reached the cotyledon stage. Optimum performance is obtained when weeds are less than 1" in height or diameter and are actively growing.

Use a surfactant at a minimum rate of 0.25% V/V (2 pints/100 gallons of water). The use of crop oil concentrate, methylated seed oils, nitrogen fertilizer solution or nonionic surfactant rates above 0.25% V/V may result in temporary crop chlorosis (lime green color). Symptoms usually disappear within 5 to 15 days.

Under growing conditions that promote crop stress (such as drought, frost, cold temperatures, high temperatures, extreme temperature variations or saturated or water-logged soils), temporary crop chlorosis (lime green color) may occur after application of MATRIX® SG. Symptoms usually disappear within 5 to 15 days.

For best results with MATRIX® SG postemergence, rainfall or sprinkler irrigation of 1/2 to 1" (sandy soils apply at least 1/2", sandy loams apply at least 1/2", silt soils apply at least 3/4", clay soils apply at least 1"), no sooner than 4 hours, but not more than 5 days after application, will activate MATRIX® SG in the soil and help provide control of subsequent flushes of annual weeds.

Postemergence applications of MATRIX® SG should be made after the tomatoes reach the cotyledon stage.

SEQUENTIAL APPLICATIONS

Annual weeds at times may have multiple flushes of seedlings, or treated weeds may sometimes regrow from underground stems or roots, depending upon rainfall and other environmental conditions. To maximize control of such weeds, it may be necessary to use sequential applications of MATRIX® SG.

PREEMERGENCE FOLLOWED BY POSTEMERGENCE

Applications of MATRIX® SG may be applied Preemergence followed by single or multiple applications Postemergence.

Note : For sequential applications the total amount of MATRIX® SG cannot exceed 4.0 oz. product per acre per year on a broadcast basis.

POSTEMERGENCE FOLLOWED BY POSTEMERGENCE

Multiple applications of MATRIX® SG may be applied postemergence, optimum control is seen when the first application is made to small actively growing weeds, followed by a second application 7 to 14 days later.

Note : For sequential applications the total amount of MATRIX® SG cannot exceed 4.0 oz. product per acre per year on a broadcast basis.

BAND APPLICATIONS – TOMATOES:

DuPont™ MATRIX® SG can be applied in a preemergence band at 2.0 - 4.0 oz. product per acre (For example, 0.5-1.0 oz. of product per conventional broadcast acre assuming 25% banding) followed by two separate postemergence band applications applied at 2 oz. product per acre (For example, 0.5 oz of product per conventional broadcast acre assuming 25% banding) over the same sprayed area.

MATRIX® SG can be applied using three postemergence band applications at 2 oz. product per acre (For example, 0.5 oz of product per conventional broadcast acre assuming 25% banding).

Do not make any more than three band applications of MATRIX® SG in one growing season.

WEEDS CONTROLLED - TOMATO

PREEMERGENCE CONTROL

Grasses

Barnyardgrass	(Echinochloa crus-galli)
Foxtail, Giant	(Setaria faberi)
Foxtail, Green	(Setaria viridis)
Foxtail, Yellow	(Setaria glauca)
Wheat, Volunteer	(Triticum aestivum)

Broadleaves

Filaree, Redstem	(Erodium cicutarium)
Henbit	(Lamium amplexicaule)
Kochia	(Kochia scoparia)
Mustard, Black	(Brassica nigra)
Pigweed, Redroot	(Amaranthus retroflexus)
Pigweed, Smooth	(Amaranthus hybridus)
Purslane, Common	(Portulaca oleracea)

PREEMERGENCE (PARTIAL CONTROL)

Grasses

Crabgrass	(Digitaria spp.)
Wild Oat	(Avena fatua)

Broadleaves

Cocklebur	(Xanthium spp.)
Lambsquarters, Common	(Chenopodium album)
Nightshade*, Black†	(Solanum nigrum)
Nightshade, Hairy	(Solanum sarrachoides)
Pigweed, Prostrate	(Amaranthus blitoides)
Ragweed, Common	(Ambrosia artemisiifolia)
Velvetleaf	(Abutilon theophrasti)

* Eastern Black Nightshade (Solanum ptycanthum) is NOT Controlled or suppressed.

Black Nightshade suppression is only for use in Tomatoes in California.

† See Specific Weed Problems

POSTEMERGENCE CONTROL (Weeds not to exceed 1" in height)

Grasses

Barley, Volunteer	(Hordeum vulgare)
Barnyardgrass	(Echinochloa crus-galli)
Bluegrass, Annual	(Poa annua)
Crabgrass	(Digitaria spp.)
Foxtail, Bristly	(Setaria verticillata)
Foxtail, Giant	(Setaria faberi)
Foxtail, Green	(Setaria viridis)
Foxtail, Yellow	(Setaria glauca)
Panicum, Fall	(Panicum dichotomisorum)
Wheat, Volunteer	(Triticum aestivum)

Broadleaves

Chamomile, False	(Matricaria maritima L.)
Chickweed, Common	(Stellaria media)
Henbit	(Lamium amplexicaule)
Kochia	(Kochia scoparia)
Mustard, Birdsraps	(Brassica rapa L.)
Mustard, Black	(Brassica nigra)
Mustard, Wild	(Sinapis arvensis)
Pigweed, Redroot	(Amaranthus retroflexus)
Pigweed, Smooth	(Amaranthus hybridus)
Purslane, Common	(Portulaca oleracea)
Shepherd's purse	(Capsella bursa-pastoris)
Wild Radish	(Raphanus raphanistrum)

POSTEMERGENCE (PARTIAL CONTROL)‡

Grasses

Johnsongrass, Seedling	(Sorghum halepense)
Millet, Wild Proso	(Panicum miliaceum)
Stinkgrass	(Eragrostis cilianensis)
Quackgrass†	(Agropyron repens)
Wild Oat	(Avena fatua)
Yellow Nutsedge	(Cyperus esculentus)

Broadleaves

Thistle, Canada†	(Cirsium arvense)
Cocklebur	(Xanthium spp.)
Lambsquarters, Common	(Chenopodium album)
Morningglory, Ivyleaf	(Ipomoea hederacea)
Nightshade, Hairy	(Solanum sarrachoides)
Nightshade*†, Black (cotyledon stage only)	(Solanum nigrum)
Pigweed, Prostrate	(Amaranthus blitoides)
Ragweed, Common	(Ambrosia artemisiifolia)
Smartweed, Pennsylvania	(Polygonum pensylvanicum)
Velvetleaf	(Abutilon theophrasti)
Volunteer Alfalfa**	(Medicago sativa)

* Eastern Black Nightshade (Solanum ptycanthum) is NOT Controlled or suppressed.

Black Nightshade partial control is only for use in Tomatoes in California.

**Except California

‡ Partial control is a reduction in weed competition (reduced population and/or vigor) as visually compared to an untreated area. The degree of partial control varies with the rate used, the size of the weeds, and the environmental conditions following treatment.

† See Specific Weed Problems

MATRIX® SG ROTATIONAL CROP GUIDELINES - TOMATO

For crops listed below, planting prior to the interval shown may result in crop injury when using MATRIX® SG. Rotation intervals may need to be extended to 18 months if drought conditions prevail after application and before the rotational crop is planted, unless supplemental sprinkler irrigation has been applied and totals greater than 15" during the growing season. For tank mixtures, follow the most restrictive rotational crop guideline.

Rotation Crop	Interval (months)
Beans, Dry	10
Beans, Snap	10
Corn, Field	Anytime
Corn, Sweet	10
Cotton	10
Cucumber	10
Garlic	6
Potatoes	Anytime
Soybeans	10
Tomatoes	Anytime
Wheat, Winter	4
Crops Not Listed	12

Note: Where drip irrigated tomatoes are grown, rotate only to tomato, potato or field corn as crop injury may result.

Rotational crops may be planted at indicated intervals provided the fields are deep disked or plowed, and thorough soil mixing is achieved, prior to planting the rotational crop.

RESTRICTIONS

Tomatoes

- Do not apply DuPont™ MATRIX® SG within 45 days of tomato harvest.
- Do not apply MATRIX® SG by air on tomatoes.
- Do not apply using assisted (Airblast) field crops sprayers on tomatoes.
- Do not exceed 4.0 oz. MATRIX® SG per acre (broadcast basis) on tomatoes during the same growing season.
- Banding applications of MATRIX® SG should not exceed 4.0 ounces on a broadcast basis in the same growing season.
- Do not apply to tomatoes growing in Greenhouses, Cold Frames, Pot cultures, etc. Apply only to tomatoes growing in fields.
- Do not apply through any type of irrigation system.

CULTIVATION

A timely cultivation may be necessary to control suppressed weeds, weeds that were beyond the maximum size at application, or weeds that emerge after an application of MATRIX® SG.

- Cultivation up to 7 days before the postemergence application of MATRIX® SG may decrease weed control by pruning weed roots, placing the weeds under stress, or covering the weeds with soil and preventing coverage by MATRIX® SG.
- To allow MATRIX® SG to fully control treated weeds, cultivation is not recommended for 7 days after application.
- Optimum timing for cultivation is 7 - 14 days after a postemergence application of MATRIX® SG.

SPECIFIC WEED PROBLEMS

Quackgrass: For best results, apply MATRIX® SG postemergence to quackgrass that is 4 to 8" tall. Quackgrass not emerged at the time of application will not be controlled or suppressed, and would require a second postemergence application for acceptable control.

Black Nightshade (Tomatoes): For best results, apply MATRIX® SG preemergence (prior to weed germination) at 2 - 4 oz per acre followed by a postemergence application at 1 to 2 oz per acre to small actively growing weeds.

Canada Thistle: For best results, apply MATRIX® SG postemergence to small actively growing Canada thistle. Canada thistle not emerged at the time of application will not be controlled or suppressed, and would require a second postemergence application for acceptable control.

SPRAY ADJUVANTS

Include a spray adjuvant with applications of MATRIX® SG when applied by itself and postemergence to the weeds. Consult your Ag dealer or applicator, local DuPont fact sheets, technical bulletins, and service policies prior to using an adjuvant system. If another herbicide is tank mixed with MATRIX® SG, select adjuvants authorized for use with both products. Products must contain only EPA-exempt ingredients (40 CFR 1001).

Nonionic Surfactant (NIS)

- Apply 0.125 to 0.25% v/v (1 to 2 pt/100 gal of water). The 0.25% v/v rate is preferred under arid or drought conditions.
- Surfactant products must contain at least 80% nonionic surfactant with a hydrophilic/lipophilic balance (HLB) greater than 12.

Petroleum Crop Oil Concentrate (COC) or Modified Seed Oil (MSO)

- Apply at 1% volume/volume (1 gal per 100 gal spray solution), or 2% under arid conditions.
- Oil adjuvants must contain at least 80% high quality, petroleum (mineral) or modified vegetable seed oil with at least 15% surfactant emulsifiers.
- Blended products which contain both MSO and Silicone are acceptable at labeled rates.

Ammonium Nitrogen Fertilizer

- Use 2 qt/acre of a high-quality urea ammonium nitrate (UAN), such as 28%N or 32%N, or 2 lb/acre of a spray grade ammonium sulfate (AMS). Use 4 qt/acre UAN or 4 lb/acre AMS under arid conditions.
- Do not use liquid nitrogen fertilizer as the total carrier solution.

Special Adjuvant Types

- Combination adjuvant products may be used at doses that provide the required amount of NIS and ammonium nitrogen fertilizer. Consult product literature for use rates and restrictions.
- Do not use any other adjuvant rates or mixtures with MATRIX® SG unless instructed to do so on DuPont Technical Bulletins.

Precautions:

1. The use of silicone polymer type surfactants is not suggested as reduced weed control may result.
2. Avoid using crop oil concentrate (COC) or methylated seed oil (MSO) when potatoes are under heat stress (>85 degrees F) as multiple stresses may cause crop injury.

EQUIPMENT-SPRAY VOLUMES

Agitate the spray tank continuously to keep the material in suspension.

Do not use equipment and/or spray volumes that will cause damage from spray by drift onto nontarget sites. Do not make applications when weather conditions are likely to cause spray to drift onto nontarget sites. (See the "Spray Drift Management" section of this label for additional information).

GROUND APPLICATION - POTATOES AND TOMATOES

To ensure optimum spray distribution and thorough coverage, apply MATRIX® SG with a properly calibrated, low-pressure (20 to 40 psi) boom sprayer equipped with flat fan, "Twinjet", underleaf banding nozzles or flood jet nozzles. Nozzle screens should be no finer than 50 mesh. When using flood nozzles, the spray pattern should overlap 100% for optimum product performance. For banded applications even flow flat fan or twin jet spray nozzles may provide a more uniform spray distribution.

With ground application equipment, use enough water to deliver 10 to 40 gal total spray solution per acre. Avoid overlapping, and shut off spray booms while starting, turning, slowing, or stopping, or injury to the crop may result.

SPRAYER CLEANUP

Spray equipment or nurse tanks used in chemigation, must be cleaned before DuPont™ MATRIX® SG is sprayed. Follow the cleanup procedures specified on the labels of previously applied products. If no directions are provided, follow the 6 steps outlined in the "After Spraying MATRIX® SG and before Spraying Other Crops" section of this label.

For maximum preemergence activity, prior to application, the bed or soil surface should be smooth and relatively free of crop and weed trash (dead weeds, decaying leaves, clippings, etc.). Leaves and trash may be removed by blowing the area to be treated or by thoroughly mixing the trash into the soil through cultivation prior to herbicide application. Cultural practices that result in redistribution or disturbance of the soil surface after treatment will decrease the herbicidal effectiveness of MATRIX® SG. Cutting water furrows, or cultivations that mix untreated soil into the treated areas, will also reduce the effectiveness of the herbicide treatment.

For best weed management apply MATRIX® SG with another suitable residual herbicide registered for that crop. This is recommended for all soil types, but especially so for coarse textured soils under standard sprinklers or micro-sprinklers.

More than one banded application of MATRIX® SG may be needed to provide extended weed control.

eliminate the invader. Consult your appropriate state extension service, forest service, or regional multidisciplinary invasive species management coordination team to determine the appropriate Rapid Response provisions and allowed treatments in your area.

DIRECTIONS FOR USE

MATRIX® SG is non-corrosive to spray equipment, nonflammable and non-volatile. Do not use MATRIX® SG in a spray solution or with spray additives that buffer the pH to below 4.0, or above 8.0, as degradation of MATRIX® SG may occur.

MATRIX® SG may be used in weed management programs on non-crop sites to provide residual preemergence and early postemergence control of the following weeds:

Barnyardgrass	<i>Echinochloa crus-galli</i>
Brome, downy	<i>Bromus tectorum</i>
Crabgrass, large	<i>Digitaria sanguinalis</i>
Foxtail, giant	<i>Setaria faberi</i>
Foxtail, green	<i>Setaria viridis</i>
Foxtail, yellow	<i>Setaria glauca</i>
Filaree redstem	<i>Erodium cicutarium</i>
Fleabane, hairy	<i>Conyza bonariensis</i>
Mallow, common	<i>Malva neglecta</i>
Marestail/horseweed*	<i>Conyza canadensis</i>
Medusahead	<i>Taeniatherum caput-medusae</i>
Mustard, black	<i>Brassica nigra</i>
Pigweed, redroot	<i>Amaranthus retroflexus</i>
Pigweed, smooth	<i>Amaranthus hybridus</i>
Puncturevine	<i>Tribulus terrestris</i>

*Naturally occurring resistant biotypes of this weed are known to exist in some areas of the U.S. MATRIX® SG will not control these biotypes.

Refer to other sections of this label for additional weeds controlled.

To provide a broader spectrum of residual weed control, MATRIX® SG may be applied in a tank mixture with other registered preemergence herbicides. When weeds are present at application, include a labeled burn down herbicide, such as glyphosate, or glufosinate, with an appropriate adjuvant.

For best results, make postemergence applications to young, actively growing weeds and include a spray adjuvant. Refer to the label of the tank mixture partner(s) for any additional use instructions or restrictions. Follow the most restrictive labeling of any of the tank-mix component products.

TANK MIXTURES

MATRIX® SG may be tank mixed with other herbicides registered for non-crop use. It may also be tank-mixed with any adjuvants registered for non-crop use. Refer to the label of the tank mix partner(s) for any additional use instructions or restrictions.

APPLICATION INFORMATION

Apply MATRIX® SG at 4.0 ounces broadcast per acre. Do not apply more than 4.0 ounces of MATRIX® SG per acre per year. For best preemergence residual activity, MATRIX® SG must be activated by rainfall and applied when soil temperatures are cool. Make applications to take advantage of normal rainfall patterns (minimum of 1/2 inch)

SELECTIVE WEED CONTROL AND INVASIVE SPECIES MANAGEMENT IN NON-CROP SITES

PRODUCT INFORMATION

MATRIX® SG can be sprayed for weed control on private, public and military lands as follows: nonagricultural areas (such as airports, highway, railroad and utility rights-of-way, sewage disposal areas, etc.); uncultivated agricultural areas - non-crop producing (such as farmyards, fuel storage areas, fence rows, non-irrigation ditchbanks, barrier strips, etc.); industrial sites - outdoor (such as lumberyards, pipeline and tank farms, etc.) and non-cropland wildlife habitats.

INVASIVE SPECIES MANAGEMENT

This product may be used on public, private, and tribal lands to treat certain weed species infestations that have been determined to be invasive, consistent with the Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW) National Early Detection and Rapid Response (EDRR) System for invasive plants.

Effective EDRR systems address invasions by eradicating the invader where possible, and controlling them when the invasive species is too established to be feasibly eradicated. Once an EDRR assessment has been completed and action is recommended, a Rapid Response needs to be taken to quickly contain, deny reproduction, and if possible,

and cooler temperatures. For best results, moisture for activation should occur within 2-3 weeks after application. To help ensure uniform coverage, use a minimum of 10 gallons of spray solution per acre. Nozzle selection should meet manufacturer's spray volume and pressure recommendations for preemergence or postemergence herbicide applications. DuPont™ MATRIX® may be applied using ground or aerial spray equipment. Fixed wing aircraft and helicopters can be used to apply MATRIX®, however, do not make applications by fixed wing aircraft unless appropriate buffer zones can be maintained to prevent spray drift out of the target area or, when treating open tracts of land, spray drift as a result of fixed wing aircraft application can be tolerated. Aerial equipment designed to minimize spray drift, such as a helicopter equipped with a Microfoil™ boom or raindrop nozzles, must be used and calibrated. Except when applying with a Microfoil™ boom, a drift control agent may be added at the labeled rate.

NON-CROPLAND RESTORATION

MATRIX® SG is labeled for the control of downy brome (cheatgrass), medusahead and certain broadleaf weeds in non-cropland. In order to release desirable, perennial grass species for site restoration, MATRIX® SG may be applied at 3.0 to 4.0 ounces of product per acre in the fall, within 6 weeks before the expected date when the soil freezes. Use the higher rate for medusahead control.

To provide broader spectrum broadleaf weed control in non-crop land restoration a tank mixture of MATRIX® SG and TELAR® XP may be used. Include TELAR® XP at the use rate of 0.5 ounce per acre. Refer to the TELAR® XP label for specific weeds controlled.

USE PRECAUTIONS AND RESTRICTIONS

Treatment of powdery, dry soil or light, sandy soil when there is little likelihood of rainfall soon after treatment may result in off target movement and possible damage to susceptible crops when soil particles are moved by wind or water. Injury to crops may result if treated soil is washed, blown, or moved onto land used to produce crops. Exposure to MATRIX® SG may injure or kill most crops.

Injury may be more severe when the crops are irrigated. Do not apply MATRIX® SG when these conditions are identified and powdery, dry soil or light or sandy soil are known to be prevalent in the area to be treated.

Where food and/or feed crops are grown, or in areas where food and/or feed crops are planned to be grown, care should be taken to prevent any direct spray of MATRIX® SG onto, or drift to, these crops or planned planting areas since severe crop injury may occur.

Do not apply in or on irrigation canals or ditches including their outer banks.

If non-crop sites treated with MATRIX® SG are to be converted to an agricultural use other than rangeland, consult the Rotational Crop Guidelines sections of this label for all rotational crop instructions.

Do not use in the state of New York.

RANGELAND RESTORATION WEST OF THE MISSISSIPPI RIVER

PRODUCT INFORMATION

MATRIX® SG herbicide is a water soluble granule that is mixed in water and applied as a spray. MATRIX® SG is non-corrosive to spray equipment, non-flammable and non-volatile. Do not use MATRIX® SG in a spray solution or with spray additives that buffer the pH to below 4.0, or above 8.0, as degradation of MATRIX® SG may occur.

A restoration management program that includes MATRIX® SG herbicide may be used when rangeland has become severely infested with invasive weed species, and deteriorated to where it is no longer suitable for grazing or forage production. To reclaim these lands, the invasive weed species must first be controlled to either allow native grasses to reestablish or to be replanted where practical with other desirable perennial grasses. The grasses must be allowed time to reestablish before grazing or forage production is resumed. A typical restoration management program will take one to two years.

In order to establish and/or release desirable, perennial grass species for rangeland restoration, MATRIX® SG may be used to control the undesirable grasses and broadleaf weeds listed in the Weeds Controlled section of this label. The residual activity of MATRIX® SG will also help prevent the reemergence of many of these weeds while desirable grasses are being reestablished. At the maximum application rate of 4.0 ounces of MATRIX® SG per acre per year desirable rangeland perennial grasses in the treated area may exhibit a temporary chlorosis following application. The use of an adjuvant with MATRIX® SG can increase desirable perennial grass injury.

Do not graze treated sites or cut for forage or hay for a minimum of 1 year after application in order to allow newly emerged grasses sufficient time to become established. Where practical, fencing or other measures are to be used to prevent early grazing of re-established sites to help promote active grass restoration.

RESTORATION PROGRAM

An effective restoration program may include one or more of the following steps (A through F):

- A. Identifying and inventorying the weed infestation and desired grass densities.
- B. Consulting and planning the entire program with personnel experienced in herbicide programs and range restoration.
- C. Making applications of MATRIX® SG prior to soil freeze up or after spring thaw. Make sure all label precautions are followed.
- D. Include a tank mix partner labeled for use on rangeland to broaden the spectrum of weeds controlled
- E. Planting grass seed as needed to improve the site, per the Grass Replant Interval section of the label.
 - Planting to obtain the highest possible grass stand establishment.
 - Planting a selected grass mixture to improve the desired stand

- Using a properly fitted drill to help ensure correct seed placement and depth is suggested.
- Seeding in late fall to best ensure moisture for seed germination. Seeding in the spring has the highest risk of stand failure.
- Consulting with a knowledgeable grass seed supplier to select the best-suited varieties for your area.

F. Treating for second year, forbes control (if necessary):

- Treat with DuPont TELAR® XP (0.25 to 1 ounce per acre) + bromoxynil (1 pint per acre) to weeds at the early growth stage.

GRASS REPLANT INTERVAL

The replant interval is for soils with a pH of less than 7.5. Soils having a pH greater than 7.5 will require a longer interval. The replant interval is for applications made in the spring. Because DuPont™ MATRIX® SG degradation is slowed by cold, dry, or frozen soils, applications made in the fall should consider the replant interval as beginning in the spring following treatment. Following a treatment with MATRIX® SG at use rates up to 4.0 ounces of product per acre, the following grasses may be replanted at least 7 months after a spring application. Rainfall or irrigation of at least 1/2 inch following treatment is necessary to replant 7 months after a MATRIX® SG application. If the treated site does not receive at least 1/2 inch of rainfall or irrigation within four weeks after MATRIX® SG application, then the grass replant interval is 12 months.

Crested wheatgrass	<i>Agropyron cristatum</i>
Intermediate wheatgrass	<i>Thinopyrum intermedium</i>
Blue bunch wheatgrass	<i>Pseudoroegneria spicata</i>
Squirreltail	<i>Elymus elymoides</i>
Beadless (creeping) wildrye	<i>Leymus triticoides</i>
Big bluegrass	<i>Poa ampla</i>
Idaho fescue	<i>Festuca idahoensis</i>
Smooth brome	<i>Bromus inermis</i>

Testing has indicated that there is considerable variation in response among species and types of grasses when seeded into areas treated with MATRIX® SG. If species other than those listed above are to be planted into areas treated with MATRIX® SG a field bioassay should be performed, or previous experience may be used to determine the feasibility of replanting treated areas. To conduct a field bioassay, grow to maturity test strips of the grass species you plan to grow the following year. The test strips should cross the entire field including knolls and low areas. Crop response to the bioassay will indicate whether or not to plant the grass species grown in the test strips.

APPLICATION EQUIPMENT

MATRIX® SG may be applied using ground or aerial spray equipment. Fixed wing aircraft and helicopters can be used to apply MATRIX® SG, however, do not make applications by fixed wing aircraft unless appropriate buffer zones can be maintained to prevent spray drift out of the target area or, when treating open tracts of land, spray drift as a result of fixed wing aircraft application can be tolerated. Aerial equipment designed to minimize spray drift, such as a helicopter equipped with a Microfoil™ boom or raindrop nozzles, must be used and calibrated. Except when applying with a Microfoil™ boom, a drift control agent may be added at the labeled rate.

APPLICATION RATES AND TIMING

Apply MATRIX® SG at 2.0 to 4.0 ounces per acre in the fall or spring, prior to moisture expectation and plant growth. Do not apply when soil is frozen. For residual activity, moisture is required to activate MATRIX® SG herbicide. When applied at lower rates in the spring, MATRIX® SG provides suppression* of weeds listed. When applied at higher rates in the fall, weed control is afforded. * Weed suppression is a visual reduction in weed competition (reduced population and/or vigor) as compared to an untreated check. The degree of actual control that may occur will vary with the size of the weeds, the degree of weed or desirable grass competition, and environmental conditions.

TANK MIXTURES

MATRIX® SG may be tank mixed with other herbicides registered for use in rangeland. It may also be tank mixed with any adjuvants registered for rangeland use. Refer to the label of the tank mix partner(s) for any additional use instructions or restrictions. MATRIX® SG may be tank mixed with DuPont™ TELAR® XP herbicide (0.25 to 1.0 ounces per acre) to broaden the spectrum of broadleaf and grass weed control. Refer to the TELAR® XP label for additional information on weed species controlled, use rates, and instructions or restrictions.

WEEDS CONTROLLED

When applied at 2.0 ounces per acre in the spring, MATRIX® SG suppresses the following weeds and when applied at 3.0 ounces per acre in the fall, MATRIX® SG controls the following weeds:

Brome, downy (cheatgrass)	<i>Bromus tectorum</i>
Brome, Japanese	<i>Bromus japonicus</i>
Cheat	<i>Bromus secalinus</i>

When applied at 4.0 ounces per acre, MATRIX® SG controls the following additional weeds:

Barnyardgrass	<i>Echinochloa crus-galli</i>
Crabgrass, large	<i>Digitaria sanguinalis</i>
Foxtail, giant	<i>Setaria faberi</i>
Foxtail, green	<i>Setaria viridis</i>
Foxtail, yellow	<i>Setaria glauca</i>
Filaree redstem	<i>Erodium cicutarium</i>
Fleabane, hairy	<i>Conyza bonariensis</i>
Mallow, common	<i>Malva neglecta</i>
Marestail/horseweed*	<i>Conyza canadensis</i>
Medusahead	<i>Taeniatherum caput-medusae</i>
Mustard, black	<i>Brassica nigra</i>
Pigweed, redroot	<i>Amaranthus retroflexus</i>
Pigweed, smooth	<i>Amaranthus hybridus</i>
Puncturevine	<i>Tribulus terrestris</i>

*Naturally occurring resistant biotypes of this weed are known to exist in some areas of the U.S. MATRIX® SG will not control these biotypes.

USE PRECAUTIONS

Treatment of powdery, dry soil or light, sandy soil when there is little likelihood of rainfall soon after treatment may result in off target movement and possible damage to susceptible crops when soil particles are moved by wind or water. Injury to crops may result if treated soil is washed,

blown, or moved onto land used to produce crops. Exposure to DuPont™ MATRIX® SG may injure or kill most crops.

Injury may be more severe when the crops are irrigated. Do not apply MATRIX® SG when these conditions are identified and powdery, dry soil or light or sandy soil are known to be prevalent in the area to be treated.

In order to reduce the potential for off-site movement of MATRIX® SG from wind or water related soil erosion do not burn, disk, or otherwise disturb treated sites between the time of application and reseeding or reestablishment of native grasses.

Crops (especially crops other than pome fruit, tree nuts, stone fruit, citrus, grapes, potatoes, tomatoes, and field corn) whose roots extend into a treated area may be injured.

Do not apply in or on irrigation ditches or canals including their outer banks.

Do not apply through any type of irrigation system.

If restoration sites treated with MATRIX® SG are to be converted to an agricultural use other than rangeland, consult the Rotational Crop Guidelines sections of this label for all rotational crop instructions.

ADDITIONAL USE INFORMATION - ALL CROPS AND USES

MIXING INSTRUCTIONS

MATRIX® SG must be completely dissolved in clean water before adding to spray tanks that do not have continuous agitation during loading and mixing. (This is common for airplanes with turbine engines).

1. Fill the tank 1/4 to 1/3 full of water.
2. While agitating, add the required amount of MATRIX® SG herbicide.
3. Continue agitation until the MATRIX® SG herbicide is fully dissolved, at least 5 minutes.
4. Once the MATRIX® SG herbicide is fully dissolved, maintain agitation and continue filling tank with water.
5. As the tank is filling, add tank mix partners (if desired) then add the required of spray adjuvant (if needed). Always add the spray adjuvant last.
6. Dispersed tank mix partners can settle if the tank mixture is not continually agitated. If settling occurs, thoroughly re-agitate before using.
7. Apply MATRIX® SG herbicide spray mixture within 24 hours of mixing to avoid product degradation.
8. If MATRIX® SG and a tank mix partner are to be applied in multiple loads, fully dissolve the MATRIX® SG in clean water prior to adding to the tank.

If the selected companion herbicide has a ground or surface water advisory, consider this advisory when using the companion herbicide.

SPRAYER CLEANUP

The spray equipment must be cleaned before MATRIX® SG is sprayed. Follow the cleanup procedures specified on the labels of the previously applied products. If no directions are provided, follow the steps outlined in the "After Spraying MATRIX® SG and before Spraying Other Crops" section of this label.

At the End of the Day

When multiple loads of MATRIX® SG herbicide are applied, it is recommended that during periods at the end of each day of spraying, the interior of the tank be rinsed with fresh water and then partially filled, and the boom and hoses be flushed. This will prevent the buildup of dried pesticide deposits from accumulating in the application equipment.

After Spraying MATRIX® SG and before Spraying Other Crops

To avoid subsequent injury to desirable crops, thoroughly clean all mixing and spray equipment immediately following applications of MATRIX™ SG as follows:

1. Empty the tank and drain the sump completely.
2. Spray the tank walls with clean water using a minimum volume of 10% of the tank volume. Circulate the water through the lines, including all by-pass lines, for at least two minutes. Flush the boom well and empty the sprayer. Completely drain the sump.
3. Repeat step 2.
4. Remove the nozzles and screens and clean separately in a bucket containing water.

The rinsate solution may be applied back to the crop(s) listed on this label. Do not exceed the maximum labeled use rate. If cleaners are used, consult the cleaner label for rinsate disposal instructions. If no instructions are given, dispose of the rinsate on site or at an approved waste disposal facility.

Notes:

1. Always start with a clean spray tank.
2. Steam-cleaning aerial spray tanks is recommended to facilitate the removal of any caked deposits.
3. When MATRIX™ SG is tank mixed with other pesticides, all cleanout procedures for each product should be examined and the most rigorous procedure should be followed.
4. Follow any pre-cleanout guidelines recommended on other product labels.

SPRAY DRIFT MANAGEMENT

The interaction of many equipment and weather-related factors determines the potential for spray drift. The applicator is responsible for considering all these factors when making application decisions.

AVOIDING SPRAY DRIFT IS THE RESPONSIBILITY OF THE APPLICATOR. Where states have more stringent regulations, they must be followed.

IMPORTANCE OF DROPLET SIZE

The most effective way to reduce drift potential is to apply large droplets (>150 - 200 microns). The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. The presence of

sensitive species nearby, the environmental conditions, and pest pressure may affect how an applicator balances drift control and coverage. **APPLYING LARGER DROPLETS REDUCES DRIFT POTENTIAL, BUT WILL NOT PREVENT DRIFT IF APPLICATIONS ARE MADE IMPROPERLY OR UNDER UNFAVORABLE ENVIRONMENTAL CONDITIONS!** See Wind, Temperature and Humidity, and Temperature Inversions sections of this label.

CONTROLLING DROPLET SIZE - GENERAL TECHNIQUES

- Volume - Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
- Pressure - Use the lower spray pressures recommended for the nozzle. Higher pressure reduces droplet size and does not improve canopy penetration. **WHEN HIGHER FLOW RATES ARE NEEDED, USE A HIGHER-CAPACITY NOZZLE INSTEAD OF INCREASING PRESSURE.**
- Nozzle Type - Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles.

CONTROLLING DROPLET SIZE - AIRCRAFT

- Number of Nozzles - Use the minimum number of nozzles with the highest flow rate that provide uniform coverage.
- Nozzle Orientation - Orienting nozzles so that the spray is emitted backwards, parallel to the airstream will produce larger droplets than other orientations.
- Nozzle Type - Solid stream nozzles (such as disc and core with swirl plate removed) oriented straight back produce larger droplets than other nozzle types.
- Boom Length - the boom length should not exceed 3/4 of the wing or rotor length--longer booms increase drift potential.
- Application Height - Application more than 10 ft above the canopy increases the potential for spray drift.

BOOM HEIGHT

Set the boom at the lowest height that provides uniform coverage and reduces the exposure of droplets to evaporation and wind. For ground equipment, the boom should remain level with the crop and have minimal bounce.

WIND

Drift potential increases at wind speeds of less than 3 mph (due to inversion potential) or more than 10 mph. However, many factors, including droplet size and equipment type determine drift potential at any given wind speed. **AVOID APPLICATIONS DURING GUSTY OR WINDLESS CONDITIONS.**

Note: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

TEMPERATURE AND HUMIDITY

When making applications in hot and dry conditions, set up equipment to produce larger droplets to reduce effects of evaporation.

TEMPERATURE INVERSIONS

Drift potential is high during a temperature inversion. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain close to the ground and move laterally in a concentrated cloud. Temperature inversions are characterized by increasing temperature with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

SHIELDED SPRAYERS

Shielding the boom or individual nozzles can reduce the effects of wind. However, it is the responsibility of the applicator to verify that the shields are preventing drift and not interfering with uniform deposition of the product.

BIOLOGICAL ACTIVITY AND ENVIRONMENTAL CONDITIONS

DuPont™ MATRIX® SG is absorbed through the roots and foliage of plants, rapidly inhibiting the growth of susceptible weeds. For Preemergence weed control, rainfall or sprinkler irrigation is needed to move MATRIX® SG into the soil. Weeds will generally not emerge from Preemergence applications. In some cases, susceptible weeds may germinate and emerge a few days after application, but growth then ceases and leaves become chlorotic three to five days after emergence. Death of leaf tissue and growing point will follow in some species, while others will remain green but stunted and noncompetitive.

One to three weeks after postemergence application to weeds, leaves of susceptible plants appear chlorotic, and the growing point subsequently dies. In warm, moist conditions, the expression of herbicide symptoms is accelerated; in cold, dry conditions, expression of herbicide symptoms is delayed. Death of leaf tissue and growing point will follow in some species, while others will remain green but stunted and noncompetitive.

MATRIX® SG provides the best control of weeds in vigorously growing crops that shade competitive weeds. Weed control in areas of thin crop stand or seeding skips may not provide satisfactory control. However, a crop canopy that is too dense at application can intercept spray and reduce weed control.

The herbicidal action of MATRIX® SG may be less effective on weeds stressed from adverse environmental conditions (such as extreme temperatures or moisture), abnormal soil conditions, or cultural practices. In addition, weeds hardened-off by drought stress are less susceptible to MATRIX® SG.

Postemergence Weed control may be reduced if rainfall occurs soon after application. Several hours of dry weather are needed to allow MATRIX® SG to be sufficiently absorbed by weed foliage (generally MATRIX® SG is rainfast in 4 hours).

RESISTANCE

When herbicides that affect the same biological site of action are used repeatedly over several years to control the same weed species in the same field, naturally-occurring resistant biotypes may survive a correctly applied herbicide treatment, propagate, and become dominant in the field. Adequate control to these resistant weed biotypes cannot be expected. If weed control is unsatisfactory, it may be necessary to retreat the problem area using a product affecting a different site of action.

To better manage herbicide resistance through delaying the proliferation and possible dominance of herbicide resistant weed biotypes, it may be necessary to change cultural practices within and between crop seasons such as using a combination of tillage, retreatment, tank-mix partners and/or sequential herbicide applications that have a different site of action. Weed escapes that are allowed to go to seed will promote the spread of resistant biotypes.

It is advisable to keep accurate records of pesticides applied to individual fields to help obtain information on the spread and dispersal of resistant biotypes. Consult your agricultural dealer, consultant, applicator, and/or appropriate state agricultural extension service representative for specific alternative cultural practices or herbicide usage available in your area.

Naturally occurring weed biotypes that are resistant to "Amber" herbicide, DuPont™ ALLY® herbicide, DuPont™ GLEAN® FC herbicide, DuPont™ EXPRESS® herbicide, DuPont™ HARMONY® EXTRA herbicide, or DuPont™ FINESSE® herbicide will also be resistant to DuPont™ MATRIX® SG.

INTEGRATED PEST MANAGEMENT

DuPont recommends the use of Integrated Pest Management (IPM) programs to control pests. This product may be used as part of an Integrated Pest Management (IPM) program, which can include biological, cultural, and genetic practices, aimed at preventing economic pest damage. Application of this product should be based on IPM principles and practices including field scouting or other detection methods, correct target pest identification, population monitoring, and treating when target pest populations reach locally determined action thresholds. Consult your state cooperative extension service, professional consultants or other qualified authorities to determine appropriate action treatment threshold levels for treating specific pest/crop or site systems in your area.

PRECAUTIONS

- Potato and tomato varieties may differ in their response to various herbicides. DuPont recommends that you first consult your state experiment station, university, or extension agent as to sensitivity to any herbicide. If no information is available, limit the initial use to a small area.
- Preemergence use on soils containing more than 6% organic matter may not provide adequate soil residual weed control and may result in reduced weed control.
- Preemergence and Postemergence use on rill irrigated potatoes and tomatoes (furrow or gravity) may not provide adequate weed control in the absence of rainfall.

- If sprinklers are used for frost protection, delay the application of MATRIX® SG until stress from environmental conditions have passed.
- Avoid spray drift to any adjacent crops or desirable plants as injury may occur.
- Crop injury may occur following an application of MATRIX® SG if there is a prolonged period of cold weather and/or cold weather in conjunction with wet soils caused by poor drainage or excessive use of sprinkler irrigation for frost protection.
- Draining or flushing equipment on or near desirable trees or other plants, or in areas where their roots may extend, or in locations where the chemical may be washed or moved into contact with their roots may injure these plants. Trees or other desirable plants whose roots extend into a treated crop use area may be injured.
- Carefully observe sprayer cleanup instructions, as spray tank residue may damage other crops.
- For best results, maintain spray tank solution at pH 5 to 7.
- Do not apply to frozen or snow covered soil. Crop injury may occur from applications made to poorly drained soils.
- If the selected companion herbicide has a ground or surface water advisory, consider the advisory when using the companion herbicide.
- Tank mixing MATRIX® SG with Organophosphate insecticides in tomatoes may result in crop injury.

RESTRICTIONS

- Injury to or loss of desirable trees or vegetation may result from failure to observe the following:
 - Do not apply, drain, or flush equipment on or near desirable trees or other plants, or on areas where their roots may extend, or in locations where the chemical may be washed or moved into contact with their roots.
 - Do not use on lawns, walks, driveways, tennis courts, or similar areas. Prevent drift of spray to desirable plants.
 - Do not contaminate any body of water, including irrigation water that may be used on other crops.
 - Carefully observe sprayer cleanup instructions, as spray tank residue may damage crops other than potatoes or tomatoes.
- Do not apply using Air Assisted (Air Blast) field crop sprayers.

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage and disposal.

Pesticide Storage: Store product in original container only. Store in a cool, dry place.

Pesticide Disposal: Waste resulting from the use of this product must be disposed of on site or at an approved waste disposal facility.

Container Handling: Refer to the Net Contents section of this product's labeling for the applicable "Nonrefillable Container" or "Refillable Container" designation.

Nonrefillable Plastic and Metal Containers (Capacity Equal to or Less Than 50 Pounds):

Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then, for Plastic Containers, offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration. Do not burn, unless allowed by state and local ordinances. For Metal Containers, offer for recycling if available or reconditioning if appropriate, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities

Nonrefillable Plastic and Metal Containers

(Capacity Greater Than 50 Pounds): Nonrefillable container. Do not reuse or refill this container. Triple rinse container (or equivalent) promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. Then, for Plastic Containers, offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration. Do not burn, unless allowed by state and local ordinances. For Metal Containers, offer for recycling if available or reconditioning if appropriate, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

Nonrefillable Plastic and Metal Containers, e.g., Intermediate Bulk Containers [IBC] (Size or Shape Too Large to be Tipped, Rolled or Turned Upside Down):

Nonrefillable container. Do not reuse or refill this container. Clean container promptly after emptying the contents from this container into application equipment or mix tank and before final disposal using the following pressure rinsing procedure. Insert a lance fitted with a suitable tank cleaning nozzle into the container and ensure that the water spray thoroughly covers the top, bottom and all sides inside the container. The nozzle manufacturer generally provides instructions for the appropriate spray pressure, spray duration and/or spray volume. If the manufacturer's instructions are not available, pressure rinse the container for at least 60 seconds using a minimum pressure of 30 PSI with a minimum rinse volume of 10% of the container volume. Drain, pour or pump rinsate into application equipment or rinsate collection system. Repeat this pressure rinsing procedure two more times. Then, for Plastic Containers, offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration. For Metal Containers, offer for recycling if available or reconditioning if appropriate, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

Nonrefillable Paper or Plastic Bags, Fiber Sacks including Flexible Intermediate Bulk Containers (FIBC) or Fiber Drums With Liners:

Nonrefillable container. Do not reuse or refill this container. Completely empty paper or plastic bag, fiber sack or drum liner by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application or manufacturing equipment. Then offer for recycling if available or dispose of empty paper or plastic bag, fiber sack or fiber drum and liner in a sanitary landfill, or by incineration. Do not burn, unless allowed by state and local ordinances.

Refillable Fiber Drums With Liners: Refillable container (fiber drum only). Refilling Fiber Drum: Refill this fiber drum with DuPont™ MATRIX® SG Herbicide containing rimsulfuron only. Do not reuse this fiber drum for any other purpose. Cleaning before refilling is the responsibility of the refiller. Completely empty liner by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application or manufacturing equipment. Disposing of Fiber Drum and/or Liner: Do not reuse this fiber drum for any other purpose other than refilling (see preceding). Cleaning the container (liner and/or fiber drum) before final disposal is the responsibility of the person disposing of the container. Offer the liner for recycling if available or dispose of liner in a sanitary landfill, or by incineration. Do not burn, unless allowed by state and local ordinances. If drum is contaminated and cannot be reused, dispose of it in the manner required for its liner. To clean the fiber drum before final disposal, completely empty the fiber drum by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application or manufacturing equipment. Then offer the fiber drum for recycling if available or dispose of in a sanitary landfill, or by incineration. Do not burn, unless allowed by state and local ordinances.

All Other Refillable Containers: Refillable container. Refilling Container: Refill this container with DuPont™ MATRIX® SG containing rimsulfuron only. Do not reuse this container for any other purpose. Cleaning before refilling is the responsibility of the refiller. Prior to refilling, inspect carefully for damage such as cracks, punctures, abrasions, worn out threads and closure devices. If damage is found, do not use the container, contact DuPont at the number below for instructions. Check for leaks after refilling and before transporting. If leaks are found, do not reuse or transport container, contact DuPont at the number below for instructions. Disposing of Container: Do not reuse this container for any other purpose other than refilling (see preceding). Cleaning the container before final disposal is the responsibility of the person disposing of the container. To clean the container before final disposal, use the following pressure rinsing procedure. Insert a lance fitted with a suitable tank cleaning nozzle into the container and ensure that the water spray thoroughly covers the top, bottom and all sides inside the container. The nozzle manufacturer generally provides instructions for the appropriate spray pressure, spray duration and/or spray volume. If the manufacturer's instructions are not available, pressure rinse the container for at least 60 seconds using a minimum pressure of 30 PSI with a minimum rinse volume of 10% of the container volume. Drain, pour or pump rinsate into application equipment or rinsate collection system. Repeat this pressure rinsing procedure two more times. Then, for Plastic Containers, offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration. Do not burn, unless allowed by state and local ordinances. For Metal Containers, offer for recycling if available or reconditioning if appropriate, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

Outer Foil Pouches of Water Soluble Packets (WSP): Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available or, dispose of the empty outer foil pouch in the trash as long as WSP is unbroken. If the outer pouch contacts the formulated product in any way, the pouch must be triple rinsed with clean water. Add the rinsate to the spray tank and dispose of the outer pouch as described previously.

Do not transport if this container is damaged or leaking. If the container is damaged, leaking or obsolete, or in the event of a major spill, fire or other emergency, contact DuPont at 1-800-441-3637, day or night.

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LIMITATION OF WARRANTY AND LIABILITY

NOTICE: Read this Limitation of Warranty and Liability Before Buying or Using This Product. If the Terms Are Not Acceptable, Return the Product at Once, Unopened, and the Purchase Price Will Be Refunded.

It is impossible to eliminate all risks associated with the use of this product. Such risks arise from weather conditions, soil factors, off target movement, unconventional farming techniques, presence of other materials, the manner of use or application, or other unknown factors, all of which are beyond the control of DuPont. These risks can cause: ineffectiveness of the product, crop injury, or injury to non-target crops or plants. **WHEN YOU BUY OR USE THIS PRODUCT, YOU AGREE TO ACCEPT THESE RISKS.**

DuPont warrants that this product conforms to the chemical description on the label thereof and is reasonably fit for the purpose stated in the Directions for Use, subject to the inherent risks described above, when used in accordance with the Directions for Use under normal conditions.

TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, DUPONT MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS OR OF MERCHANTABILITY OR ANY OTHER EXPRESS OR IMPLIED WARRANTY. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, IN NO EVENT SHALL DUPONT OR SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT. BUYER'S OR USER'S BARGAINED-FOR EXPECTATION IS CROP PROTECTION. TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, THE EXCLUSIVE REMEDY OF THE USER OR BUYER AND THE EXCLUSIVE LIABILITY OF DUPONT OR SELLER, FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY OR CONTRACT, NEGLIGENCE, TORT OR STRICT LIABILITY), WHETHER FROM FAILURE TO PERFORM OR INJURY TO CROPS OR OTHER PLANTS, AND RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, SHALL BE THE RETURN OF THE PURCHASE PRICE OF THE PRODUCT, OR AT THE ELECTION OF DUPONT OR SELLER, THE REPLACEMENT OF THE PRODUCT.

To the extent consistent with applicable law that allows such requirement, DuPont or its Ag Retailer must have prompt notice of any claim so that an immediate inspection of buyer's or user's growing crops can be made. Buyer and all users shall promptly notify DuPont or a DuPont Ag Retailer of any claims, whether based on contract, negligence, strict liability, other tort or otherwise, or be barred from any remedy.

This Limitation of Warranty and Liability may not be amended by any oral or written agreement.

For product information call: 1-888-6-DUPONT

Internet address: www.dupont.com/ag/us

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**DuPont Crop
Protection**

SUPPLEMENTAL LABELING

**DUPONT™ MATRIX® SG
HERBICIDE
FOR USE IN BLUEBERRIES,
RASPBERRIES, AND
BLACKBERRIES**

DUPONT™ MATRIX® SG Herbicide

EPA Reg. No. 352- 768

FOR USE IN BLUEBERRIES, RASPBERRIES, AND BLACKBERRIES

This supplemental labeling expires on February 1, 2015 and must not be used or distributed after this date.

DIRECTIONS FOR USE

It is a violation of federal law to use this product in a manner inconsistent with its labeling. DuPont™ MATRIX® SG must be used only in accordance with instructions on this label or in separate published DuPont instructions.

DuPont will not be responsible for losses or damages resulting from the use of this product in any manner not specifically stated on this label or other labels or bulletins published by DuPont. User assumes all risk associated with such non-specified use.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

APPLICATION INFORMATION

MATRIX™ SG is most effective when applied preemergence or early postemergence to actively growing weeds. If weeds have emerged at the time of application, use an adjuvant (non-ionic surfactant at 1 quart/100 gallons, or crop oil/methylated seed oil at 1 gallon per 100 gallons of spray mix) with MATRIX® SG to improve foliar uptake and translocation.

To optimize residual weed control, MATRIX® SG must be moved into the soil via rainfall or overhead irrigation. The best residual control is obtained when at least 0.5 inches of rain or overhead irrigation comes within the first week after application.

BLUEBERRY (High Bush)

For broadcast applications, make a single application of MATRIX® SG preemergence or early postemergence to

actively growing weeds at 4 ounces per acre. Use a directed spray application adjusted to provide complete coverage of the weeds while minimizing the amount of spray coming into contact with the blueberry plants. When applied as a banded treatment (50% band or less), MATRIX® SG may be applied twice per year. Allow a minimum of 30 days between applications.

Application made after bud break may cause temporary chlorosis and/or stunting of leaves contacted by the spray.

Use MATRIX® SG on high bush blueberries that have gone through at least one growing season and are in good health and vigor. MATRIX® SG may be applied in tank mixture with other herbicides registered for use in high bush blueberries.

Do not apply by air.

Do not use on soils classified as Sand.

Do not apply within 21 days of first harvest.

Do not apply more than 4 ounces per acre per year.

BLUEBERRY (Low Bush)

All applications of MATRIX® SG are to be applied in the Vegetative Year growth stage of low bush blueberries. Make a single broadcast application of MATRIX® SG preemergence or early postemergence to actively growing weeds at 4 ounces per acre. When applied as a banded treatment (50% treated band or less) MATRIX® SG may be applied twice per year. Allow a minimum of 30 days between applications.

For broadcast treatments, make the application prior to bud break of the blueberries. After bud break, use a directed spray application adjusted to provide complete coverage of the weeds while minimizing spray contact with the blueberry plants.

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Application made after bud break may cause temporary chlorosis and/or stunting of foliage contacted by the spray.

Use MATRIX® SG on low bush blueberries that have gone through at least one growing season and are in good health and vigor.

MATRIX® SG may be applied in tank mixture with other herbicides registered for use in low bush blueberries.

Do not apply by air.

Do not use on soils classified as Sand.

Do not apply within 21 days of first harvest.

Do not apply more than 4 ounces per acre per year.

RASPBERRY AND BLACKBERRY

For broadcast applications, make a single application of MATRIX® SG preemergence or early postemergence to actively growing weeds at 4 ounces per acre. Use a directed spray application adjusted to provide complete coverage of the weeds while minimizing the amount of spray coming into contact with the caneberry plants. When applied as a banded treatment (50% band or less), MATRIX® SG may be applied twice per year. Allow a minimum of 30 days between applications.

Do not apply by air.

Do not use on soils classified as Sand.

Do not apply within 21 days of first harvest.

Do not apply more than 4 ounces per acre per year.

Crop Age for Application

Apply MATRIX® SG to raspberries that have been established for at least one growing season and are in good health and vigor. For blackberries apply after plantings have gone through at least two growing seasons and are in good health and vigor. See precautions.

Crop Grown Stage

For Every-year Bearing Crops:

To reduce the risk of injury to primocanes, apply before primocanes emerge in the spring, or wait until primocanes are approximately 3 feet tall or taller and make a directed application by adjusting the spray nozzles so that only the lower 12 inches of primocanes are exposed to the herbicide spray pattern. For blackberries that have trailing primocanes, apply before primocane emergence.

Alternate Year Bearing Crops:

Apply in the dormant period before canes start new growth or wait until new growth canes are several feet tall so that a directed application can be used. To avoid crop injury, do not apply over the top of canes once new growth had started. Once canes are approximately 3 feet tall or taller, a directed application can be

used provided the spray nozzles are adjusted so that only lower 12 inches of canes are exposed to the herbicide spray pattern.

MATRIX® SG may be applied in tank mixture with other herbicides registered for use in caneberries.

Precautions

If MATRIX® SG is applied over the top of emerged primocanes, injury to the primocanes may occur in the form of chlorosis and/or stunting of primocane growth and in severe situations, individual primocanes may die. To avoid injury to primocanes, apply before primocane emergence or wait until they are at least 3 feet tall before making a directed spray so that only the bottom 12 inches of primocanes are exposed to the herbicide spray pattern.

MATRIX® SG may cause damage to plants that are small and/or weak due to weed competition, poor soil conditions, disease, insect damage or other factors that can reduce plant health and vigor.

MATRIX® SG may cause damage to plants growing in areas that are poorly drained, or areas that are subject to saturated or anaerobic soil conditions for an extended period of time.

IMPORTANT

BEFORE USING DUPONT™ MATRIX® SG HERBICIDE, READ AND FOLLOW ALL APPLICABLE DIRECTIONS, RESTRICTIONS AND PRECAUTIONS ON THE EPA REGISTERED LABEL.

This bulletin contains new or supplemental instructions for use of the product which may not appear on the package label, and may contain recommendations which are not appropriate for all geographies and weed control situations. Follow the instructions carefully.

This labeling must be in the possession of the user at the time of pesticide application.

**DuPont™ Matrix® SG Herbicide**

Version 2.0

Revision Date 02/05/2013

Ref. 130000043303

This SDS adheres to the standards and regulatory requirements of the United States and may not meet the regulatory requirements in other countries.

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : DuPont™ Matrix® SG Herbicide
Tradename/Synonym : DPX-E9636 25SG
Rimsulfuron 25SG
B12756279
RIMSULFURON: N-((4,6-dimethoxypyrimidin-2-yl)aminocarbonyl)-3-(ethylsulfonyl)-2-pyridinesulfonamide

MSDS Number : 130000043303

Product Use : Herbicide

Manufacturer : DuPont
1007 Market Street
Wilmington, DE 19898

Product Information : 1-800-441-7515 (outside the U.S. 1-302-774-1000)
Medical Emergency : 1-800-441-3637 (outside the U.S. 1-302-774-1139)
Transport Emergency : CHEMTREC: 1-800-424-9300 (outside the U.S. 1-703-527-3887)

SECTION 2. HAZARDS IDENTIFICATION

Emergency Overview

Caution

Avoid contact with skin, eyes and clothing. Wash hands thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, or using the toilet.

Potential Health Effects

This section includes potential acute adverse effects which could occur if this material is not used according to the label.

Repeated exposure

Quartz : DuPont has classified this material as a known human carcinogen.

Carcinogenicity



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Material	IARC	NTP	OSHA
Titanium dioxide	2B		
Quartz	1	X	

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Concentration
Rimsulfuron	122931-48-0	25 %
Other Ingredients		75 %

Present as an impurity in the clay component of this product:

Titanium Dioxide		<1 %
Quartz		<1 %

SECTION 4. FIRST AID MEASURES

Skin contact : Take off all contaminated clothing immediately. Rinse skin immediately with plenty of water for 15-20 minutes. Call a poison control center or doctor for treatment advice.

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- Eye contact : Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a poison control center or doctor for treatment advice.
- Inhalation : No specific intervention is indicated as the compound is not likely to be hazardous. Consult a physician if necessary.
- Ingestion : No specific intervention is indicated as the compound is not likely to be hazardous. Consult a physician if necessary.
- General advice : Have the product container or label with you when calling a poison control center or doctor, or going for treatment. For medical emergencies involving this product, call toll free 1-800-441-3637. See Label for Additional Precautions and Directions for Use.

SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Water spray, Foam, Dry chemical, Carbon dioxide (CO2)
- Unsuitable extinguishing media : High volume water jet, (contamination risk)
- Firefighting Instructions : Wear full protective clothing and self-contained breathing apparatus. (on small fires) If area is heavily exposed to fire and if conditions permit, let fire burn itself out since water may increase the area contaminated. Cool containers / tanks with water spray. Do not allow run-off from fire fighting to enter drains or water courses.

SECTION 6. ACCIDENTAL RELEASE MEASURES

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

- Safeguards (Personnel) : Evacuate personnel, thoroughly ventilate area, use self-contained breathing apparatus. Use personal protective equipment.
- Spill Cleanup : Sweep up and shovel into suitable containers for disposal.
- Accidental Release Measures : Prevent material from entering sewers, waterways, or low areas.



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Never return spills in original containers for re-use. Dispose of in accordance with local regulations.

SECTION 7. HANDLING AND STORAGE

- Handling (Personnel) : Wash hands thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, or using the toilet. Remove personal protective equipment immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing. Remove clothing/PPE immediately if material gets inside. Wash thoroughly and put on clean clothing.
- Handling (Physical Aspects) : Keep away from heat and sources of ignition.
- Storage : Store in original container. Store in a cool, dry place. Do not contaminate water, other pesticides, fertilizer, food or feed in storage. Keep out of the reach of children.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- Engineering controls : Ensure adequate ventilation.
- Personal protective equipment
 - Skin and body protection : Applicators and other handlers must wear:
Long sleeved shirt and long pants
Chemical-resistant gloves, Category A (such as butyl rubber, natural rubber, neoprene rubber, or nitrile rubber), all greater than or equal to 14 mils
Shoes plus socks
Wear shoes with conductive soles.
PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:
Coveralls
Chemical-resistant gloves, Category A (such as butyl rubber, natural rubber, neoprene rubber, or nitrile rubber), all greater than or equal to 14 mils
Shoes plus socks



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Protective measures : Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

Exposure Guidelines
Exposure Limit Values

Rimsulfuron AEL *	(DUPONT)	5 mg/m3	8 & 12 hr. TWA Total dust.
AEL *	(DUPONT)	2.5 mg/m3	8 & 12 hr. TWA Respirable dust.
Titanium dioxide PEL:	(OSHA)	15 mg/m3	8 hr. TWA Total dust.
TLV	(ACGIH)	10 mg/m3	TWA
AEL *	(DUPONT)	10 mg/m3	8 & 12 hr. TWA Total dust.
AEL *	(DUPONT)	5 mg/m3	8 & 12 hr. TWA Respirable dust.

Quartz PEL:	(OSHA)	2.4 millions of particles per cubic foot of air Respirable.	TWA Remarks The exposure limit is calculated from the equation, $250/(\%SiO_2+5)$, using a value of 100% SiO ₂ . Lower percentages of SiO ₂ will yield higher exposure limits.
PEL:	(OSHA)	0.1 mg/m3 Remarks	TWA Respirable. The exposure limit is calculated from the equation, $10/(\%SiO_2+2)$, using a value of 100% SiO ₂ . Lower percentages of SiO ₂ will yield higher exposure limits.
PEL:	(OSHA)	0.3 mg/m3 Remarks	TWA Total dust. The exposure limit is calculated from the equation, $30/(\%SiO_2+2)$, using a value of


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100% SiO₂. Lower values of % SiO₂ will give higher exposure limits.

TLV	(ACGIH)	0.025 mg/m ³	TWA Respirable fraction.
AEL *	(DUPONT)	0.01 mg/m ³	12 hr. TWA Respirable dust.
AEL *	(DUPONT)	0.02 mg/m ³	8 hr. TWA Respirable dust.

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Form	: granules
Color	: light brown
Odor	: mild
pH	: 6.7
Bulk density	: 0.638 g/ml Tapped

SECTION 10. STABILITY AND REACTIVITY

Stability	: Stable at normal temperatures and storage conditions.
Conditions to avoid	: None reasonably foreseeable.
Incompatibility	: No materials to be especially mentioned.
Hazardous reactions	: Polymerization will not occur.



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SECTION 11. TOXICOLOGICAL INFORMATION

DuPont™ Matrix® SG Herbicide

- Dermal LD50 : > 5,000 mg/kg , rabbit
- Oral LD50 : > 5,000 mg/kg , rat
- Skin irritation : No skin irritation, rabbit
- Eye irritation : No eye irritation, rabbit
- Sensitisation : Animal test did not cause sensitization by skin contact., guinea pig

Rimsulfuron

- Inhalation 4 h LC50 : > 5.4 mg/l , rat
- Repeated dose toxicity : The following effects occurred at levels of exposure that significantly exceed those expected under labeled usage conditions.

Oral
rat

altered blood chemistry, Liver effects, Organ weight changes

- Carcinogenicity : Did not show carcinogenic effects in animal experiments.
- Mutagenicity : Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
Did not show mutagenic effects in animal experiments.
- Reproductive toxicity : Animal testing did not show any effects on fertility.
- Teratogenicity : Evidence suggests the substance is not a developmental toxin in animals.

Titanium Dioxide

- Carcinogenicity : Based upon all available study results, DuPont scientists conclude that titanium dioxide will not cause lung cancer or chronic respiratory diseases in humans at concentrations experienced in the workplace.

Quartz


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Repeated dose toxicity : Inhalation
 The following effects occurred at levels of exposure that significantly exceed those expected under labeled usage conditions., Fluid retention in lungs (pulmonary oedema), lung effects, Inflammation, Chronic lung disease, Fibrosis

SECTION 12. ECOLOGICAL INFORMATION

 Aquatic Toxicity
 Rimsulfuron

96 h LC50 : Oncorhynchus mykiss (rainbow trout) > 390 mg/l
 120 h EbC50 : Selenastrum capricornutum (green algae) 1.6 mg/l
 48 h EC50 : Daphnia magna (Water flea) > 360 mg/l
 90 d : NOEC Oncorhynchus mykiss (rainbow trout) 110 mg/l
 21 d : NOEC Daphnia magna (Water flea) 0.82 mg/l

Additional ecological information : Environmental Hazards: Do not apply directly to water, or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment washwaters or rinsate.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste Disposal : Do not contaminate water, food or feed by disposal. Wastes resulting from the use of this product must be disposed of on site or at an approved waste disposal facility.

Container Disposal : Container Refilling and Disposal:
 Refer to the product label for instructions.
 Do not transport if this container is damaged or leaking.

In the event of a major spill, fire or other emergency, call 1-800-441-3637 day or night.


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SECTION 14. TRANSPORT INFORMATION

IATA_C	UN number	: 3077
	Proper shipping name	: Environmentally hazardous substance, solid, n.o.s. (Rimsulfuron)
	Class	: 9
	Packing group	: III
	Labelling No.	: 9MI
IMDG	UN number	: 3077
	Proper shipping name	: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Rimsulfuron)
	Class	: 9
	Packing group	: III
	Labelling No.	: 9
	Marine pollutant	: yes (Rimsulfuron)

Not regulated as a hazardous material by DOT.

SECTION 15. REGULATORY INFORMATION

SARA 313 Regulated Chemical(s)	: SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.
Title III hazard classification	: Acute Health Hazard: Yes Chronic Health Hazard: No Fire: No Reactivity/Physical hazard: No Pressure: No
EPA Reg. No.	: 352-768 In the United States this product is regulated by the US Environmental Protection Agency (EPA) under the Federal Insecticide, Fungicide and



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Rodenticide Act (FIFRA). It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Read and follow all label directions. This product is excluded from listing requirements under EPA/TSCA.

California Prop. 65 : WARNING! This product contains a chemical or chemicals known to the State of California to cause cancer.

PA Right to Know : Substances on the Pennsylvania Hazardous Substances List present at a concentration of 1% or more (0.01% for Special Hazardous Regulated Chemical(s) Substances): Kaolin , Disodium hydrogen orthophosphate (for Italian CPP) , Sucrose

SECTION 16. OTHER INFORMATION

	NFPA
Health :	1
Flammability :	0
Reactivity/Physical hazard :	0

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Contact person : DuPont Crop Protection, Wilmington, DE, 19898, Phone: 1-888-638-7668

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Significant change from previous version is denoted with a double bar.

Specimen Label



Milestone[®] VM

Specialty Herbicide

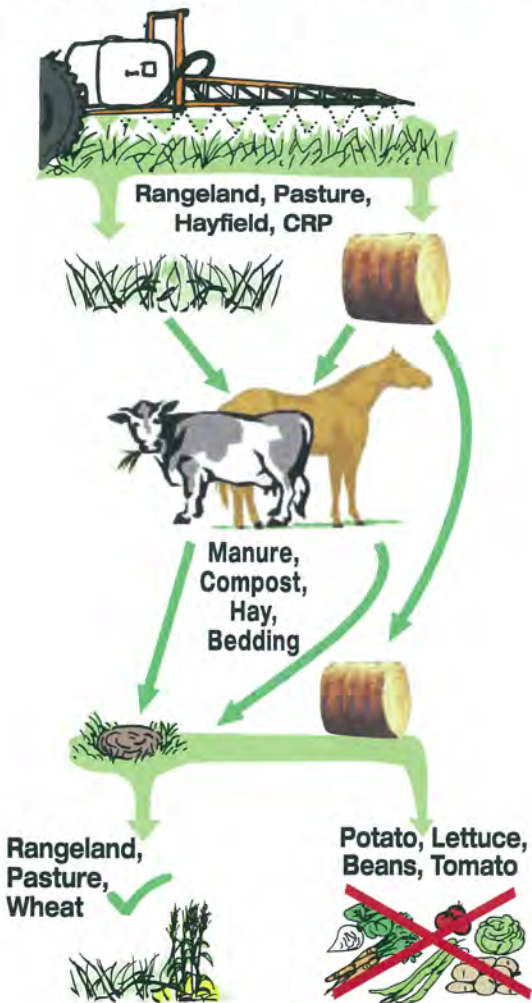
©Trademark of Dow AgroSciences LLC

For control of susceptible weeds and certain woody plants, including many invasive and noxious weeds, on non-cropland areas including industrial sites, rights-of-way (such as roadsides, electric utility and communication transmission lines, pipelines, and railroads), non-irrigation ditch banks, natural areas (such as wildlife management areas, wildlife openings, wildlife habitats, recreation areas, campgrounds, trailheads and trails), and grazed areas in and around these sites.

IMPORTANT ADVISORY TO PREVENT INJURY TO DESIRABLE PLANTS

- It is mandatory to follow the **"Use Precautions and Restrictions"** section of this product label.
- Carefully read the section **"Plant Residues or Manure."**
- Manure and urine from animals consuming treated grass or hay may contain enough aminopyralid to cause injury to sensitive broadleaf plants.
- Inform the recipient of hay or manure from animals grazing pastures or feeding on hay from areas treated with aminopyralid of the label use precautions and restrictions.
- Consult with a Dow AgroSciences representative if you do not understand the "Use Precautions and Restrictions".
Call [1-(800) 263-1196]
Customer Information Group.

Hay and Manure Management



Not For Sale, Distribution, or Use in New York State.

GROUP	4	HERBICIDE
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Active Ingredient:

Triisopropanolammonium salt of 2-pyridine carboxylic acid, 4-amino-3,6-dichloro-.....	40.6%
Other Ingredients	59.4%
Total	100.0%

Acid Equivalent: aminopyralid (2-pyridine carboxylic acid, 4-amino-3,6-dichloro-) - 21.1% - 2 lb/gal

EPA Reg. No. 62719-537




Keep Out of Reach of Children CAUTION

Refer to inside of label booklet for Directions for Use.

Notice: Read the entire label. Use only according to label directions. **Before using this product, read Warranty Disclaimer, Inherent Risks of Use, and Limitation of Remedies at end of label booklet. If terms are unacceptable, return at once unopened.**

In case of emergency endangering health or the environment involving this product, call 1-800-992-5994.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

1 - Tip  Tilt container to angle as shown and fill head to desired amount - use vertical scale for measuring. Container should be closed.	2 - Level  Hold container up-right and check the amount for accuracy. Add or subtract as needed, using pour-back scale as guide.	3 - Dispense  Remove cap on head and pour into sprayer or other devices. No fluid will pour from the main container. Replace cap for storage in sealed condition.
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Precautionary Statements

Hazards to Humans and Domestic Animals

CAUTION

Causes Moderate Eye Irritation

Avoid contact with eyes or clothing.

Personal Protective Equipment (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables, use detergent and hot water. Keep and wash PPE separately from other laundry.

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.

First Aid

If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing. Call a poison control center or doctor for treatment advice.

First Aid (Cont.)

Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact 1-800-992-5994 for emergency medical treatment information

Environmental Hazards

Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate.

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Read all Directions for Use carefully before applying.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

Not For Sale, Distribution, or Use in New York State.

Entry Restrictions: For applications on non-cropland areas, do not enter or allow worker entry into treated areas until sprays have dried.

Storage and Disposal

Do not contaminate water, food, feed or fertilizer by storage or disposal. Open dumping is prohibited.

Pesticide Storage: If this product is exposed to subfreezing temperatures, the active ingredient may crystallize and settle out of solution. Under these conditions the product should be warmed to at least 40°F and agitated well to dissolve any crystallized active ingredient prior to use.

Pesticide Disposal: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Nonrefillable containers 5 gallons or less:

Container Handling: Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available, or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse** as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. **Pressure rinse** as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Refillable containers larger than 5 gallons:

Container Handling: Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10% full with water. Agitate vigorously or recirculate water with the pump for two minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

Nonrefillable containers larger than 5 gallons:

Container Handling: Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available, or puncture and dispose of in

Storage and Disposal (Cont.)

a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse** as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. **Pressure rinse** as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Milestone[®] VM specialty herbicide may be applied by aerial or ground equipment to control susceptible weeds and certain woody plants, including invasive and noxious weeds on non-cropland areas including industrial sites, rights-of-way (including roadsides, electric utility and communication transmission lines, pipelines, and railroads), non-irrigation ditch banks, natural areas (including wildlife management areas, wildlife openings, wildlife habitats, recreation areas, campgrounds, trailheads and trails), and grazed areas in and around these sites without injury to most grasses.

It is permissible to treat non-irrigation ditch banks, seasonally dry wetlands (such as flood plains, deltas, marshes, swamps, or bogs) and transitional areas between upland and lowland sites. Milestone VM can be used to the waters edge. Do not apply directly to water and take precautions to minimize spray drift onto water.

Resistance Management Guidelines

- Development of plant populations resistant to this herbicide mode of action is usually not a problem on non-cropland sites since these sites receive infrequent pesticide applications.
- Similar looking biotypes of a given weed species occurring in a treated area may vary in their susceptibility to a herbicide. Application of a herbicide below its labeled rate may allow more tolerant weeds to survive and a shift to more tolerant biotypes within the treated area.
- Where identified, spreading of resistant weeds to other fields may be prevented by cleaning harvesting and tillage equipment before moving to other areas and by planting weed-free seed.
- Contact your extension specialist, certified crop consultant, or Dow AgroSciences representative for the latest resistance management information.

Use Precautions and Restrictions

Consult with a Dow AgroSciences representative if you do not understand the "Use Precautions and Restrictions." Call (1-800-263-1196) for more information.

- **This product is not intended for reformulation or repackaging into other end-use products.**
- **Maximum Application Rate:** On all labeled use sites do not broadcast apply more than 7 fl oz per acre of Milestone VM per year. The total amount of Milestone VM applied broadcast, as a re-treatment, and/or spot treatment cannot exceed 7 fl oz per acre per year. Spot treatments may be applied at an equivalent broadcast rate of up to 0.22 lb acid equivalent (14 fl oz of Milestone VM) per acre per annual growing season; however, not more than 50% of an acre may be treated at that rate. Do not apply more than a total of 0.11 lb acid equivalent (7 fl oz per acre of Milestone VM) per annual growing season as a result of broadcast, spot or repeat applications.
- **Avoiding Injury to Non-Target Plants:** Do not aerially apply Milestone VM within 50 feet of a border downwind (in direction of wind movement), or allow spray drift to come in contact with, any broadleaf crop or other desirable broadleaf plants, including, but not limited to, alfalfa, cotton, dry beans, flowers, grapes, lettuce, potatoes, radishes, soybeans, sugar beets, sunflowers, tobacco, tomatoes

or other broadleaf or vegetable crop, fruit trees, ornamental plants, or soil where sensitive crops are growing or will be planted. Avoid application under conditions that may allow spray drift because very small quantities of spray may seriously injure susceptible crops. Read and consider the "Precautions for Avoiding Spray Drift and Spray Drift Advisory" at the end of the label to help minimize the potential for spray drift.

- **Milestone VM is highly active against many broadleaf plant species.** Do not use this product on areas where loss of desirable broadleaf plants, including legumes, cannot be tolerated.
- **Do not use on grasses grown for hay intended for export.**
- **Do not use on grasses grown for seed production.**
- **Chemigation:** Do not apply this product through any type of irrigation system.
- **Do not contaminate water intended for irrigation or domestic purposes.** Do not treat inside banks or bottoms of irrigation ditches, either dry or containing water, or other channels that carry water that may be used for irrigation or domestic purposes.
- **Do not apply this product on residential or commercial lawns, turf, or ornamental plantings.**
- Trees adjacent to or in a treated area can occasionally be affected by root uptake of Milestone VM. Do not apply Milestone VM within the root zone of desirable trees unless such injury can be tolerated. Use special caution near roses, and leguminous trees such as locusts, redbud, mimosa, and caragana.
- **Seeding grasses:**
 - **Preemergence:** Milestone VM may be applied in the spring or early summer, depending on the target weed species, and grass planted the following fall or winter when appropriate for the grass species being planted.
 - **Postemergence:** During the season of establishment, Milestone VM should be applied only after perennial grasses are well established (have developed a secondary root system and are vigorous. Most perennial grasses are tolerant to Milestone VM at this stage of development. Milestone VM may suppress certain established grasses, such as smooth brome grass (*Bromus inermis*), especially when plants are stressed by adverse environmental conditions. Plants should recover from this transient suppression with the onset of environmental conditions favorable to grass growth and upon release from weed competition.
- **Seeding Legumes or Susceptible Wildflowers:** Do not plant legumes or susceptible wildflowers until a soil bioassay has been conducted to determine if residues of Milestone VM remaining in the soil will adversely affect establishment of legumes and wildflowers.
- **Grazing and Haying Restrictions:** There are no restrictions on grazing or hay harvest following application of Milestone VM at labeled rates. Cutting hay too soon after spraying weeds will reduce weed control. Wait 14 days after herbicide application to cut grass hay to allow herbicide to work. Do not transfer grazing animals from areas treated with Milestone VM to areas where sensitive broadleaf crops occur without first allowing 3 days of grazing on an untreated pasture. Otherwise, urine and manure may contain enough Milestone VM to cause injury to broadleaf plants.
- **Grazing Poisonous Plants:** Herbicide application may increase palatability of certain poisonous plants. Do not graze treated areas until poisonous plants are dry and no longer palatable to livestock.
- **Plant Residues or Manure:**
 - Do not use Milestone VM-treated plant residues, including hay or straw from treated areas, or manure from animals that have grazed forage or eaten hay harvested from treated areas within the previous 3 days as compost or mulch that will be applied to areas where commercially grown mushrooms or susceptible broadleaf plants may be grown.
 - Do not spread manure from animals that have grazed or consumed forage or hay from treated areas within the previous 3 days on land used for growing susceptible broadleaf crops.
 - Manure from animals that have grazed forage or eaten hay harvested from Milestone VM-treated areas within the previous 3 days may only be spread on pasture grasses, grass grown for seed, and wheat.
 - Do not plant a broadleaf crop in fields treated in the previous year with manure from animals that have grazed forage or eaten hay harvested from Milestone VM-treated areas until an adequate sensitive field bioassay is conducted to determine that the Milestone VM residues in the soil is at a level that is not injurious to the crop to be planted.

- To promote herbicide decomposition, plant residues should be evenly incorporated in the surface soil or burned. Breakdown of Milestone VM in plant residues or manure is more rapid under warm, moist soil conditions and may be accelerated by supplemental irrigation.
- **Crop Rotation:** Do not rotate non-cropland to cropland for one year following an application of Milestone VM. Do not plant a broadleaf crop until an adequately sensitive field bioassay shows that the level of aminopyralid present in the soil will not adversely affect that broadleaf crop.
- **Field Bioassay Instructions:** In a representative section of an area previously treated with this product, plant short test rows of the intended species across the original direction of application in a manner to sample variability in field conditions such as soil texture, soil organic matter, soil pH, rainfall pattern or drainage. The field bioassay can be initiated at any time after application and before the planting of the intended species. Observe the seeded species for symptoms of herbicidal activity, such as poor stand (effect on seed germination), chlorosis (yellowing), necrosis (dead leaves or shoots), or stunting (reduced growth). If herbicidal symptoms do not occur, the intended seeded species may be planted. If herbicidal activity is observed, do not plant the field to the intended seeded species, plant only to wheat, forage grasses, native grasses or grasses grown for hay.

Sprayer Clean-Out Instructions

It is recommended that separate spray equipment be used on highly sensitive crops such as tobacco, soybeans, peanuts and tomatoes.

Do not use spray equipment used to apply Milestone VM for other applications to land planted to, or to be planted to, broadleaf plants unless it has been determined that all residues of this herbicide has been removed by thorough cleaning of equipment.

Equipment used to apply Milestone VM should be thoroughly cleaned before reusing to apply any other chemicals as follows:

1. Rinse and flush application equipment thoroughly after use. Dispose of rinse water in non-cropland area away from water supplies.
2. Rinse a second time, adding 1 quart of household ammonia or tank cleaning agent for every 25 gallons of water. Circulate the solution through the entire system so that all internal surfaces are contacted (15 to 20 minutes). Let the solution stand for several hours, preferably overnight.
3. Flush the solution out of the spray tank through the boom.
4. Rinse the system twice with clean water, recirculating and draining each time.
5. Spray nozzles and screens should be removed and cleaned separately.

Application Methods

Apply the specified rate of Milestone VM as a coarse low-pressure spray. Do not apply this product with mist blower systems that deliver very fine spray droplets. Spray volume should be sufficient to uniformly cover foliage. Increase spray volume to ensure thorough and uniform coverage when target vegetation is tall and/or dense. To enhance foliage wetting and coverage, an approved non-ionic agricultural surfactant may be added to the spray mixture as specified by the surfactant label.

Ground Broadcast Application: Higher spray volumes (greater than 10 gallons per acre) generally provides better coverage and better control, particularly in dense and/or tall foliage.

Aerial Broadcast Application: Do not apply less than 2 gallons per acre total spray volume. Five gallons per acre or greater will generally provide better coverage and better control, particularly in dense and/or tall foliage.

High-Volume Foliar Application: High volume foliar treatments may be applied at rates equivalent to broadcast up to a maximum of 7 fl oz per acre per annual growing season. Use sufficient spray volume to thoroughly and uniformly wet foliage and stems but not to runoff.

Spot Application: Spot treatments may be applied at an equivalent broadcast rate of up to 0.22 lb acid equivalent (14 fl oz of Milestone VM) per acre per annual growing season; however, not more than 50% of an acre may be treated at that rate. Do not apply more than a total of 0.11 lb acid equivalent (7 fl oz per acre of Milestone VM) per annual growing season as a result of broadcast, spot or repeat applications. Spray volume should be sufficient to thoroughly and uniformly wet weed foliage but not to the point of runoff.

Repeat treatments may be made, but the total amount of Milestone VM applied must not exceed 7 fl oz per acre per year. To prevent misapplication, spot treatments should be applied with a calibrated sprayer.

Note: Table 1 below shows mixes for various sprayer outputs in gallons per acre (GPA).

Table 1: Amount of Milestone VM herbicide (in mL) to mix in 1 gallon of water

Milestone VM amount (in mL) to mix with various application rates			
GPA	5 fl oz/a	7 fl oz/a	14 fl oz/a
20	7.5	10.5	21.0
30	5.0	7.0	14.0
40	3.8	5.3	10.5
50	3.0	4.2	8.4
60	2.5	3.5	7.0
70	2.1	3.0	6.0
80	1.9	2.6	5.3
90	1.7	2.3	4.7
100	1.5	2.1	4.2

Use a syringe to measure cc

Conversions:

1 tsp = 5 mL 30 mL = 1 fluid ounce 1 cc = 1 mL
3 tsp = 1 Tbsp 2 Tbsp = 1 fluid ounce

Table 2: Application rates in the table below are based on treating an area of 1000 sq ft. An area of 1000 sq ft is about 31.5 ft by 31.5 ft (10.5 by 10.5 yards) in size. Mix the amount of Milestone VM (fl oz or milliliters) corresponding to the desired broadcast rate in 0.5 to 2.5 gallons of water, depending upon the spray volume required to treat 1000 sq ft. A delivery volume of 0.5 to 2.5 gallons per 1000 sq ft is equivalent to 22 to 109 gallons per acre.

Amount of Milestone VM per 1000 sq ft to Equal Broadcast Rate		
Broadcast Rate (fl oz/acre)	Amount of Milestone VM per 1000 sq ft	
	(fl oz)	(Milliliters)
3	0.069	2
5	0.115	3.4
7	0.161	4.8

Note: 1 mL = 1 cc and 1 fluid ounce (fl oz) = 29.6 milliliters (mL) = 2 tablespoons = 6 teaspoons

To calculate the amount of Milestone VM for areas larger than 1000 sq ft: Multiply the table value (fl oz or milliliters) by the area to be treated in "thousands" of square feet. For example, if the area to be treated is 3500 sq ft, multiply the table value by 3.5 (3500 sq ft divided by 1000 sq ft = 3.5).

Mixing Instructions

Mixing with Water: To prepare the spray, add about half the required amount of water in the spray tank. Then, with agitation, add the specified amount of Milestone and other registered tank mix herbicides. Finally, with continued agitation, add the rest of the water and additives such as surfactants or drift control and deposition aids.

Addition of Surfactants or Adjuvants on All Labeled Use Sites: For post emergent applications, a non-ionic surfactant (of at least 80% active ingredient) at 0.25 to 0.5 % volume per volume (1 to 2 quarts per 100 gallons of spray) is recommended to enhance herbicide activity under adverse environmental conditions (such as, high temperature, low relative humidity, drought conditions, dusty plant surfaces) or when weeds are heavily pubescent or more mature.

Tank Mixing with Other Herbicides: Milestone at rates of up to 7 fl oz per acre may be mixed with labeled rates of other herbicides registered for application on all labeled use sites. Milestone may be applied in tank

mix combination with labeled rates of other herbicides provided: (1) the tank mix product is labeled for the timing and method of application for the use site to be treated and (2) mixing is not prohibited by the label of the registered tank mixed products, and (3) that the tank mix combination is physically compatible (see tank mix compatibility testing below). When tank mixing, use only in accordance with the restrictions, precautions and limitations on the respective product labels.

- Read carefully and follow all applicable use directions, precautions, and limitations on the respective product labels.
- Do not exceed specified application rates. If products containing the same active ingredient are mixed, do not exceed the maximum allowable active ingredient use rates.
- For direct injection or other spray equipment where the product formulations will be mixed in undiluted form, special care should be taken to ensure tank mix compatibility.
- Always perform a jar test to ensure the compatibility of products to be used in tank mixture.

Tank Mix Compatibility Testing: Perform a jar test prior to mixing in a spray tank to ensure compatibility of Milestone and other pesticides or carriers. Use a clear glass jar with lid and mix ingredients in the same order and proportions as will be used in the spray tank. The mixture is compatible if the materials mix readily when the jar is inverted several times. The mixture should remain stable after standing for 1/2 hour or, if separation occurs, should readily remix if agitated. An incompatible mixture is indicated by separation into distinct layers that do not readily remix when agitated and/or the presence of flakes, precipitates, gels, or heavy oily film in the jar. Use of an appropriate compatibility aid may resolve mix incompatibility. If the mixture is incompatible do not use that tank mix partner in tank mixtures.

Mixing with Sprayable Liquid Fertilizer Solutions: Milestone is usually compatible with liquid fertilizer solutions. It is anticipated that Milestone will not require a compatibility agent for mixing with fertilizers; however, a compatibility test (jar test) should be made prior to mixing. Jar tests are particularly important when a new batch of fertilizer or pesticide is used, when water sources change, or when tank mixture ingredients or concentrations are changed. Compatibility may be determined by mixing the spray components in the desired order and proportions in a clear glass jar before large scale mixing of spray components in the spray tank.

Note: The lower the temperature of the liquid fertilizer, the greater the likelihood of mixing problems. Use of a compatibility aid may be required if Milestone is mixed with a 2,4-D-containing product and liquid fertilizer. **Mixing Milestone and 2,4-D in N-P or N-P-K liquid fertilizer solutions is more difficult than mixing with straight nitrogen fertilizer and should not be attempted without first conducting a successful compatibility jar test.** Agitation in the spray tank must be vigorous to be comparable with jar test agitation. Apply the spray mixture the same day it is prepared while maintaining continuous agitation. Rinse the spray tank thoroughly after use.

Note: Foliar-applied liquid fertilizers themselves can cause yellowing of the foliage of forage grasses and other vegetation.

Table 3: Weeds Controlled

Note: Numbers in parentheses (-) refer to specific use directions for a particular weeds species.

Common Name	Scientific Name	Rate Range (fl oz/acre)	Life Cycle	Plant Family
amaranth, spiny	<i>Amaranthus spinosus</i>	4 to 7	annual	Amaranthaceae
bedstraw	<i>Galium spp.</i>	4 to 7	perennial	Rubiaceae
beggarticks	<i>Bidens spp.</i>	4 to 7	annual	Asteraceae
broomweed, annual	<i>Amphiachyris dracunculoides</i>	4 to 7	annual	Asteraceae
burdock, common*, **	<i>Arctium minus</i>	4 to 7	biennial	Asteraceae
buttercup, hairy*	<i>Ranunculus sardous</i>	4 to 7	annual	Ranunculaceae
buttercup, tall*, **	<i>Ranunculus acris</i>	4 to 7	perennial	Ranunculaceae
camelthorn	<i>Alhagi pseudalhagi</i>	5 to 7	perennial	Fabaceae
chamomile, scentless	<i>Matricaria inodora</i>	4 to 7	annual	Asteraceae
chicory*	<i>Cichorium intybus</i>	4 to 7	perennial	Asteraceae
chickweed	<i>Stellaria media</i>	7	annual	Caryophyllaceae

Milestone VM may be applied to all labeled use sites as an aerial or ground broadcast treatment, as a spot or high volume foliar application, to control susceptible weeds and certain woody plants, including invasive weeds (see Weeds Controlled section).

Do not use Milestone VM if loss of legumes species or other broadleaf species cannot be tolerated.

Milestone VM may be applied post emergence as a broadcast spray or as a spot application to control weeds including, but not limited to, those listed on this label. When a rate range is given use the higher rate to control weeds at advanced growth stages, or under less than favorable growing conditions, or for longer residual control. Best results are obtained when spray volume is sufficient to provide uniform coverage of treated weeds. For optimum uptake and translocation of Milestone, avoid mowing, haying, shredding, burning or soil disturbance in treated areas for at least 14 days following application.

Milestone VM also provides preemergence control of emerging seedlings of susceptible weeds, and re-growth of certain perennial weeds following application. Preventing establishment of weeds will depend upon application rate, season of application, and environmental conditions after application.

Milestone VM can provide long-term control of susceptible weeds. The length of control is dependent upon the application rate, condition and growth stage of target weeds, environmental conditions at and following application, and the density and vigor of competing desirable vegetation. Long-term weed control is most effective where grass vegetation is allowed to recover from overgrazing, drought, etc., and compete with weeds.

Milestone VM can be an important component of integrated vegetation management programs designed to renovate or restore desired plant communities. To maximize and extend the benefits of weed control provided by Milestone VM, it is important that other vegetation management practices, including proper grazing management, biological control agents, replanting, fertilization, prescribed fire, etc., be used in appropriate sequences and combinations to further alleviate the adverse effects of weeds on desirable plant species and to promote development of desired plant communities. Agricultural and natural resources specialists with federal and state government agencies can provide guidance on best management practices and development of integrated vegetation management programs.

Weeds Controlled

The following weeds will be controlled with the rates of Milestone VM indicated in table 3. For best results, most weeds should be treated when they are actively growing and under conditions favorable for growth. Use a higher rate in the rate range when growing conditions are less than favorable or when weed foliage is tall and dense or when residual control is desired. Milestone VM also provides preemergence control of germinating seeds and control of emerged seedlings of susceptible weeds following application.

Table 3: Weeds Controlled (Cont.)

Common Name	Scientific Name	Rate Range (fl oz/acre)	Life Cycle	Plant Family
cinquefoil, sulfur (1)*, **	<i>Potentilla recta</i>	4 to 7	perennial	Rosaceae
cocklebur	<i>Xanthium strumarium</i>	3 to 5	annual	Asteraceae
clover	<i>Trifolium spp.</i>	5 to 7	perennial	Fabaceae
croton, tropic	<i>Croton glandulosus</i>	3 to 5	annual	Euphorbiaceae
crownvetch	<i>Securigera varia</i>	5 to 7	perennial	Fabaceae
cudweed, purple	<i>Gamochaeta purpurea</i>	4 to 7	annual	Asteraceae
daisy, oxeye (1)*, **	<i>Leucanthemum vulgare</i>	4 to 7	perennial	Asteraceae
dock, curly*	<i>Rumex crispus</i>	4 to 7	perennial	Polygonaceae
evening primrose, cutleaf	<i>Oenothera laciniata</i>	4 to 7	annual	Onagraceae
fiddleneck, common	<i>Amsinckia intermedia</i>	7	annual	Boraginaceae
fireweed	<i>Epilobium angustifolium</i>	5 to 7	perennial	Onagraceae
fleabane, flax-leaf	<i>Conyza bonariensis</i>	4 to 7	annual	Asteraceae
hawkweed, orange (2)*, **	<i>Hieracium aurantiacum</i>	4 to 7	perennial	Asteraceae
hawkweed, yellow (2)*, **	<i>Hieracium caespitosum</i>	4 to 7	perennial	Asteraceae
henbit*	<i>Lamium amplexicaule</i>	5 to 7	annual/ biennial	Lamiaceae
horsenettle, Carolina**	<i>Solanum carolinense</i>	4 to 7	perennial	Solanaceae
horseweed (marestail)	<i>Conyza canadensis</i>	4 to 7	annual	Asteraceae
ironweed, tall	<i>Vernonia gigantea</i>	5 to 7	perennial	Asteraceae
ironweed, western	<i>Vernonia baldwinii</i>	7	perennial	Asteraceae
knapweed, diffuse (3)*, **	<i>Centaurea diffusa</i>	5 to 7	biennial/ perennial	Asteraceae
knapweed, Russian (4)*, **	<i>Acroptilon repens</i>	5 to 7	perennial	Asteraceae
knapweed, spotted (3)*, **	<i>Centaurea stoebe</i>	5 to 7	biennial/ perennial	Asteraceae
knapweeds	<i>Centaurea spp.</i>	5 to 7	biennial/ perennial	Asteraceae
kudzu*, **	<i>Pueraria montana</i>	7	perennial	Fabaceae
lady's thumb*	<i>Polygonum persicaria</i>	3 to 5	annual	Polygonaceae
lambsquarters	<i>Chenopodium album</i>	5 to 7	annual	Chenopodiaceae
lespedeza, annual	<i>Lespedeza striata</i>	5 to 7	annual	Fabaceae
locust, black	<i>Robinia pseudoacacia</i>	7	woody perennial	Fabaceae
locust, honey	<i>Gleditsia triacanthos</i>	7	woody perennial	Fabaceae
mayweed, scentless*	<i>Tripleurospermum perforata</i>	4 to 7	annual	Asteraceae
mayweed, stinking*, **	<i>Anthemis cotula</i>	7	annual	Asteraceae
medic, black*	<i>Medicago lupulina</i>	4 to 6	perennial	Fabaceae
mimosa	<i>Albizia julibrissin</i>	7	woody perennial	Fabaceae
mullein (5)	<i>Verbascum spp.</i>	7	biennial	Scrophulariaceae
oxtongue, bristly	<i>Picris echioides</i>	5 to 7	biennial	Asteraceae
ragweed, common**	<i>Ambrosia artemisiifolia</i>	3 to 5	annual	Asteraceae
ragweed, western	<i>Ambrosia psilostachya</i>	4 to 7	perennial	Asteraceae
ragwort, tansy*, **	<i>Senecio jacobaea</i>	5 to 7	perennial	Asteraceae
redbud	<i>Cercis Canadensis</i>	7	woody perennial	Fabaceae
rose	<i>Rosa spp.</i>	7	Woody perennial	Rosaceae
rush skeletonweed	<i>Chondrilla juncea</i>	5 to 7	perennial	Asteraceae
smartweed, Pennsylvania	<i>Polygonum pensylvanicum</i>	3 to 5	annual	Polygonaceae
sneezeweed, bitter	<i>Helenium amarum</i>	4 to 7	annual	Asteraceae
soda apple, tropical (6)*, **	<i>Solanum viarum</i>	5 to 7	perennial	Solanaceae
sowthistle, perennial*, **	<i>Sonchus arvensis</i>	3 to 5	perennial	Asteraceae
spanishneedles	<i>Bidens bipinnata</i>	4 to 7	annual	Asteraceae
star-thistle, Malta (7)*, **	<i>Centaurea melitensis</i>	3 to 5	annual	Asteraceae
starthistle, purple (7)*, **	<i>Centaurea calcitrapa</i>	3 to 5	biennial	Asteraceae
star thistle, yellow (7)*, **	<i>Centaurea solstitialis</i>	3 to 5	annual	Asteraceae
St. Johnswort, common	<i>Hypericum perforatum</i>	5 to 7	perennial	Clusiaceae

Table 3: Weeds Controlled (Cont.)

Common Name	Scientific Name	Rate Range (fl oz/acre)	Life Cycle	Plant Family
sunflower, common	<i>Helianthus annuus</i>	4 to 7	annual	Asteraceae
teasel	<i>Dipsacus spp.</i>	4 to 7	biennial	Dipsacaceae
thistle, artichoke	<i>Cynara cardunculus</i>	5 to 7	perennial	Asteraceae
thistle, bull (8)*, **	<i>Cirsium vulgare</i>	3 to 5	biennial	Asteraceae
thistle, Canada (9)*, **	<i>Cirsium arvense</i>	5 to 7	perennial	Asteraceae
thistle, woolly distaff	<i>Carthamus lanatus</i>	4 to 7	annual	Asteraceae
thistle, Italian	<i>Carduus pycnocephalus</i>	7	annual	Asteraceae
thistle, musk (8)*, **	<i>Carduus nutans</i>	3 to 5	biennial	Asteraceae
thistle, plumeless (8)*, **	<i>Carduus acanthoides</i>	3 to 5	biennial	Asteraceae
thistle, Scotch*, **	<i>Onopordum acanthium</i>	5 to 7	biennial	Asteraceae
vetch	<i>Vicia spp.</i>	3 to 7	perennial	Fabaceae
wisteria	<i>Wisteria brachybotris</i>	7	woody perennial	Fabaceae
wormwood, absinth(10)*, **	<i>Artemisia absinthium</i>	6 to 7	perennial	Asteraceae
yarrow, common	<i>Achillea millefolium</i>	7	perennial	Asteraceae

*Invasive plants are introduced species that are indicated to be invasive in the USDA-NRCS, PLANTS Database (<http://plants.usda.gov/index.html>).
 **Plants designated as noxious weeds in at least one state (PLANTS Database, USDA-NRCS, <http://plants.usda.gov/index.html>).

- (1) **Sulfur cinquefoil or oxeye daisy:** Apply Milestone at 4 to 6 fl oz per acre to plants in the prebud stage of development.
- (2) **Orange or yellow hawkweeds:** Apply Milestone at 4 to 7 fl oz per acre to plants in the bolting stage of development.
- (3) **Diffuse and spotted knapweeds:** Apply Milestone at 5 to 7 fl oz per acre when plants are actively growing with the optimum time of application occurring from rosette to the bolting stages of development or in the fall. Plants will be controlled by mid-summer and fall applications even though plants may not show any changes in form or stature the year of application.
- (4) **Russian knapweed:** Apply Milestone at 5 to 7 fl oz per acre to plants in the spring and summer to plants from early bud to flowering stage and to dormant plants in the fall.
- (5) **Mullein:** Apply to the rosette stage
- (6) **Tropical soda apple:** Apply Milestone at 5 to 7 fl oz per acre at any growth stage, but application by flowering will reduce seed production potential.
- (7) **Malta, purple, and Yellow starthistle:** Apply Milestone at 3 to 5 fl oz per acre to plants at the rosette through bolting growth stages.
- (8) **Bull, musk, and plumeless thistles:** Apply Milestone at 3 to 5 fl oz per acre in the spring and early summer to rosette or bolting plants or in the fall to seedlings and rosettes. Apply at 4 to 5 fl oz when plants are at the late bolt through early flowering growth stages. 2,4-D at 1 lb ae/acre should be tank-mixed with Milestone starting at the late bud stages
- (9) **Canada thistle:** Apply Milestone at 5 to 7 fl oz per acre either in the spring to plants in the prebud to early bud growth stage – the goal is to insure all plants have emerged. Applications are also effective in the fall before a killing frost.
- (10) **Absinth wormwood:** Apply 6 to 7 fl oz per acre before wormwood is 12 inches tall. When applying by air on CRP, coverage is important and a minimum of 3 GPA is specified. Remove old duff and litter by fire or mowing for best results

Precautions for Avoiding Spray Drift

Avoid application under conditions that may allow spray drift because very small quantities of spray, which may not be visible, may injure susceptible crops. This product should be applied only when the potential for drift to adjacent sensitive areas (e.g., residential areas, bodies of water, non-target crops and other plants) is minimal (e.g., when wind is blowing away from the sensitive areas. A drift control aid may be added to the spray solution to further reduce the potential for drift. If a drift control aid is used, follow the use directions and precautions on the manufacturer's label. Do not use a thickening agent with Microfoil, Thru-Valve booms, or other spray delivery systems that cannot accommodate thickened spray solutions.

Ground Equipment: With ground equipment spray drift can be reduced by keeping the spray boom as low as possible; by applying 10 gallons or more of spray per acre; by keeping the operating spray pressures at the manufacturer's specified minimum pressures for the specific nozzle type used (low pressure nozzles are available from spray equipment manufacturers); and by spraying when the wind velocity is low (follow state regulations). Avoid calm conditions which may be conducive to thermal inversions. Direct sprays no higher than the tops of target vegetation and keep spray pressures low enough to provide coarse spray droplets to minimize drift.

Aerial Application: Avoid spray drift at the application site. The interaction of many equipment-and weather-related factors determine the potential for spray drift. Users are responsible for considering all these factors when making decisions.

The following drift management requirements must be followed to avoid off-target drift movement from aerial applications:

1. The distance of the outer most operating nozzles on the boom must not exceed 75% of wingspan or 85% of the rotor diameter.
2. Nozzles should be pointed backward parallel with the air stream or not pointed downwards more than 45 degrees.

State regulations must be followed.

The applicator should be familiar with and take into account the information covered in the following **Aerial Drift Reduction Advisory**. This information is advisory in nature and does not supersede mandatory label requirements.

Aerial Drift Reduction Advisory

Information on Droplet Size: The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (see Wind, Temperature and Humidity, and Temperature Inversions).

Controlling Droplet Size:

- **Volume** - Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.

- **Pressure** - Do not exceed the nozzle manufacturer's specified pressures. For many nozzle types lower pressure produces larger droplets. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
- **Number of Nozzles** - Use the minimum number of nozzles that will provide uniform coverage.
- **Nozzle Orientation** - Orient nozzles so that the spray is released parallel to the airstream to produce larger droplets than other orientations. Significant deflection from horizontal will reduce droplet size and increase drift potential.
- **Nozzle Type** - Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift.

Boom Length: The distance of the outer most operating nozzles on the boom must not exceed 75% of wingspan or 85% of rotor diameter.

Application Height: Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

Swath Adjustment: When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase, with increasing drift potential (higher wind, smaller drops, etc.).

Wind: Drift potential is lowest between wind speeds of 2 to 10 mph. However, many factors, including droplet size and equipment type determine drift potential at any given speed. Application should be avoided below 2 mph due to variable wind direction and high inversion potential. **Note:** Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

Temperature and Humidity: When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

Temperature Inversions: Applications should not occur during a local, low level temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of the smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

Terms and Conditions of Use

If terms of the following Warranty Disclaimer, Inherent Risks of Use and Limitation of Remedies are not acceptable, return unopened package at once to the seller for a full refund of purchase price paid. To the extent permitted by law, otherwise, use by the buyer or any other user constitutes acceptance of the terms under Warranty Disclaimer, Inherent Risks of Use and Limitation of Remedies.

Warranty Disclaimer

Dow AgroSciences warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. To the extent permitted by law, Dow AgroSciences MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

Inherent Risks of Use

It is impossible to eliminate all risks associated with use of this product. Crop injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions (including conditions noted on the label, such as unfavorable temperatures, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of Dow AgroSciences or the seller. To the extent permitted by law, all such risks shall be assumed by buyer.

Limitation of Remedies

To the extent permitted by law, the exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories), shall be limited to, at Dow AgroSciences' election, one of the following:

1. Refund of purchase price paid by buyer or user for product bought, or
2. Replacement of amount of product used.

To the extent permitted by law, Dow AgroSciences shall not be liable for losses or damages resulting from handling or use of this product unless Dow AgroSciences is promptly notified of such loss or damage in writing. To the extent permitted by law, in no case shall Dow AgroSciences be liable for consequential or incidental damages or losses.

The terms of the Warranty Disclaimer, Inherent Risks of Use and this Limitation of Remedies cannot be varied by any written or verbal statements or agreements. No employee or sales agent of Dow AgroSciences or the seller is authorized to vary or exceed the terms of the Warranty Disclaimer or this Limitation of Remedies in any manner.

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Produced for
Dow AgroSciences LLC
Indianapolis, IN 46268

Label Code: D02-880-003
 Replaces Label: D02-880-002
 LOES Number: 010-02121

EPA accepted 12/4/09

Revisions:

1. Added advisory and graphics to prevent injury to desirable plants
2. Added restrictions on grasses grown for hay intended for export, grasses grown for seed, turf, and poisonous plants
3. Revised Storage and Disposal

MATERIAL SAFETY DATA SHEET



Emergency Phone: 800-992-5994
Dow AgroSciences LLC
Indianapolis, IN 46268

Effective Date: 20-Apr-06
Product Code: 103339
MSDS: 007887

MILESTONE* VM HERBICIDE

1. PRODUCT AND COMPANY IDENTIFICATION:

PRODUCT: Milestone* VM Herbicide

COMPANY IDENTIFICATION:

Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis, IN 46268-1189

2. HAZARDOUS IDENTIFICATIONS:

EMERGENCY OVERVIEW

Brown liquid with a mild odor. May cause temporary eye irritation. May cause skin irritation.

EMERGENCY PHONE NUMBER: 800-992-5994

3. COMPOSITION/INFORMATION ON INGREDIENTS:

Aminopyralid tri- isopropanolammonium	CAS # 566191-89-7	40.6%
Balance, Total, Including		59.4%

4. FIRST AID:

EYE: Flush eyes thoroughly with water for several minutes. Remove contact lenses, if present, after the initial 1-2 minutes. If effects occur, consult a physician, preferably an ophthalmologist.

SKIN: Wash skin with plenty of water.

INGESTION: No emergency medical treatment necessary.

INHALATION: Move person to fresh air; if effects occur, consult a physician.

NOTE TO PHYSICIAN: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Have the Safety Data sheet, and if available, the product container or label with you when calling a poison control center or doctor, or going for treatment.

5. FIRE FIGHTING MEASURES:

FLASH POINT: Not applicable (water-based material)

METHOD USED: Not applicable

FLAMMABLE LIMITS

LFL: Not determined

UFL: Not determined

EXTINGUISHING MEDIA: Foam, CO₂, or Dry chemical

FIRE AND EXPLOSION HAZARDS: Foam fire extinguishing system is preferred because uncontrolled water can spread possible contamination. Toxic irritating gases may be formed under fire conditions.

FIRE-FIGHTING EQUIPMENT: Use positive-pressure, self-contained breathing apparatus and full protective equipment.

6. ACCIDENTAL RELEASE MEASURES:

ACTION TO TAKE FOR SPILLS: Absorb small spills with materials such as sand, sawdust, Zorball, or dirt. Wash exposed body areas thoroughly after handling. Report large spills to Dow AgroSciences at 800-992-5994.

7. HANDLING AND STORAGE:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep out of reach of children. Do not swallow. Avoid contact with eyes, skin, and clothing. Avoid breathing vapors and spray mist. Handle concentrate in ventilated area. Wash thoroughly with soap and water after handling and before eating, chewing gum, using tobacco, using the toilet or smoking. Keep away from food, feedstuffs, and water supplies. Store in original container with the lid tightly closed.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION:

These precautions are suggested for conditions where the potential for exposure exists. Emergency conditions may require additional precautions.

EXPOSURE GUIDELINES: None established

ENGINEERING CONTROLS: Good general ventilation should be sufficient for most conditions.

RECOMMENDATIONS FOR MANUFACTURING, COMMERCIAL BLENDING, AND PACKAGING WORKERS:

EYE/FACE PROTECTION: Use safety glasses.

SKIN PROTECTION: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full-body suit will depend on the task.

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MILESTONE* VM HERBICIDE

HAND PROTECTION: Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Polyethylene, Chlorinated polyethylene, and Ethyl vinyl alcohol laminate (EVAL). Examples of acceptable glove barrier materials include: Viton, Butyl rubber, Neoprene, Natural rubber (Latex), Polyvinyl chloride (PVC or Vinyl), Nitrile/butadiene rubber (Nitrile or NBR). Avoid gloves made of: Polyvinyl alcohol (PVA). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

RESPIRATORY PROTECTION: No respiratory protection should be needed.

APPLICATORS AND ALL OTHER HANDLERS: Refer to the product label for personal protective clothing and equipment.

9. PHYSICAL AND CHEMICAL PROPERTIES:

APPEARANCE: Brown liquid

ODOR: Mild

DENSITY: 1.14 g/mL @ 20°C

pH: 7.33 @ 19.8°C for a 1% solution

FREEZING POINT: <14°F (<-10°C)

10. STABILITY AND REACTIVITY:

STABILITY: (CONDITIONS TO AVOID) Stable under normal storage conditions.

INCOMPATIBILITY: (SPECIFIC MATERIALS TO AVOID) None known.

HAZARDOUS DECOMPOSITION PRODUCTS: None known.

HAZARDOUS POLYMERIZATION: Not known to occur.

11. TOXICOLOGICAL INFORMATION:

EYE: May cause slight temporary eye irritation. Corneal injury is unlikely.

SKIN: Brief contact may cause slight skin irritation with local redness. Prolonged skin contact is unlikely to result in absorption of harmful amounts. The LD₅₀ for skin absorption in rats is >5000 mg/kg. Did not cause allergic skin reactions when tested in guinea pigs.

INGESTION: Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts. The oral LD₅₀ for rats is >5000 mg/kg.

INHALATION: Prolonged exposure is not expected to cause adverse effects. The aerosol LC₅₀ for rats is >5.79 mg/L in 4 hours.

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: Based on available data, repeated exposures are not anticipated to cause significant adverse effects.

CANCER INFORMATION: Based largely or completely on information for similar material(s): did not cause cancer in laboratory animals.

TERATOLOGY (BIRTH DEFECTS): Did not cause birth defects or any other fetal effects in laboratory animals.

REPRODUCTIVE EFFECTS: Based largely or completely on information for similar material(s): did not interfere with reproduction in laboratory animal studies.

MUTAGENICITY: In-vitro and animal genetic toxicity studies were negative.

12. ECOLOGICAL INFORMATION:

ENVIRONMENTAL FATE:

MOVEMENT & PARTITIONING:

No relevant information found.

DEGRADATION & PERSISTENCE:

No relevant information found.

ECOTOXICOLOGY:

Material is practically non-toxic to aquatic organisms on an acute basis (LC₅₀ or EC₅₀ is >100 mg/L).

Material is practically non-toxic to fish on an acute basis (LC₅₀ is >100 mg/L).

Material is practically non-toxic to birds on an acute basis (LD₅₀ is >2000 mg/kg).

MATERIAL SAFETY DATA SHEET



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Dow AgroSciences LLC
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MILESTONE* VM HERBICIDE

13. DISPOSAL CONSIDERATIONS:

DISPOSAL METHOD: If wastes and/or containers cannot be disposed of according to the product label directions, disposal of this material must be in accordance with your local or area regulatory authorities.

This information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

If the material as supplied becomes a waste, follow all applicable regional, national and local laws and regulations.

14. TRANSPORT INFORMATION:

U.S. DEPARTMENT OF TRANSPORTATION (DOT) INFORMATION:

For all package sizes and modes of transportation:
This material is not regulated for transport

15. REGULATORY INFORMATION:

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations.

U.S. REGULATIONS

SARA 313 INFORMATION: To the best of our knowledge, this product contains no chemical subject to SARA Title III Section 313 supplier notification requirements.

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Section 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

No real health hazard

TOXIC SUBSTANCES CONTROL ACT (TSCA): All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

OSHA HAZARD COMMUNICATION STANDARD: This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

STATE RIGHT-TO-KNOW: This product is not known to contain any substances subject to the disclosure requirements of

New Jersey
Pennsylvania

COMPREHENSIVE ENVIRONMENTAL RESPONSE COMPENSATION AND LIABILITY ACT (CERCLA, or SUPERFUND): To the best of our knowledge, this product contains no chemical subject to reporting under CERCLA.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:

Health	1
Flammability	0
Reactivity	0

16. OTHER INFORMATION:

MSDS STATUS: Revised Sections: 2, 4, 8, 11, 12 & 15
Reference: DR-0368-4864
Replaces RSSDS Dated: 3-Jan-06
Document Code: D03-880-004
Replaces Document Code: D03-880-003

The Information Herein Is Given In Good Faith, But No Warranty, Express or Implied, Is Made. Consult Dow AgroSciences for Further Information.

Specimen Label



Milestone[®] VM Plus

Specialty Herbicide

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For control of herbaceous broadleaf weeds and woody plants in rangeland, permanent grass pastures (including grasses grown for hay*), Conservation Reserve Program (CRP), forests, and on non-cropland areas including industrial sites, rights-of-way (such as roadsides, electric utility and communication transmission and distribution lines, pipelines, and railroads), fencerows, non-irrigation ditch banks, natural areas (such as wildlife management areas, wildlife openings, wildlife habitats, recreation areas, campgrounds, trailheads and trails), and grazed areas in and around these sites.

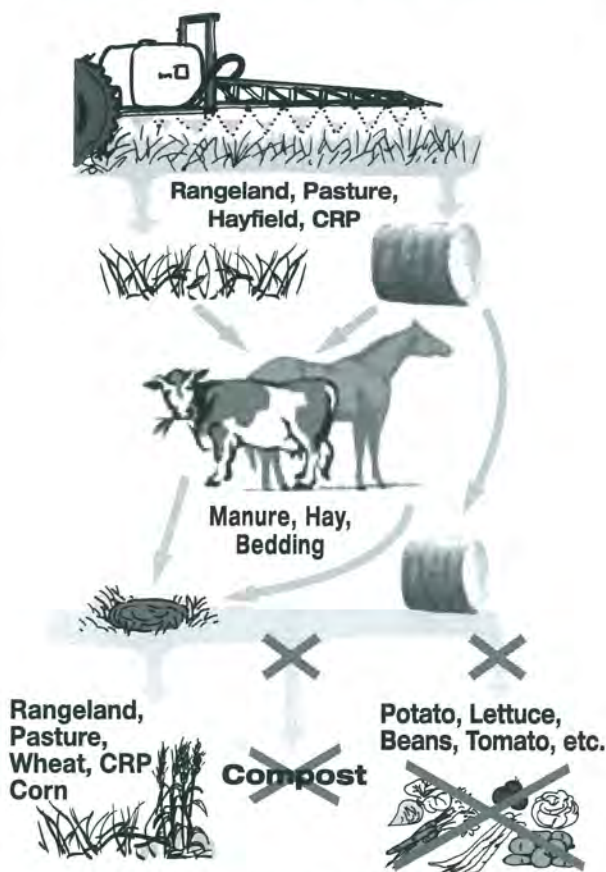
Use within sites listed above may include applications to seasonably dry wetlands (including flood plains, marshes, swamps, or bogs) and around standing water on sites such as deltas and riparian areas.

*Hay from grass treated with Milestone VM Plus within the preceding 18-months can only be used on the farm or ranch where the product is applied unless allowed by supplemental labeling

IMPORTANT USE PRECAUTIONS AND RESTRICTIONS TO PREVENT INJURY TO DESIRABLE PLANTS

- Carefully read the section "*Restrictions in Hay or Manure Use*."
- It is mandatory to follow the "*Use Precautions and Restrictions*" section of this label.
- Manure and urine from animals consuming grass or hay treated with this product may contain enough aminopyralid to cause injury to sensitive broadleaf plants.
- Hay can only be used on the farm or ranch where product is applied unless allowed by supplemental labeling.
- Consult with a Dow AgroSciences representative if you do not understand the "*Use Precautions and Restrictions*". Call [1-(800) 263-1196] Customer Information Group.

Forage and Manure Management



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Not For Sale, Distribution, or Use in New York State.

GROUP	4	HERBICIDE
Active Ingredient:		
Triisopropanolammonium salt of 2-pyridine carboxylic acid, 4-amino-3,6-dichloro-.....	2.22%	
Triethylamine salt of [(3,5,6-trichloro-2-pyridinyl)oxy]acetic acid).....	16.22%	
Other Ingredients	81.56%	
Total	100.0%	

Acid Equivalents:
aminopyralid (2-pyridine carboxylic acid, 4-amino-3,6-dichloro-) – 1.15% (0.1 lb/gal)
triclopyr (3,5,6-trichloro-2-pyridinyloxyacetic acid) – 11.63% (1 lb/gal)

Precautionary Statements

Hazards to Humans and Domestic Animals

EPA Reg. No. 62719-572

CAUTION

Harmful if Swallowed • Causes Moderate Eye Irritation

Avoid contact with eyes, skin or clothing.

Personal Protective Equipment (PPE)

Some of the materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for category C on an EPA chemical-resistance category selection chart.

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Shoes plus socks
- Chemical resistant gloves (≥ 14 mils) such as butyl rubber, natural rubber, neoprene rubber or nitrile rubber

Follow manufacturer's instructions for cleaning/maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

Engineering Controls

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the WPS (40 CFR 170.240(d)(4-6), the handler PPE requirements may be reduced or modified as specified in the WPS.

User Safety Recommendations

Users should:

- Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

First Aid

If swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by a poison control center or doctor. Do not give anything by mouth to an unconscious person.
If in eyes: Hold eye open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing. Call a poison control center or doctor for treatment advice.

Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact 1-800-992-5994 for emergency medical treatment information.

Environmental Hazards

Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate.

This chemical has properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Read all Directions for Use carefully before applying.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

Not For Sale, Distribution, or Use in New York State.

Entry Restrictions: For applications on non-cropland areas, do not enter or allow others to enter the treated area until sprays have dried.

Agricultural Use Requirements

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 48 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- Coveralls
- Shoes plus socks
- Protective eyewear
- Chemical-resistant gloves (≥ 14 mils) such as butyl rubber, natural rubber, neoprene rubber or nitrile rubber

Non-Agricultural Use Requirements

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for Agricultural Pesticides (40 CFR Part 170). The WPS does not pertain to non-agricultural use on sites, such as, rangeland, permanent grass pastures, or non-cropland. See the Agricultural Use Requirements section for information where the WPS applies.

Entry Restrictions for Non-WPS Uses: For applications on rangeland and permanent grass pastures (not harvested for hay) and non-cropland areas, do not allow entry into areas until sprays have dried, unless applicator and other handler PPE is worn.

Storage and Disposal

Do not contaminate water, food, feed or fertilizer by storage or disposal. Open dumping is prohibited.

Pesticide Storage: If this product is exposed to subfreezing temperatures, the active ingredient may crystallize and settle out of solution. Under these conditions the product should be warmed to at least 40°F and agitated well to dissolve any crystallized active ingredient prior to use.

Pesticide Disposal: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Nonrefillable containers 5 gallons or less:

Container Handling: Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available, or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse** as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. **Pressure rinse** as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Refillable containers larger than 5 gallons:

Container Handling: Refillable container. Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of

Storage and Disposal (Cont.)

the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or a mix tank. Fill the container about 10% full with water. Agitate vigorously or recirculate water with the pump for two minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

Nonrefillable containers larger than 5 gallons:

Container Handling: Nonrefillable container. Do not reuse or refill this container. Offer for recycling if available, or puncture and dispose of in a sanitary landfill, or by incineration, or by other procedures allowed by state and local authorities.

Triple rinse or pressure rinse container (or equivalent) promptly after emptying. **Triple rinse** as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. **Pressure rinse** as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or mix tank or collect rinsate for later use or disposal. Insert pressure rinsing nozzle in the side of the container, and rinse at about 40 psi for at least 30 seconds. Drain for 10 seconds after the flow begins to drip.

Resistance Management Guidelines

- Development of plant populations tolerant to auxiliary growth regulator mode-of-action is usually not a problem on non-cropland sites because these sites receive infrequent pesticide applications.
- Similar looking biotypes of a given weed species occurring in a treated area may vary in their susceptibility to a herbicide. Application of a herbicide below its labeled rate may allow more tolerant weeds to survive and a shift to more tolerant biotypes within the treated area.
- Where identified, spreading of resistant weeds to other fields may be prevented by cleaning harvesting and tillage equipment before moving to other areas and by planting weed-free seed.
- Contact your extension specialist, certified crop consultant, or Dow AgroSciences representative for the latest resistance management information.

Non-Cropland Areas, Forests, Industrial Non-Crop Areas, Rangeland, Pastures and CRP

Milestone[®] VM Plus specialty herbicide controls broadleaf weeds and woody plants in rangeland, permanent grass pastures (including grasses grown for hay*), Conservation Reserve Program (CRP), forests, and on non-cropland areas, including invasive and noxious weeds on forests and non-cropland areas including industrial sites, rights-of-way (including roadsides, electric utility and communication transmission and distribution lines, pipelines, and railroads), non-irrigation ditch banks, natural areas (including wildlife management areas, wildlife openings, wildlife habitats, recreation areas, campgrounds, trailheads and trails), and grazed areas in and around these sites without injury to most grasses.

***Hay from grass treated with Milestone VM Plus within the preceding 18-months can only be used on the farm or ranch where the product is applied unless allowed by supplemental labeling**

Use within sites listed above may include applications to seasonably dry wetlands (including flood plains, marshes, swamps, or bogs) and around standing water on sites such as deltas and riparian areas.

Use Precautions and Restrictions

Consult with a Dow AgroSciences representative if you do not understand the "Use Precautions and Restrictions." Call (1-800-263-1196) for more information.

- **Do not use grasses treated with Milestone VM Plus in the preceding 18-months for hay intended for export outside the United States.**

- **Hay from areas treated with Milestone VM Plus in the preceding 18-months CAN NOT be distributed or made available for sale off the farm or ranch where harvested unless allowed by supplemental labeling.**
- **Hay from areas treated with Milestone VM Plus in the preceding 18-months CAN NOT be used for silage, haylage, baylage and green chop unless allowed by supplemental labeling.**
- **Do not move hay made from grass treated with Milestone VM Plus within the preceding 18-months off farm unless allowed by supplemental labeling.**
- **Do not use hay or straw from areas treated with Milestone VM Plus within the preceding 18-months or manure from animals feeding on hay treated with Milestone in compost.**
- **Do not use grasses treated with Milestone VM Plus in the preceding 18-months for seed production.**
 - It is permissible to treat non-irrigation ditch banks, seasonally dry wetlands (such as flood plains, deltas, marshes, swamps, or bogs) and transitional areas between upland and lowland sites only when dry.
 - Minimize overspray to open water when treating target vegetation in and around non-flowing, quiescent or transient water. When making applications to control unwanted plants on banks or shorelines of flowing water, minimize overspray to open water. **Note:** Consult local public water control authorities before applying this product in and around public water. Permits may be required to treat such areas.
 - **Avoiding Injury to Non-Target Plants:** Do not aerially apply Milestone VM Plus within 50 feet of a border downwind (in direction of wind movement), or allow spray drift to come in contact with, any broadleaf crop or other desirable broadleaf plants, including, but not limited to, alfalfa, cotton, dry beans, flowers, grapes, lettuce, potatoes, radishes, soybeans, sugar beets, sunflowers, tobacco, tomatoes or other broadleaf or vegetable crop, fruit trees, ornamental plants, or soil where sensitive crops are growing or will be planted. Avoid application under conditions that may allow spray drift because very small quantities of spray may seriously injure susceptible crops. Follow Precautions for Avoiding Spray Drift and Spray Drift Advisory under General Mixing and Application Instructions to minimize the potential for spray drift.
 - **Milestone VM Plus is highly active against many broadleaf plant species.** Do not use this product on areas where loss of desirable broadleaf plants, including legumes, cannot be tolerated.
 - Do not apply this product on lawns, turf, ornamental plantings, urban walkways, driveways, tennis courts, golf courses, athletic fields, commercial sod operations, or other high-maintenance, fine turfgrass areas, or similar areas.
 - **Do not use this product for impregnation on dry fertilizer, unless specified in a Dow AgroSciences state specific product bulletin.**
 - **Chemigation:** Do not apply this product through any type of irrigation system.
 - **Do not contaminate water intended for irrigation or domestic purposes.** Do not treat inside banks or bottoms of irrigation ditches, either dry or containing water, or other channels that carry water that may be used for irrigation or domestic purposes.
 - Untreated trees can occasionally be affected by root uptake of Milestone VM Plus through movement into the soil or by excretion of the product from the roots of nearby treated trees. Do not apply Milestone VM Plus within the root zone of desirable trees.
 - **Crop Rotation:** Do not rotate non-cropland to cropland for one year following an application of Milestone VM Plus. Do not plant a broadleaf crop until an adequately sensitive field bioassay shows that the level of aminopyralid present in the soil will not adversely affect that broadleaf crop.
 - Applications made during periods of intense rainfall, to soils saturated with water, surfaces paved with materials such as asphalt or concrete, or soils through which rainfall will not readily penetrate may result in runoff and movement of Milestone VM Plus. Injury to crops may result if treated soil and/or runoff water containing Milestone VM Plus is washed, or moved onto land used to produce crops. Exposure to Milestone VM Plus may injure or kill susceptible crops and other plants, such as grapes, soybeans, tobacco, sensitive ornamentals. Do not treat frozen soil where runoff could damage sensitive plants.
 - **Seeding grasses:**
 - **Preemergence:** In general, Milestone VM Plus may be applied in the spring or early summer, depending on the target weed species, and grass planted after 4 months when conditions are favorable for

grass establishment. With fall applications, do not plant grasses the following spring. Do not overseed ryegrass for 4 months after treatment.

- **Postemergence:** During the season of establishment, Milestone VM Plus should be applied only after perennial grasses are well established (have developed a secondary root system and are vigorous. Most perennial grasses are tolerant to Milestone VM Plus at this stage of development. Milestone VM Plus may suppress certain established grasses, such as smooth bromegrass (*Bromus inermis*), especially when plants are stressed by adverse environmental conditions. Plants should recover from this transient suppression with the onset of environmental conditions favorable to grass growth and upon release from weed competition.
- **Seeding Legumes or Wildflowers:** Do not plant legumes or wildflowers until a soil bioassay has been conducted to determine if residues of Milestone VM Plus remaining in the soil will adversely affect establishment of legumes and wildflowers.
- **Field Bioassay Instructions:** In a representative section of an area previously treated with this product, plant short test rows of the intended species across the original direction of application in a manner to sample variability in field conditions such as soil texture, soil organic matter, soil pH, rainfall pattern or drainage. The field bioassay can be initiated at any time after application and before the planting of the intended species. Observe the seeded species for symptoms of herbicidal activity, such as poor stand (effect on seed germination), chlorosis (yellowing), necrosis (dead leaves or shoots), or stunting (reduced growth). If herbicidal symptoms do not occur, the intended seeded species may be planted. If herbicidal activity is observed, do not plant the field to the intended seeded species.
- **Restrictions in Hay or Manure Use:**
 - ◆ Do not use treated plant residues, including hay or straw from areas treated within the preceding 18-months, in compost, mulch or mushroom spawn.
 - ◆ Do not use manure from animals that have grazed forage or eaten hay harvested from treated areas within the previous 3 days, in compost, mulch or mushroom spawn.
 - ◆ Do not spread manure from animals that have grazed or consumed forage or hay from treated areas within the previous 3 days on land used for growing susceptible broadleaf crops.
 - ◆ Manure from animals that have grazed forage or hay harvested from Milestone VM Plus-treated areas within the previous 3 days may only be spread on pasture grasses, grass grown for seed, wheat and corn.
- Do not plant a broadleaf crop (including soybeans, sunflower, tobacco, vegetables, field beans, peanuts, and potatoes) in fields treated with manure from animals that have grazed forage or eaten hay harvested from aminopyralid-treated areas until an adequately sensitive field bioassay is conducted to determine that the aminopyralid concentration in the soil is at level that is not injurious to the crop to be planted.
 - ◆ Do not plant a broadleaf crop in fields treated in the previous year with manure from animals that have grazed forage or hay harvested from Milestone VM Plus-treated areas until an adequately sensitive field bioassay is conducted to determine that the Milestone VM Plus residues in the soil is at a level that is not injurious to the crop to be planted.
 - ◆ To promote herbicide decomposition, plant residues should be evenly incorporated in the surface soil or burned. Breakdown of Milestone VM Plus in plant residues or manure is more rapid under warm, moist soil conditions and may be accelerated by supplemental irrigation.
- **Grazing and Haying Restrictions:** There are no restrictions on grazing or hay harvest following application of Milestone VM Plus at labeled rates. Do not transfer grazing animals from areas treated with Milestone VM Plus to areas where sensitive broadleaf crops occur without first allowing 3 days of grazing on an untreated pasture. Otherwise, urine and manure may contain enough Milestone VM Plus to cause injury to broadleaf plants.
- **Grazing Poisonous Plants:** Herbicide application may increase palatability of certain poisonous plants. Do not graze treated areas until poisonous plants are dry and no longer palatable to livestock.
- **Maximum Application Rate:** On non-cropland areas, do not apply more than 9 pints per acre of Milestone VM Plus (0.11 lb acid equivalent aminopyralid and 1.12 lb acid equivalent triclopyr) per year. The total amount of Milestone VM Plus applied broadcast, as a re-treatment, and/or spot treatment per year, must not exceed 9 pints per acre. If products containing the same active ingredient are tank mixed, do not exceed the maximum allowable active ingredient rate per acre per application per year.

Application Methods

(Broadcast Equipment)

Ground Broadcast Application: Apply the labeled rate of Milestone VM Plus as a coarse low-pressure spray. Spray volume

should be sufficient to uniformly cover foliage. Higher volumes (greater than 10 gallons per acre) generally provide better coverage and better control, particularly in dense and/or tall foliage canopies situations. To enhance foliage wetting and coverage, an approved non-ionic agricultural surfactant may be added to the spray mixture as recommended by the surfactant manufacturer.

Do not apply this product with mist blower systems that deliver very fine spray droplets. Use of mist blower equipment can reduce weed control and increase spray drift potential.

Aerial Broadcast Application: Apply the labeled rate of Milestone VM Plus as a coarse low-pressure spray. Spray volume should be sufficient to uniformly cover foliage. Increase spray volume to ensure thorough and uniform coverage when target vegetation is tall and/or dense. Spray volumes greater than 2 gallons per acre generally provide better coverage and better control, particularly when the foliage canopy is dense and/or tall. To enhance foliage wetting and coverage, an approved non-ionic agricultural surfactant may be added to the spray mixture as recommended by the surfactant manufacturer. Also see Precautions for Avoiding Spray Drift and Aerial Spray Drift Advisory.

(Hand-Held Equipment)

High-Volume Foliar Application: High volume foliar applications may be applied at rates equivalent to a maximum of 9 pints per acre per annual growing season. Use sufficient spray volume to thoroughly and uniformly wet foliage and stems. To ensure thorough wetting of high volume treatments, a high quality non-ionic agricultural surfactant such as a non-ionic or methylated seed oil may be added to the spray mixture as recommended by the surfactant manufacturer. Multiple applications may be made, but the total amount of Milestone VM Plus applied must not exceed 9 pints per acre per year.

Low Volume Foliage Treatment

To control susceptible woody plants, apply up to 9 pints of Milestone VM Plus in 10 to 100 gallons of finished spray depending on plant density. The spray concentration of Milestone VM Plus and total spray volume per acre should be adjusted according to the size and density of target woody plants and kind of spray equipment used. With low volume sprays, use sufficient spray volume to obtain uniform coverage of target plants including the surfaces of all foliage, stems, and root collars (see General Use Precautions and Restrictions). For best results, a surfactant such as a non-ionic or methylated seed oil should be added to all spray mixtures. Match equipment and delivery rate of spray nozzles to height and density of woody plants. When treating tall, dense brush, a hose and spray gun with spray tips that deliver up to 2 gallons per minute at 40 to 60 psi may be required. Backpack or other types of specialized spray equipment with spray tips that deliver less than 1 gallon of spray per minute may be appropriate for short, low to moderate density brush.

Spot Application: Spot applications may be made at rates equivalent to the broadcast-applied rate of 4 to a maximum of 9 pints per acre per annual growing season. Spray volume should be sufficient to thoroughly and uniformly wet weed foliage. A high quality non-ionic agricultural surfactant may be added to the spray mixture as recommended by the surfactant manufacturer. Repeat treatments may be made, but the total amount of Milestone VM Plus applied must not exceed 9 pints per acre per year. To prevent misapplication, spot treatments should be applied with a calibrated boom, boomless spray system, hand-held, or backpack sprayers.

Spot applications may be made at a rate of up to 0.22 lb acid equivalent aminopyralid (9 quarts of Milestone VM Plus) per acre; however, not more than 50% of an acre may be treated. Do not apply more than a total of 0.11 lb acid equivalent aminopyralid per acre (9 pints per acre of Milestone VM Plus) per annual growing season as a result of broadcast, spot or repeat applications.

Aerial Application

Aerial sprays should be applied using suitable drift control. (See Precautions for Avoiding Spray Drift and Aerial Drift Reduction Advisory). Add an agriculturally labeled non-ionic surfactant.

Herbaceous Broadleaf Weed and Woody Plant Control

Rangeland, Permanent Grass Pastures and CRP Acres

Milestone VM Plus may be applied to rangeland, permanent pasture or CRP acres seeded to permanent grasses as an aerial or ground broadcast treatment, as a spot application, or as a high or low volume foliar application (see Application Methods section) to control susceptible broadleaf weeds, including invasive and noxious weeds (see Broadleaf Weeds Controlled section). Milestone VM Plus may be applied alone or in tank mix combinations with labeled rates of other herbicides provided

that: (1) the tank mix product is labeled for the timing and method of application for the use site to be treated and (2) tank mixing is not prohibited by the label of the registered tank mixed products. When tank mixing, follow the use directions on the labeling of each tank mix partner. Follow Mixing Instructions under the General Mixing and Application Instructions section.

Do not use Milestone VM Plus if loss of legumes species or other broadleaf species cannot be tolerated.

During the season of establishment, Milestone VM Plus should be applied only after perennial grasses are well established (have developed a good secondary root system and show good vigor). Most perennial grasses are tolerant to Milestone VM Plus at this stage of development. Only Smooth Brome grass (*Bromus inermis*) has been identified to be suppressed by Milestone VM Plus, this appears to occur under adverse environmental conditions. Plants should recover from this transient suppression with the onset of environmental conditions favorable to grass growth and upon release from weed competition.

Non-Cropland, Forests, and Industrial Non-Crop Areas

Milestone VM Plus may be applied to non-cropland, forests, and industrial non-crop areas as an aerial or ground broadcast application, as a spot application, or as a high volume foliar application (see Application Methods section) to control herbaceous broadleaf weeds and woody plants. Milestone VM Plus may be applied alone or in tank-mix combinations with labeled rates of other herbicides provided: (1) the tank mix product is labeled for the timing and method of application for the use site to be treated and (2) mixing is not prohibited by the label of the registered tank mixed products. Use as directed in the Directions of Use section of the tank-mix partner. Follow Mixing Instructions under the General Mixing and Application Instructions section below.

Forest Management Applications

For best control from broadcast applications of Milestone VM Plus, use a spray volume which will provide thorough plant coverage. Recommended spray volumes are usually 10 to 25 gallons per acre by air or 10 to 100 gallons per acre by ground. To improve spray coverage of spray volumes less than 50 gallons per acre, add an agriculturally labeled non-ionic surfactant. Application systems should be used to prevent hazardous drift to off-target sites. Nozzles or additives that produce larger droplets of spray may require higher spray volumes.

Forest Site Preparation (Not for Conifer Release)

Use up to 9 pints of Milestone VM Plus and apply in a total spray volume of 10 to 30 gallons per acre. Use a non-ionic agricultural surfactant for all foliar applications. Tank mixtures with other herbicides registered for forest use may be necessary to control woody brush if brush is not sensitive to the use rates of this product. When tank mixtures of herbicides are used for forest site preparation, labels for all products in the mixture must be followed and the longest recommended waiting period before planting observed.

Directed Spray Applications for Conifer Release

To release conifers from competing hardwoods such as red maple, sugar maple, striped maple, sweetgum, red and white oaks, ash, hickory, alder, birch, aspen, and pin cherry, mix 9 pints Milestone VM Plus in enough water to make 100 gallons of spray mixture. To improve spray coverage, add an agriculturally labeled non-ionic surfactant. The spray mixture should be directed onto foliage of competitive hardwoods using knapsack or backpack sprayers with flat fan nozzles or equivalent any time after hardwoods have reached full leaf size, but before autumn coloration. The majority of treated hardwoods should be less than 6 feet in height to ensure adequate spray coverage. Care should be taken to direct spray away from contact with conifer foliage, particularly foliage of desirable pines.

Note: Over-the-top spray applications can severely injure or kill some species such as redbud and locust.

Cut-Stump Treatment

To control unwanted trees of hardwood species such as elm, maple, oak and conifers, apply Milestone VM Plus, undiluted, by spraying or painting the cut surfaces of freshly cut stumps and stubs as soon as possible after cutting, if possible within about 5 minutes; waiting longer will reduce efficacy due to loss of turgor pressure (suction) in the cut stump. The cambium area next to the bark is the most vital area to wet.

With Tree Injector Method

Apply by injecting 1 milliliter of undiluted Milestone VM Plus through the bark at intervals of 3 to 4 inches between centers of the injector wound. The injections should completely surround the tree at any convenient height. **Note: No Worker Protection Standard worker entry restrictions or worker notification requirements apply when this product is injected directly into plants.**

With Hack and Squirt Method

Make cuts around the tree trunk at a convenient height with a hatchet or similar equipment so that the cuts overlap slightly and make a continuous circle around the trunk. Spray 1 milliliter of undiluted Milestone VM Plus into the pocket created between the bark and the inner stem/trunk by each cut.

With Frill or Girdle Method

Make a single girdle through the bark completely around the tree at a convenient height. The frill should allow for the herbicide to remain next to the inner stem and absorb into the plant. Wet the cut surface with undiluted solution.

Both of the above methods may be used successfully at any season except during periods of heavy sap flow of certain species - for example, maples.

Herbaceous Broadleaf Weed and Woody Plant Management Practices

Milestone VM Plus may be applied postemergence as a broadcast spray or as a spot application to control broadleaf weeds listed on this label; weeds other than those listed may also be controlled by this herbicide. Postemergence applications should be made before bud stage or early flowering, unless otherwise specified. When a rate range is given, use a higher rate in the range to control weeds at advanced growth stages or under less than favorable growing conditions (such as drought stress). Best weed control results are obtained when spray volume is sufficient to provide uniform coverage of treated plants. For optimum uptake and translocation of the herbicide, avoid mowing, haying, shredding, burning or soil disturbance in treated areas for at least 7 days following application.

Milestone VM Plus also provides preemergence control of germinating seeds or emerging seedlings of susceptible broadleaf weeds following application.

Milestone VM Plus can provide long-term control of weeds. The length of control is dependent upon the application rate, condition and growth stage of target weeds, environmental conditions at and following application, and the density and vigor of competing desirable vegetation. Long-term broadleaf weed control is most effective where grasses and other desirable vegetation is allowed to recover from adverse environmental conditions (such as drought) and compete with susceptible broadleaf weeds.

Milestone VM Plus can be an important component of integrated vegetation management programs designed to renovate or restore desired non-cropland plant communities. To maximize and extend the benefits of weed control provided by Milestone VM Plus, it is important that other vegetation management practices, including mowing, fertilization, haying, etc., be used in appropriate sequences and combinations to further alleviate the adverse effects of weeds on desirable plant species and to promote development of desired non-cropland plant communities. Natural resources specialists with federal and state government agencies can provide guidance on best management practices and development of integrated vegetation management programs.

Herbaceous Broadleaf Weeds Controlled

The following weeds will be controlled with the rates of Milestone VM Plus indicated in Table 1 below. For best results, most weeds should be treated when they are actively growing and under conditions favorable for growth. Use a higher rate in the rate range when growing conditions are less than favorable or when weed foliage is tall and dense. Milestone VM Plus also provides preemergence control of germinating seeds and control of emerged seedlings of susceptible broadleaf weeds following application.

Table 1: Broadleaf Weeds Controlled (Rate Range 4-6 pints/acre)

Common Name	Scientific Name	Life Cycle	Plant Family
amaranth, spiny	<i>Amaranthus spinosus</i>	annual	Amaranthaceae
bedstraw	<i>Galium spp.</i>	perennial	Rubiaceae
beggarticks	<i>Bidens spp.</i>	annual	Asteraceae
bindweed, field	<i>Convolvulus arvensis</i>	perennial	Convolvulaceae
broomweed, annual	<i>Amphiachyris dracunculoides</i>	annual	Asteraceae
burdock, common*, **	<i>Arctium minus</i>	biennial	Asteraceae
buttercup, hairy*	<i>Ranunculus sardous</i>	annual	Ranunculaceae
buttercup, tall*, **	<i>Ranunculus acris</i>	perennial	Ranunculaceae
camelthorn	<i>Alhagi pseudalhagi</i>	perennial	Fabaceae
chamomile, scentless	<i>Matricaria inodora</i>	annual	Asteraceae
chickweed	<i>Stellaria media</i>	annual	Caryophyllaceae
chicory*	<i>Cichorium intybus</i>	perennial	Asteraceae
cinquefoil, sulfur (1)*, **	<i>Potentilla recta</i>	perennial	Rosaceae
clover	<i>Trifolium spp.</i>	perennial	Fabaceae
cocklebur	<i>Xanthium strumarium</i>	annual	Asteraceae
croton, tropic	<i>Croton glandulosus</i>	annual	Euphorbiaceae
crownvetch	<i>Securigera varia</i>	perennial	Fabaceae
cudweed, purple	<i>Gamochaeta purpurea</i>	annual	Asteraceae
daisy, oxeye (1)*, **	<i>Leucanthemum vulgare</i>	perennial	Asteraceae
dandelion, common	<i>Taraxacum officinale</i>	perennial	Asteraceae
dock, curly*	<i>Rumex crispus</i>	perennial	Polygonaceae
evening primrose, cutleaf	<i>Oenothera laciniata</i>	annual	Onagraceae
fiddleneck, common	<i>Amsinckia intermedia</i>	annual	Boraginaceae
fireweed	<i>Epilobium angustifolium</i>	perennial	Onagraceae
fleabane, flax-leaf or hairy	<i>Conyza bonariensis</i>	annual	Asteraceae
hawkweed, orange (2)*, **	<i>Hieracium aurantiacum</i>	perennial	Asteraceae
hawkweed, yellow (2)*, **	<i>Hieracium caespitosum</i>	perennial	Asteraceae
henbit*	<i>Lamium amplexicaule</i>	annual/biennial	Lamiaceae
hogweed, giant	<i>Heracleum mantegazzianum</i>	perennial	Apiacea
horsenettle, Carolina**	<i>Solanum carolinense</i>	perennial	Solanaceae
horseweed (marestail)	<i>Conyza canadensis</i>	annual	Asteraceae
ironweed, tall	<i>Vernonia gigantea</i>	perennial	Asteraceae
ironweed, western	<i>Vernonia baldwinii</i>	perennial	Asteraceae
knawweed, diffuse (3)*, **	<i>Centaurea diffusa</i>	biennial/perennial	Asteraceae
knawweed, Russian (4)*, **	<i>Acroptilon repens</i>	perennial	Asteraceae
knawweed, spotted (3)*, **	<i>Centaurea stoebe</i>	biennial/ perennial	Asteraceae
knawweeds	<i>Centaurea spp.</i>	biennial/ perennial	Asteraceae
knotweeds, Japanese, bohemian	<i>Reynoutria japonica</i>	perennial	Polygonaceae
kudzu*, **	<i>Pueraria montana</i>	perennial	Fabaceae
lady's thumb*	<i>Polygonum persicaria</i>	annual	Polygonaceae
lambsquarters	<i>Chenopodium album</i>	annual	Chenopodiaceae
lespedeza, annual	<i>Lespedeza striata</i>	annual	Fabaceae
licorice, wild	<i>Glycyrrhiza lepidota</i>	Perennial	Fabaceae
loosestrife, purple	<i>Lythrum salicaria</i>	Perennial	Lythraceae
marshelder, annual	<i>Iva annua</i>	annual	Asteraceae
mayweed, scentless*	<i>Tripleurospermum perforata</i>	annual	Asteraceae
mayweed, stinking*, **	<i>Anthemis cotula</i>	annual	Asteraceae
medic, black*	<i>Medicago lupulina</i>	perennial	Fabaceae
mullein	<i>Verbascum spp.</i>	biennial	Scrophulariaceae
nightshade, silverleaf	<i>Solanum elaeagnifolium</i>	perennial	Solanaceae
ox tongue, bristly	<i>Picris echioides</i>	biennial	Asteraceae
pea, Swainson	<i>Sphaerophysa salsula</i>	perennial	Fabaceae
povertyweed	<i>Iva axillaris</i>	perennial	Asteraceae
plantain spp.	<i>Plantago spp.</i>	perennial	Plantaginaceae
ragweed, common**	<i>Ambrosia artemisiifolia</i>	annual	Asteraceae
ragweed, western	<i>Ambrosia psilostachya</i>	perennial	Asteraceae
ragwort, tansy*, **	<i>Senecio jacobaea</i>	perennial	Asteraceae
rush skeletonweed	<i>Chondrilla juncea</i>	perennial	Asteraceae

Table 1: Broadleaf Weeds Controlled (Rate Range 4-6 pints/acre) (Cont.)

Common Name	Scientific Name	Life Cycle	Plant Family
sicklepod	<i>Cassia obtusifolia</i>	perennial	Fabaceae
smartweed, Pennsylvania	<i>Polygonum pennsylvanicum</i>	annual	Polygonaceae
sneezeweed, bitter	<i>Helenium amarum</i>	annual	Asteraceae
soda apple, tropical (5)*, **	<i>Solanum viarum</i>	perennial	Solanaceae
sowthistle, perennial*, **	<i>Sonchus arvensis</i>	perennial	Asteraceae
sowthistle, annual	<i>Sonchus oleraceae</i>	Annual	Asteraceae
spanishneedles	<i>Bidens bipinnata</i>	annual	Asteraceae
St. Johnswort, common	<i>Hypericum perforatum</i>	perennial	Clusiaceae
star thistle, yellow (6)*, **	<i>Centaurea solstitialis</i>	annual	Asteraceae
starthistle, purple (6) *, **	<i>Centaurea calcitrapa</i>	biennial	Asteraceae
star-thistle, Malta (6) *, **	<i>Centaurea melitensis</i>	annual	Asteraceae
stiltgrass, Japanese	<i>Microstegium vimineum</i>	annual	Poacea
sunflower, common	<i>Helianthus annuus</i>	annual	Asteraceae
teasel	<i>Dipsacus spp.</i>	biennial	Dipsacaceae
teasel, fuller's*	<i>Dipsacus sativus</i>	biennial	Dipsacaceae
thistle, artichoke	<i>Cynara cardunculus</i>	perennial	Asteraceae
thistle, blessed milk	<i>Silybum marianum</i>	biennial	Asteraceae
thistle, bull (7)*, **	<i>Cirsium vulgare</i>	biennial	Asteraceae
thistle, Canada (8)*, **	<i>Cirsium arvense</i>	perennial	Asteraceae
thistle, Italian	<i>Carduus pycnocephalus</i>	annual	Asteraceae
thistle, musk (7)*, **	<i>Carduus nutans</i>	biennial	Asteraceae
thistle, plumeless (7)*, **	<i>Carduus acanthoides</i>	biennial	Asteraceae
thistle, Scotch*, **	<i>Onopordum acanthium</i>	biennial	Asteracea
thistle, woolly distaff	<i>Carthamus lanatus</i>	annual	Asteraceae
Tree of heaven	<i>Ailanthus altissima</i>	perennial	Simaroubaceae
vetch	<i>Vicia spp.</i>	perennial	Fabaceae
wild carrot	<i>Daucus carota</i>	biennial	Apiaceae
willoweed, panicle	<i>Epilobium brachycarpum</i>	annual	Onagraceae
wormwood, absinth *, **	<i>Artemisia absinthium</i>	perennial	Asteraceae
yarrow, common	<i>Achillea millefolium</i>	perennial	Asteraceae

*Invasive plants are introduced species that are indicated to be invasive in the USDA-NRCS, PLANTS Database (<http://plants.usda.gov/index.html>).
 **Plants designated as noxious weeds in at least one state (PLANTS Database, USDA-NRCS, <http://plants.usda.gov/index.html>).

- Sulfur cinquefoil or oxeye daisy:** Apply Milestone VM Plus at 5 to 8 pints per acre to plants in the prebud stage of development.
- Orange or yellow hawkweeds:** Apply Milestone VM Plus at 5 to 8 pints per acre to plants in the bolting stage of development.
- Diffuse and spotted knapweeds:** Apply Milestone VM Plus at 6 to 9 pints per acre when plants are actively growing with the optimum time of application occurring from rosette to the bolting stages of development or in the fall.
- Russian knapweed:** Apply Milestone VM Plus at 5 to 8 pints per acre to plants in the spring and summer that are in the bud to flowering stage and to dormant plants in the fall.
- Tropical soda apple:** Apply Milestone VM Plus at 6 to 9 pints per acre at any growth stage, but application at flowering will reduce seed production potential.
- Yellow starthistle:** Apply Milestone VM Plus at 4 to 6 pints per acre to plants at the rosette through bolting growth stages.
- Bull, musk and plumeless thistles:** Apply Milestone VM Plus at 4 to 6 pints per acre in the spring and early summer to rosette or bolting plants or in the fall to seedlings and rosettes. Apply at 5 to 6 pints when plants are at the late bolt through early flowering growth stages.
- Canada thistle:** Apply Milestone VM Plus at 8 to 9 pints per acre either in the spring after all plants have fully emerged (some may be budding) until the oldest plants are in full flower stage. Use the higher rate when applying to the flower stage. Applications are also effective in the fall before a killing frost.

Invasive knotweeds: Japanese, Bohemian, giant knotweeds: Apply Milestone VM Plus at 8-9 pints per acre broadcast using high volume per acre (100 gallons per acre) or apply as a spot treatment using the spot treatment rate (see Spot Treatment section). Optimum results for suppression of plant growth are obtained when applications are made to plants that are about 3 to 4 feet in height in early summer.

Multiple applications/retreatments will be necessary for control of resprouts. the total amount of Milestone VM Plus applied broadcast, as a re-treatment, and/or spot treatment cannot exceed 9 pints per acre per year.

Purple loosestrife: For optimum control apply Milestone VM Plus at 8-9 pints per acre plus 1 pt to 1 qt of 2,4-D amine. Spot treatments may also be made by applying Milestone VM Plus at the Spot treatment rate (see Spot Treatment section of the label) with or without the addition of 2,4-D.

Woody Plants Controlled

The following woody plants will be controlled or partially controlled with Milestone VM Plus at 6 to 9 pints/acre. For best results, woody plants should be treated when they are actively growing and under conditions favorable for growth. Use a higher rate with plants listed as Partial Control, when growing conditions are less than favorable, or when weed foliage is tall and dense.

Table 2: Woody Plants Controlled or Partially Controlled

Common Name	Scientific Name	Plant Family
arrowwood	<i>Viburnum spp.</i>	Viburnum
aspen	<i>Populus spp.</i>	Salicaceae
Australian pine	<i>Pinus nigra</i>	Pinaceae
blackberry	<i>Rubus spp</i>	Rosaceae
ceanothus	<i>Ceanothus spp.</i>	Rhanaceae
choke cherry	<i>Prunus virginiana</i>	Rosaceae
cottonwood	<i>Populus spp.</i>	Salicaceae
Kudzu	<i>Pueraria lobata</i>	Fabaceae

Table 2: Woody Plants Controlled or Partially Controlled (Cont.)

Common Name	Scientific Name	Plant Family
locust	<i>Robinia spp.</i>	Fabaceae
locust, black	<i>Robinia pseudoacacia</i>	Fabaceae
locust, honey	<i>Gleditsia triacanthos</i>	Fabaceae
mimosa	<i>Albizia julibrissin</i>	Fabaceae
poison ivy	<i>Toxicodendron radicans</i>	Anacardiaceae
poison oak	<i>Toxicodendron diversilobum</i>	Anacardiaceae
poplar	<i>Populus spp.</i>	Salicaceae
poplar, tulip	<i>Liriodendron tulipera</i>	Salicaceae
redbud	<i>Cercis spp.</i>	Fabaceae
Scotch broom	<i>Cytisus scoparius</i>	Fabaceae
sumac	<i>Rhus spp.</i>	Anacardiaceae
rose	<i>Rosa spp.</i>	Rosaceae
wisteria	<i>Wisteria brachybotris</i>	Fabaceae

Partial Control

Common Name	Scientific Name	Plant Family
Ash	<i>Fraxinus spp.</i>	Oleaceae
bear clover (bearmat)	<i>Chamaebatia foliolosa</i>	Rosaceae
beech	<i>Fagus spp.</i>	Fagaceae
birch	<i>Betula spp.</i>	Betulaceae
blackgum	<i>Nyssa sylvatica</i>	Cornaceae
Brazilian pepper	<i>Schinus terebinthifolius</i>	Anacardiaceae
casacara	<i>Rhamnus purshiana</i>	Rhamnaceae
chinquapin	<i>Castanea spp.</i>	Fagaceae
Douglas-fir	<i>Pseudotsuga spp.</i>	Pinaceae
dogwood	<i>Cornus drummondii</i>	Cornaceae
elderberry	<i>Sambucus spp.</i>	Adoxaceae
elm	<i>Ulmus spp.</i>	Ulmaceae
gallberry	<i>Ilex glabra</i>	Aquifoliaceae
hazel	<i>Corylus</i>	Betulaceae
hornbean	<i>Carpinus caroliniana</i>	Betulaceae
madrone	<i>Arbutus spp.</i>	Ericaceae
maple	<i>Acer spp.</i>	Sapindaceae
Mulberry	<i>Morus</i>	Moraceae
oak	<i>Quercus</i>	Fagaceae
persimmon	<i>Diospyros</i>	Ebenaceae
pine	<i>Pinus spp.</i>	Pinaceae
salt-bush	<i>Baccharis spp.</i>	Asteraceae
salt cedar	<i>Tamarix spp.</i>	Tamaricaceae
salmonberry	<i>Rubus spectabilis</i>	Rosaceae
sassafras	<i>Sassafras albidum</i>	Lauraceae
sweetbay magnolia	<i>Magnolia virginiana</i>	Magnoliaceae
sweetgum	<i>Liquidambar spp.</i>	Altingiaceae
sycamore	<i>Platanus occidentalis</i>	Platanaceae
tanoak	<i>Lithocarpus densiflorus</i>	Fagaceae
thimbleberry	<i>Rubus parviflorus</i>	Rosaceae
waxmyrtle	<i>Myrica cerifera</i>	Myricaceae
western hemlock	<i>Tsuga heterophylla</i>	Pinaceae
willow	<i>Salix spp.</i>	Salicaceae
winged elm	<i>Ulmus alata</i>	Ulmaceae

Partial control: a sequential application or tank mixes with additional Garlon® 3A, Accord® or other herbicides may be necessary for complete control.

General Mixing and Application Instructions

Mixing Instructions

Mixing with Water: To prepare the spray, add about half the required amount of water in the spray tank. Then, with agitation, add Milestone VM Plus and other registered tank mix herbicides. Finally, with continued agitation, add the rest of the water and additives such as surfactants or drift reduction and deposition aids.

Tank Mixing with Other Herbicides: Milestone VM Plus at rates of up to 9 pints per acre may be mixed with labeled rates of other herbicides registered for application on listed sites to broaden the spectrum of weeds controlled or to improve control of certain weeds. Milestone VM Plus may be applied in tank-mix combination with labeled rates of other herbicides provided: (1) the product tank-mixed with Milestone VM Plus is labeled for the timing and method of application for the use site to be treated; (2) mixing is not prohibited by the label of the product to be tank mixed with Milestone VM Plus; and (3) Milestone VM Plus is compatible with the product to be included in a tank-mix. Use as directed in the Directions for Use section of the tank mix partner.

- For direct injection or other spray equipment where the product formulations will be mixed in undiluted form, special care should be taken to ensure tank mix compatibility (see Tank Mix Compatibility Testing below.)
- Always perform a jar test to ensure the compatibility of products to be used in tank mixture.

Note: If tank mixing with Accord® Concentrate or Rodeo® herbicides, mix the Milestone VM Plus with at least 75% of the total spray volume desired and ensure that the Milestone VM Plus is well mixed before adding the Accord Concentrate or Rodeo to avoid incompatibility.

Tank-Mix Compatibility Testing: Perform a jar test prior to mixing in a spray tank to ensure compatibility of Milestone VM Plus and other pesticides or carriers. Use a clear glass jar with lid and mix ingredients in the same order and proportions as will be used in the spray tank. The mixture is compatible if the materials mix readily when the jar is inverted several times. The mixture should remain stable after standing for 1/2 hour or, if separation occurs, should readily remix if agitated. An incompatible mixture is indicated by separation into distinct layers that do not readily remix when agitated and/or the presence of flakes, precipitates, gels, or heavy oily film in the jar. Use of an appropriate compatibility aid such as Unite or Complex may resolve mix incompatibility. If the mixture is incompatible do not use that tank mix partner in tank mixtures.

Use with Surfactants: For post-emergence applications, a high quality surfactant such as a non-ionic surfactant of at least 80% active ingredient, should be added at 0.25% to 0.5% by volume (unless otherwise specified) to enhance herbicide activity under adverse environmental conditions (such as, high temperature, low relative humidity, drought conditions, dusty plant surfaces) or when weeds are heavily pubescent or more mature.

Sprayer Clean-Out Instructions

Do not use spray equipment used to apply Milestone VM Plus for other applications to land planted to susceptible crops or desirable sensitive plants unless it has been determined that all residues of this herbicide has been removed by thorough cleaning of equipment.

Equipment used to apply Milestone VM Plus should be thoroughly cleaned before reusing to apply any other chemicals as follows:

1. Rinse and flush application equipment thoroughly after use. Dispose of rinse water in non-cropland area away from water supplies.
2. Rinse a second time, adding 1 quart of household ammonia or tank cleaning agent for every 25 gallons of water. Circulate the solution through the entire system so that all internal surfaces are contacted (15 to 20 minutes). Let the solution stand for several hours, preferably overnight.
3. Flush the solution out of the spray tank through the boom.
4. Rinse the system twice with clean water, recirculating and draining each time.
5. Spray nozzles and screens should be removed and cleaned separately.

Precautions for Avoiding Spray Drift

Avoid application under conditions that may allow spray drift because very small quantities of spray, which may not be visible, may injure susceptible crops. This product should be applied only when the potential for drift to adjacent sensitive areas (e.g., residential areas, bodies of water, non-target crops and other plants) is minimal (e.g., when wind is blowing away from the sensitive areas. A drift control aid may be

added to the spray solution to further reduce the potential for drift. If a drift control aid is used, follow the use directions and precautions on the manufacturer's label. Do not use a thickening agent with Microfoil, Thru-Valve booms, or other spray delivery systems that cannot accommodate thickened spray solutions.

Ground Equipment: With ground equipment spray drift can be lessened by keeping the spray boom as low as possible; by applying 10 gallons or more of spray per acre; by keeping the operating spray pressures at the manufacturer's recommended minimum pressures for the specific nozzle type used (low pressure nozzles are available from spray equipment manufacturers); and by spraying when the wind velocity is low (follow state regulations). Avoid calm conditions which may be conducive to thermal inversions. Direct sprays no higher than the tops of target vegetation and keep spray pressures low enough to provide coarse spray droplets to minimize drift.

Aerial Application: Avoid spray drift at the application site. The interaction of many equipment-and weather-related factors determine the potential for spray drift. Users are responsible for considering all these factors when making decisions.

The following drift management requirements must be followed to avoid off-target drift movement from aerial applications:

1. The distance of the outer most operating nozzles on the boom must not exceed 75% of wingspan or 85% of the rotor diameter.
2. Nozzles should be pointed backward parallel with the air stream or not pointed downwards more than 45 degrees.

Where states have more stringent regulations, they should be observed.

The applicator should be familiar with and take into account the information covered in the following **Aerial Drift Reduction Advisory**. This information is advisory in nature and does not supersede mandatory label requirements.

Aerial Drift Reduction Advisory

Information on Droplet Size: The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, or under unfavorable environmental conditions (see Wind, Temperature and Humidity, and Temperature Inversions).

Controlling Droplet Size:

- **Volume** - Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows produce larger droplets.
- **Pressure** - Do not exceed the nozzle manufacturer's recommended pressures. For many nozzle types lower pressure produces larger droplets. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.
- **Number of Nozzles** - Use the minimum number of nozzles that will provide uniform coverage.
- **Nozzle Orientation** - Orient nozzles so that the spray is released parallel to the airstream. This produces larger droplets than other orientations. Significant deflection from horizontal will reduce droplet size and increase drift potential.
- **Nozzle Type** - Use a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles oriented straight back produce the largest droplets and the lowest drift.

Boom Length: For some use patterns, reducing the effective boom length to less than 75% of wingspan or 85% of the rotor diameter may further reduce drift without reducing swath width.

Application Height: Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.

Swath Adjustment: When applications are made with a crosswind, the swath will be displaced downwind. Therefore, on the up and downwind edges of the field, the applicator must compensate for this displacement by adjusting the path of the aircraft upwind. Swath adjustment distance should increase, with increasing drift potential (higher wind, smaller drops, etc.).

Wind: Drift potential is lowest between wind speeds of 2 to 10 mph. However, many factors, including droplet size and equipment type determine drift potential at any given speed. Application should be avoided below 2 mph due to variable wind direction and high inversion potential.

Note: Local terrain can influence wind patterns. Every applicator should be familiar with local wind patterns and how they affect spray drift.

Temperature and Humidity: When making applications in low relative humidity, set up equipment to produce larger droplets to compensate for evaporation. Droplet evaporation is most severe when conditions are both hot and dry.

Temperature Inversions: Applications should not occur during a local, low level temperature inversion because drift potential is high. Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain in a concentrated cloud. This cloud can move in unpredictable directions due to the light variable winds common during inversions. Temperature inversions are characterized by increasing temperatures with altitude and are common on nights with limited cloud cover and light to no wind. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of the smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

Terms and Conditions of Use

If terms of the following Warranty Disclaimer, Inherent Risks of Use and Limitation of Remedies are not acceptable, return unopened package at once to the seller for a full refund of purchase price paid. To the extent permitted by law, otherwise, use by the buyer or any other user constitutes acceptance of the terms under Warranty Disclaimer, Inherent Risks of Use and Limitation of Remedies.

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Dow AgroSciences warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. To the extent permitted by law, Dow AgroSciences MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

Inherent Risks of Use

It is impossible to eliminate all risks associated with use of this product. Crop injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions (including conditions noted on the label, such as unfavorable temperatures, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of Dow AgroSciences or the seller. To the extent permitted by law, all such risks shall be assumed by buyer.

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To the extent permitted by law, the exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories), shall be limited to, at Dow AgroSciences' election, one of the following:

1. Refund of purchase price paid by buyer or user for product bought, or
2. Replacement of amount of product used.

To the extent permitted by law, Dow AgroSciences shall not be liable for losses or damages resulting from handling or use of this product unless Dow AgroSciences is promptly notified of such loss or damage in writing. To the extent permitted by law, in no case shall Dow AgroSciences be liable for consequential or incidental damages or losses.

The terms of the Warranty Disclaimer, Inherent Risks of Use and this Limitation of Remedies cannot be varied by any written or

verbal statements or agreements. No employee or sales agent of Dow AgroSciences or the seller is authorized to vary or exceed the terms of the Warranty Disclaimer or this Limitation of Remedies in any manner.

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**Produced for
Dow AgroSciences LLC
9330 Zionsville Road
Indianapolis, IN 46268**

Label Code: D02-886-004
Replaces Label: D02-886-003
LOES Number: 010-02160

EPA accepted: 05/26/11

Revisions:

1. Revised advisory text and graphic
2. Added restrictions for on and off farm hay
3. Revised restrictions in hay or manure use
4. Added the following broadleaf weeds: hairy fleabane, giant hogweed, Japanese knotweeds, wild licorice, purple loosestrife, silverleaf nightshade, Swainson pea, povertyweed, sicklepod, annual sowthistle, Japanese stiltgrass, blessed milk thistle, Tree of heaven, tulip poplar, panicle willoweed.
5. Added scientific name and plant family to all weeds

Product Name: MILESTONE* VM Plus Herbicide

Issue Date: 12/09/2008
Print Date: 20 Mar 2009

Dow AgroSciences LLC encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Product and Company Identification

Product Name

MILESTONE* VM Plus Herbicide

COMPANY IDENTIFICATION

Dow AgroSciences LLC
A Subsidiary of The Dow Chemical Company
9330 Zionsville Road
Indianapolis, IN 46268-1189
USA

Customer Information Number: 800-992-5994

EMERGENCY TELEPHONE NUMBER

24-Hour Emergency Contact: 800-992-5994
Local Emergency Contact: 800-992-5994

2. Hazards Identification

Emergency Overview

Color: Red to brown
Physical State: Liquid
Odor: Mild

OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Potential Health Effects

Eye Contact: May cause slight eye irritation. May cause slight temporary corneal injury.
Skin Contact: Brief contact may cause skin irritation with local redness.
Skin Absorption: Prolonged skin contact is unlikely to result in absorption of harmful amounts.
Inhalation: No adverse effects are anticipated from single exposure to vapor. No adverse effects are anticipated from single exposure to mist. Prolonged exposure is not expected to cause adverse effects.

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Ingestion: Low toxicity if swallowed. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury.

Effects of Repeated Exposure: In animals, effects have been reported on the following organs: For the active ingredient(s): Kidney. For similar active ingredient(s): Liver. Gastrointestinal tract.

Birth Defects/Developmental Effects: EDTA and its sodium salts have been reported to cause birth defects in laboratory animals only at exaggerated doses that were toxic to the mother. These effects are likely associated with zinc deficiency due to chelation.

Reproductive Effects: For similar active ingredient(s): Triclopyr. In laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals.

Component	CAS #	Amount
Triclopyr Triethylamine Salt	57213-69-1	16.22 %
Aminopyralid Triisopropanolamine Salt	566191-89-7	2.22 %
Ethylenediamine tetraacetic acid	60-00-4	0.8 %
Balance		80.76 %

4. First-aid measures

Eye Contact: Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

Skin Contact: Wash skin with plenty of water.

Inhalation: Move person to fresh air; if effects occur, consult a physician.

Ingestion: If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

Notes to Physician: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. Fire Fighting Measures

Extinguishing Media: To extinguish combustible residues of this product use water fog, carbon dioxide, dry chemical or foam. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. General purpose synthetic foams (including AFFF type) or protein foams are preferred if available. Alcohol resistant foams (ATC type) may function.

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. To extinguish combustible residues of this product use water fog, carbon dioxide, dry chemical or foam. Contain fire water run-off if possible. Fire water run-off, if not contained, may cause environmental damage. Review the "Accidental Release Measures" and the "Ecological Information" sections of this (M)SDS.

Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

Unusual Fire and Explosion Hazards: This material will not burn until the water has evaporated. Residue can burn. May produce flash fire. If exposed to fire from another source and water is evaporated, exposure to high temperatures may cause toxic fumes.

Hazardous Combustion Products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Nitrogen oxides. Hydrogen chloride. Carbon monoxide. Carbon dioxide.

6. Accidental Release Measures

Steps to be Taken if Material is Released or Spilled: Contain spilled material if possible. Small spills: Absorb with materials such as: Clay. Dirt. Sand. Sweep up. Collect in suitable and properly labeled containers. Large spills: Contact Dow AgroSciences for clean-up assistance.

Personal Precautions: Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental Precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

7. Handling and Storage

Handling

General Handling: Keep out of reach of children. Do not swallow. Avoid breathing vapor or mist. Avoid contact with eyes, skin, and clothing. Use with adequate ventilation. Wash thoroughly after handling.

Other Precautions: Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers.

Storage

Store in a dry place. Store in original container. Keep container tightly closed when not in use. Do not store near food, foodstuffs, drugs or potable water supplies.

8. Exposure Controls / Personal Protection

Exposure Limits

Component	List	Type	Value
Triclopyr Triethylamine Salt	Dow IHG	TWA	2 mg/m ³ D-SEN

A D-SEN notation following the exposure guideline refers to the potential to produce dermal sensitization, as confirmed by human or animal data.

RECOMMENDATIONS IN THIS SECTION ARE FOR MANUFACTURING, COMMERCIAL BLENDING AND PACKAGING WORKERS. APPLICATORS AND HANDLERS SHOULD SEE THE PRODUCT LABEL FOR PROPER PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING.

Personal Protection

Eye/Face Protection: Use safety glasses.

Skin Protection: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.

Hand protection: Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl chloride ("PVC" or "vinyl"). Avoid gloves made of: Polyvinyl alcohol ("PVA"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Respiratory Protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements

or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. For most conditions, no respiratory protection should be needed; however, if material is heated or sprayed, use an approved air-purifying respirator. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

Ingestion: Use good personal hygiene. Do not consume or store food in the work area. Wash hands before smoking or eating.

Engineering Controls

Ventilation: Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. Local exhaust ventilation may be necessary for some operations.

9. Physical and Chemical Properties

Physical State	Liquid
Color	Red to brown
Odor	Mild
Flash Point - Closed Cup	78.8 °C (173.8 °F) <i>Closed Cup</i>
Flammable Limits In Air	Lower: <i>Not applicable</i> No test data available Upper: <i>Not applicable</i> No test data available
Autoignition Temperature	<i>Not applicable</i> No test data available
Vapor Pressure	<i>Not applicable</i> No test data available
Boiling Point (760 mmHg)	<i>Not applicable</i> No test data available.
Vapor Density (air = 1)	<i>Not applicable</i> No test data available
Specific Gravity (H ₂ O = 1)	<i>Not applicable</i> No test data available
Freezing Point	<i>Not applicable</i> No test data available
Melting Point	
Solubility in Water (by weight)	<i>Not applicable</i> No test data available
pH	7.3 <i>Literature</i>
Decomposition Temperature	

10. Stability and Reactivity

Stability/Instability

Thermally stable at recommended temperatures and pressures.

Conditions to Avoid: Active ingredient decomposes at elevated temperatures. Generation of gas during decomposition can cause pressure in closed systems.

Incompatible Materials: Avoid contact with: Oxidizers.

Hazardous Polymerization

Will not occur.

Thermal Decomposition

Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Carbon monoxide. Carbon dioxide. Hydrogen chloride. Nitrogen oxides. Toxic gases are released during decomposition.

11. Toxicological Information

Acute Toxicity

Ingestion

LD50, Rat, female 3,752 mg/kg

Skin Absorption

LD50, Rat, male and female > 5,000 mg/kg

Inhalation

LC50, 4 h, Aerosol, Rat, male and female > 5.34 mg/l

Sensitization

Skin

Did not cause allergic skin reactions when tested in mice.

Repeated Dose Toxicity

In animals, effects have been reported on the following organs: For the active ingredient(s): Kidney. For similar active ingredient(s). Liver. Gastrointestinal tract.

Chronic Toxicity and Carcinogenicity

For similar active ingredient(s). Triclopyr. Aminopyralid. Did not cause cancer in laboratory animals. The trisodium salt of EDTA did not cause cancer in laboratory animals.

Developmental Toxicity

Active ingredient did not cause birth defects in laboratory animals. For similar active ingredient(s). Did not cause birth defects in laboratory animals. EDTA and its sodium salts have been reported to cause birth defects in laboratory animals only at exaggerated doses that were toxic to the mother. These effects are likely associated with zinc deficiency due to chelation.

Reproductive Toxicity

For similar active ingredient(s). Triclopyr. In laboratory animal studies, effects on reproduction have been seen only at doses that produced significant toxicity to the parent animals. For similar active ingredient(s). Aminopyralid. In animal studies, did not interfere with reproduction. For the minor component(s): Limited data on component(s) tested did not indicate an effect on reproduction in laboratory animals.

Genetic Toxicology

For the active ingredient(s): In vitro genetic toxicity studies were negative. For similar active ingredient(s). In vitro genetic toxicity studies were predominantly negative. Genetic toxicity studies in animals were negative for component(s) tested. Most data indicate that EDTA and its salts are not mutagenic. Minimal effects reported are likely due to trace metal deficiencies resulting from chelating by EDTA.

12. Ecological Information

ENVIRONMENTAL FATE

Data for Component: **Triclopyr Triethylamine Salt**

Movement & Partitioning

Bioconcentration potential is low (BCF less than 100 or log Pow less than 3). Based largely or completely on information for similar material(s). Potential for mobility in soil is medium (Koc between 150 and 500).

Henry's Law Constant (H): 3.724E-14 atm*m3/mole; 25 °C Estimated

Partition coefficient, n-octanol/water (log Pow): 1.50 Estimated

Partition coefficient, soil organic carbon/water (Koc): 4,523 Estimated

Bioconcentration Factor (BCF): 1; invertebrate; Measured

Persistence and Degradability

Chemical degradation (hydrolysis) is expected in the environment. Based largely or completely on information for similar material(s). Biodegradation under aerobic static laboratory conditions is high (BOD20 or BOD28/ThOD > 40%).

Chemical degradation (hydrolysis) is expected in the environment. Based largely or completely on information for similar material(s). Based on stringent OECD test guidelines,

this material cannot be considered as readily biodegradable; however, these results do not necessarily mean that the material is not biodegradable under environmental conditions.

Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
2.96E-11 cm ³ /s	0.361 d	Estimated

Data for Component: Aminopyralid Triisopropanolamine Salt

Movement & Partitioning

For similar active ingredient(s). Aminopyralid. Bioconcentration potential is low (BCF less than 100 or log Pow less than 3). Potential for mobility in soil is very high (Koc between 0 and 50).

Persistence and Degradability

Material is not readily biodegradable according to OECD/EC guidelines.

Data for Component: Ethylenediamine tetraacetic acid

Movement & Partitioning

Bioconcentration potential is low (BCF less than 100 or log Pow less than 3). Potential for mobility in soil is high (Koc between 50 and 150).

Henry's Law Constant (H): 7.7E-16 atm*m³/mole Estimated

Partition coefficient, n-octanol/water (log Pow): -5.005 Estimated

Partition coefficient, soil organic carbon/water (Koc): 98

Bioconcentration Factor (BCF): 1.1; fish; Measured

Persistence and Degradability

Material is inherently biodegradable (reaches > 20% biodegradation in OECD test(s) for inherent biodegradability).

OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method
37 %	14 d	OECD 302B Test

Theoretical Oxygen Demand: 1.37 mg/mg

ECOTOXICITY

Material is practically non-toxic to fish on an acute basis (LC50 > 100 mg/L). Material is practically non-toxic to aquatic invertebrates on an acute basis (LC50/EC50 > 100 mg/L). Material is slightly toxic to birds on an acute basis (LD50 between 501 and 2000 mg/kg).

Fish Acute & Prolonged Toxicity

LC50, rainbow trout (*Oncorhynchus mykiss*), flow-through, 96 h: > 800 mg/l

Aquatic Invertebrate Acute Toxicity

EC50, water flea *Daphnia magna*, flow-through, 48 h, immobilization: > 800 mg/l

Aquatic Plant Toxicity

EC50, diatom *Navicula* sp., static, biomass growth inhibition, 96 h: 89.8 mg/l

Toxicity to Non-mammalian Terrestrial Species

oral LD50, bobwhite (*Colinus virginianus*): 1,839 mg/kg

contact LD50, Honey bee (*Apis mellifera*): > 191.6 micrograms/bee

oral LD50, Honey bee (*Apis mellifera*): 133.0 micrograms/bee

Toxicity to Soil Dwelling Organisms

LC50, Earthworm *Eisenia foetida*, adult, 14 d: > 0.3508 mg/kg

13. Disposal Considerations

If wastes and/or containers cannot be disposed of according to the product label directions, disposal of this material must be in accordance with your local or area regulatory authorities. This information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with

applicable regulations. If the material as supplied becomes a waste, follow all applicable regional, national and local laws.

14. Transport Information

DOT Non-Bulk
NOT REGULATED

DOT Bulk
Proper Shipping Name: COMBUSTIBLE LIQUID, NOS
Technical Name: CONTAINS TRIETHYLAMINE
Hazard Class: COMBUSTIBLE LIQUID **ID Number:** NA1993 **Packing Group:** PG III

IMDG
NOT REGULATED

ICAO/IATA
NOT REGULATED

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. Regulatory Information

OSHA Hazard Communication Standard

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312

Immediate (Acute) Health Hazard	Yes
Delayed (Chronic) Health Hazard	Yes
Fire Hazard	No
Reactive Hazard	No
Sudden Release of Pressure Hazard	No

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Special Hazardous Substances List:

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Section 103

This product contains the following substances which are subject to CERCLA Section 103 reporting requirements and which are listed in 40 CFR 302.4.

Component	CAS #	Amount
Ethylenediamine tetraacetic acid	60-00-4	0.8%

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

Toxic Substances Control Act (TSCA)

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30

CEPA - Domestic Substances List (DSL)

16. Other Information

Hazard Rating System

NFPA	Health	Fire	Reactivity
	3	1	1

Revision

Identification Number: 1007086 / 1016 / Issue Date 12/09/2008 / Version: 2.2

DAS Code: GF-1883

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ_DES	Hazard Designation
Action Level	A value set by OSHA that is lower than the PEL which will trigger the need for activities such as exposure monitoring and medical surveillance if exceeded.

Dow AgroSciences LLC urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.

D7

**For suppression of Downy Brome (cheatgrass),
Medusahead, Japanese Brome, and Jointed Goatgrass on
Wheat, Barley, Triticale, Oats, and Rangeland.**

ACTIVE INGREDIENT:

Pseudomonas fluorescens, strain D7* 95.0%

OTHER INGREDIENTS: 5.0%

TOTAL 100.0%

*Contains a minimum of 2×10^{11} cells/g *Pseudomonas fluorescens* strain D7

**KEEP OUT OF REACH OF CHILDREN
CAUTION**

**See inside booklet for complete First Aid, Precautionary Statements,
Directions For Use, and Warranty**

EPA Reg. No. 73771-4

EPA Est. No. 73771-WA-001



This product is manufactured by:
Verdesian Life Sciences, U.S., LLC 1001 Winstead Drive, Suite 480, Cary, NC 27513
Customer Service: 800-868-6446

**Net Weight:
0.44 lbs
(200 grams)**

FIRST AID

IF INHALED:	<ul style="list-style-type: none">▪ Move person to fresh air.▪ If person is not breathing, call 9-1-1 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible.▪ Call a poison control center or doctor for further treatment advice.
IF SWALLOWED:	<ul style="list-style-type: none">▪ Call a poison control center or doctor immediately for treatment advice.▪ Have person sip a glass of water if able to swallow.▪ Do not induce vomiting unless told to by a poison control center or doctor.▪ Do not give anything by mouth to an unconscious person.

HOT LINE NUMBER

Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact InfoTrac at 1-800-535-5053 for emergency medical treatment information.

PRECAUTIONARY STATEMENTS HAZARDS TO HUMANS & DOMESTIC ANIMALS CAUTION

Harmful if inhaled. Avoid breathing spray mist. Remove contaminated clothing and wash clothing before reuse. Avoid contact with skin, eyes or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Waterproof gloves
- Shoes plus socks
- NIOSH approved respirator with at least N-95, R-95, or P-95 filter. Repeated exposures to high concentrations of microbial proteins can cause allergic reactions.

Follow manufacturer's instructions for cleaning and maintaining PPE. Mixers/loaders and applicators must wear a dust/mist filter respirator meeting NIOSH standards of at least N-95, R-95 or P-95. Repeated exposures to high concentrations of microbial proteins can cause allergic sensitization. If no such instructions are available, use detergent and hot water for washables. Keep and wash PPE separately from other laundry.

OPTIONAL STATEMENT: [When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.]

USER SAFETY RECOMMENDATIONS

Users should:

Wash hands before eating, drinking, and chewing gum, using tobacco or using the toilet.

Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

Do not apply directly to water or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters. Do not apply when weather conditions favor drift or runoff from treated areas.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

AGRICULTURAL USE REQUIREMENTS

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the State or Tribal agency responsible for pesticide regulation.

Use this product only in accordance with its labeling and with the Worker Protection Standard 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forest, seed treatment facilities and non-commercial seed treatment activities, nurseries and greenhouses and handlers of agriculture pesticides. It contains requirements for training, decontamination, notification and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted entry interval. The requirement in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow workers entry into treated areas during the restricted entry interval (REI) of 4 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil or water is:

- Coveralls
- Water proof gloves
- Shoes plus socks

"Exception: If the product is soil-injected or soil-incorporated, the Worker Protection Standard, under certain circumstances, allows workers to enter the treated area if there will be no contact with anything that has been treated."

NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard (WPS) for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

DO NOT enter treated areas without protective clothing until sprays have dried.

D7 is a freeze dried powder that is dissolved in water and applied as a spray solution to the soil surface. Dissolve D7 in water and direct spray solution on the soil surface at a minimum rate of 1 gram (g)/acre. Optimum application conditions are cool (<50°F) and wet (measurable precipitation). Hot (>60°F) and dry conditions will limit the effectiveness of this application. For best results apply before rain in the fall or spring before germination and with daytime temperatures below 50°F.

D7 is for use in preemergence applications. Use coverage characteristics of the application equipment to determine the volume of water. Use 10 to 30 gallons of solution per acre for conventional-tillage applications. **For other applications use 15 to 50 gallons per acre of spray solution. If there is dense vegetation or residue use 20 to 50 gallons per acre of spray solution.**

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment and weather related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.

Apply up to 4 times per 12 month period for a maximum annual application of 8 g/acre.

Cereal Grains: wheat, barley, triticale, oats

Apply at preemergence before or after seeding.

Dilute product in water to apply at a rate of 2 g (0.07 ounces)/acre.

For ground application, apply in 10 to 50 gallons of spray per acre.

For aerial application use 2 to 10 gallons of water per acre. Use adequate spray volume to provide accurate and uniform distribution of spray particles over the treated area and to avoid spray drift.

Turf and grasses grown for seed: bluegrass, ryegrass, fescue, needle grass

Apply at preemergence before or after seeding.

Dilute product in water to apply at a rate of 2 g (0.07 ounces)/acre.

For ground application, apply in 10 to 50 gallons of spray per acre.

For aerial application use 2 to 10 gallons of water per acre. Use adequate spray volume to provide accurate and uniform distribution of spray particles over the treated area and to avoid spray drift.

Alfalfa

Apply at preemergence before or after seeding.

Dilute product in water to apply at a rate of 2 g (0.07 ounces)/acre.

For ground application, apply in 10 to 50 gallons of spray per acre.

For aerial application use 2 to 10 gallons of water per acre. Use adequate spray volume to provide accurate and uniform distribution of spray particles over the treated area and to avoid spray drift.

Rangeland

Dilute product in water to apply at a rate of 2 g (0.07 ounces)/acre.

For ground application, apply in 10 to 50 gallons of spray per acre.

For aerial application use 2 to 10 gallons of water per acre. Use adequate spray volume to provide accurate and uniform distribution of spray particles over the treated area and to avoid spray drift.

Do not allow cattle to graze on applied rangeland within 24 hours of application.

Seed Treatment

This product may also be applied as a seed treatment for the above crops. Apply to seeds at rate of 2-4 g (0.07 to 0.14 ounces)/100 pounds of seed.

Do not use with other seed treatment products unless previous experience assures compatibility.

D7 may be applied as a water based slurry with other registered seed treatment products through standard slurry or mist-type commercial seed treatment equipment.

Do Not Apply Through Any Type of Irrigation System

Compatibility: Do not use with adjuvants.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

Pesticide Storage: D7 must be stored in the original container at temperatures less than 32°F. Product will last longer if kept below 0°F. Store pesticides away from food, pet food, feed, seed, fertilizers and veterinary supplies.

Pesticide Disposal: Waste resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Container Disposal: Nonrefillable Container. Do not reuse or refill this container. Completely empty bag into application equipment by shaking and tapping sides and bottom to loosen clinging particles. If not emptied in this manner, the bag may be considered an acute hazardous waste and must be disposed in accordance with local, state and federal regulations. When completely empty, offer for recycling if available, or dispose of bag in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

WARRANTY

Verdesian Life Sciences U.S., LLC warrants that this Product conforms to the specifications set forth on the label. This Product is reasonably fit for the purpose stated on the label when used in accordance with the label directions and instructions under normal conditions of use.

VERDESIAN NEITHER MAKES, NOR AUTHORIZES ANY AGENT, REPRESENTATIVE OR THIRD PARTY TO MAKE ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE, AS TO THE CONDITION, QUALITY, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Neither the warranty of merchantability nor fitness for a particular purpose, expressed or implied, extends to the use of this Product contrary to label instructions or under abnormal conditions or under conditions not foreseeable to the Seller or Verdesian.

Limitation of Remedies. The exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability or other legal theories), shall be limited to, at Verdesian's election, one of the following: (1) replacement of the amount of product used; or (2) refund of the purchase price paid for the product; provided that Verdesian's provision of (1) or (2) is conditioned on its first being promptly notified of such loss or damage in writing. Verdesian shall not be liable to the buyer or any other party claiming by, through, or under the buyer for any other losses or damages resulting or relating to this product, including but not limited to any direct, indirect, special, punitive, economic, incidental or consequential damages or loss of profits, whether in contract, tort or otherwise. Verdesian neither assumes, nor authorizes any person to assume for it, any other liability in connection with the sale, storage, use or handling of this product other than expressly set forth herein.

NOTES

D7

For suppression of Downy Brome (cheatgrass), Medusahead, Japanese Brome, and Jointed Goatgrass on Wheat, Barley, Triticale, Oats, and Rangeland.

ACTIVE INGREDIENT:

Pseudomonas fluorescens, strain D7* 95.0%

OTHER INGREDIENTS: 5.0%

TOTAL 100.0%

*Contains a minimum of 2×10^{11} cells/g *Pseudomonas fluorescens* strain D7

**KEEP OUT OF REACH OF CHILDREN
CAUTION**

FIRST AID - IF INHALED: • Move person to fresh air. • If person is not breathing, call 9-1-1 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. • Call a poison control center or doctor for further treatment advice. **IF SWALLOWED:** • Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to by a poison control center or doctor. • Do not give anything by mouth to an unconscious person.

HOT LINE NUMBER - Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact InfoTrac at 1-800-535-5053 for emergency medical treatment information.

See attached booklet for complete First Aid,
Precautionary Statements, Directions For Use, and Warranty

EPA Reg. No. 73771-4

EPA Est. No. 73771-WA-001

PRECAUTIONARY STATEMENTS - HAZARDS TO HUMANS & DOMESTIC ANIMALS - CAUTION - Harmful if inhaled. Avoid breathing spray mist. Remove contaminated clothing and wash clothing before reuse. Avoid contact with skin, eyes or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet.

ENVIRONMENTAL HAZARDS - Do not apply directly to water or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters. Do not apply when weather conditions favor drift or runoff from treated areas.

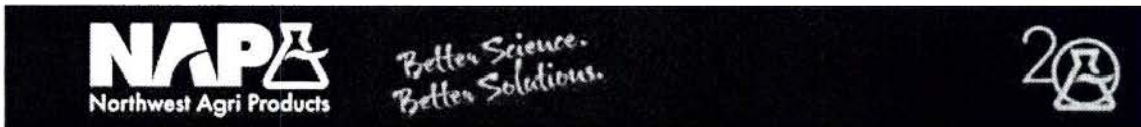
STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal. **Pesticide Storage:** D7 must be stored in the original container at temperatures less than 32° F. Product will last longer if kept below 0° F. Store pesticides away from food, pet food, feed, seed, fertilizers and veterinary supplies. **Pesticide Disposal:** Waste resulting from the use of this product may be disposed of on site or at an approved waste disposal facility. **Container Disposal:** Nonrefillable Container. Do not reuse or refill this container. Completely empty bag into application equipment by shaking and tapping sides and bottom to loosen clinging particles. If not emptied in this manner, the bag may be considered an acute hazardous waste and must be disposed in accordance with local, state and federal regulations. When completely empty, offer for recycling if available, or dispose of bag in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.



This product is manufactured by:
Verdesian Life Sciences, U.S., LLC 1001 Winstead Drive, Suite 480, Cary, NC 27513
Customer Service: 800-868-6446

Net Weight:
0.44 lbs
(200 grams)



D7

For suppression of Downy Brome (cheatgrass), Medusahead, Japanese Brome, and Jointed Goatgrass on Wheat, Barley, Triticale, Oats, and Rangeland.

ACTIVE INGREDIENT:

<i>Pseudomonas fluorescens</i> , strain D7	95.00%
Other ingredients	5.00%
	100.00%

*Contains a minimum of 2×10^{11} cells/g *Pseudomonas fluorescens* strain D7

EPA Reg. No. 71975-U
EPA Est. No. 71975-WA-001
Northwest Agricultural Products
P.O. Box 3453
Pasco, WA 99302
(509)547-8234



BIO SCIENCE
PESTICIDES

**KEEP OUT OF REACH OF CHILDREN
CAUTION**

Net weight: 0.44 lb. (200 grams)

Batch #

FIRST AID	
IF INHALED:	
<ul style="list-style-type: none"> ▪ Move person to fresh air. ▪ If person is not breathing, call 9-1-1 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. ▪ Call a poison control center or doctor for further treatment advice. 	
IF SWALLOWED:	
<ul style="list-style-type: none"> ▪ Call a poison control center or doctor immediately for treatment advice. ▪ Have person sip a glass of water if able to swallow. ▪ Do not induce vomiting unless told to by a poison control center or doctor. ▪ Do not give anything by mouth to an unconscious person. 	
HOT LINE NUMBER	
Have the product container or label with you when calling a poison control center or doctor or going for treatment. You may also contact Infotrac at 1-800-535-5053 for emergency medical treatment information.	

ACCEPTED

AUG 29 2014

Under the Federal Insecticide, Fungicide, and Rodenticide Act, as amended, for the pesticide registered under EPA Reg. No.

71975-4

**PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS & DOMESTIC ANIMALS
CAUTION**

Harmful if inhaled. Avoid breathing spray mist. Remove contaminated clothing and wash clothing before reuse. Avoid contact with skin, eyes or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Applicators and other handlers must wear:

- Long-sleeved shirt and long pants
- Waterproof gloves
- Shoes plus socks
- NIOSH approved respirator with at least N-95, R-95, or P-95 filter. Repeated exposures to high concentrations of microbial proteins can cause allergic reactions.

Follow manufacturer's instructions for cleaning and maintaining PPE. Mixers/loaders and applicators must wear a dust / mist filter respirator meeting NIOSH standards of at least N-95, R-95 or P-95. Repeated exposures to high concentrations of microbial proteins can cause allergic sensitization. If no such instructions are available, use detergent and hot water for washables. Keep and wash PPE separately from other laundry.

OPTIONAL STATEMENT: [When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(d)(4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.]

USER SAFETY RECOMMENDATIONS

Users should:

Wash hands before eating, drinking, and chewing gum, using tobacco or using the toilet. Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.

Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

Do not apply directly to water or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters. Do not apply when weather conditions favor drift or runoff from treated areas.

ACCEPTED

Northwest Agricultural Products, Inc.
10000 1st Avenue, Everett, WA 98203
P.O. Box 10000, Everett, WA 98203

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

AGRICULTURAL USE REQUIREMENTS

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the State or Tribal agency responsible for pesticide regulation.

Use this product only in accordance with its labeling and with the Worker Protection Standard 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forest, seed treatment facilities and non-commercial seed treatment activities, nurseries and greenhouses and handlers of agriculture pesticides. It contains requirements for training, decontamination, notification and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted entry interval. The requirement in this box only apply to uses of this product that are covered by the Worker Protection Standard,

Do not enter or allow workers entry into treated areas during the restricted entry interval (REI) of 4 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil or water is:

- Coveralls
- Water proof gloves
- Shoes plus socks

“Exception: If the product is soil-injected or soil-incorporated, the Worker Protection Standard, under certain circumstances, allows workers to enter the treated area if there will be no contact with anything that has been treated.”

Non-Agricultural Use Requirements

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard (WPS) for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

DO NOT enter treated areas without protective clothing until sprays have dried.

D7 Master Label

D7 is a freeze dried powder that is dissolved in water and applied as a spray solution to the soil surface. Dissolve D7 in water and direct spray solution on the soil surface at a minimum rate of 1 gram (g)/acre. Optimum application conditions are cool (<50°F) and wet (measurable precipitation). Hot (>60°F) and dry conditions will limit the effectiveness of this application. For best results apply before rain in the fall or spring before germination and with daytime temperatures below 50° F.

D7 is for use in preemergence applications. Use coverage characteristics of the application equipment to determine the volume of water. Use 10 to 30 gallons of solution per acre for conventional-tillage applications. **For other applications use 15 to 50 gallons per acre of spray solution. If there is dense vegetation or residue use 20 to 50 gallons per acre of spray solution.**

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment and weather related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.

Apply up to 4 times per 12 month period for a maximum annual application of 8 g/acre.

Cereal Grains: wheat, barley, triticale, oats

Apply at preemergence before or after seeding.

Dilute product in water to apply at a rate of 2g (0.07 ounces) / acre

For ground application, apply in 10 to 50 gallons of spray per acre.

For aerial application use 2 to 10 gallons of water per acre. Use adequate spray volume to provide accurate and uniform distribution of spray particles over the treated area and to avoid spray drift.

Turf and grasses grown for seed: bluegrass, ryegrass, fescue, needle grass

Apply at preemergence before or after seeding.

Dilute product in water to apply at a rate of 2g (0.07 ounces) / acre

For ground application, apply in 10 to 50 gallons of spray per acre.

For aerial application use 2 to 10 gallons of water per acre. Use adequate spray volume to provide accurate and uniform distribution of spray particles over the treated area and to avoid spray drift.

Alfalfa

Apply at preemergence before or after seeding.

Dilute product in water to apply at a rate of 2g (0.07 ounces) / acre

For ground application, apply in 10 to 50 gallons of spray per acre.

For aerial application use 2 to 10 gallons of water per acre. Use adequate spray volume to provide accurate and uniform distribution of spray particles over the treated area and to avoid spray drift.

Rangeland:

Dilute product in water to apply at a rate of 2g (0.07 ounces) / acre

For ground application, apply in 10 to 50 gallons of spray per acre.

D7 Master Label

For aerial application use 2 to 10 gallons of water per acre. Use adequate spray volume to provide accurate and uniform distribution of spray particles over the treated area and to avoid spray drift.

Do not allow cattle to graze on applied rangeland within 24 hours of application.

Seed Treatment

This product may also be applied as a seed treatment for the above crops. Apply to seeds at rate of 2-4g (0.07 to 0.14 ounces) / 100 pounds of seed.

Do not use with other seed treatment products unless previous experience assures compatibility.

D7 may be applied as a water based slurry with other registered seed treatment products through standard slurry or mist-type commercial seed treatment equipment.

Do Not Apply Through Any Type of Irrigation System

Compatibility: Do not use with adjuvants.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

Pesticide Storage: D7 must be stored in the original container at temperatures less than 32°F. Product will last longer if kept below 0°F. Store pesticides away from food, pet food, feed, seed, fertilizers and veterinary supplies.

Pesticide Disposal: Waste resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

Container Disposal: Nonrefillable Container. Do not reuse or refill this container. Completely empty bag into application equipment by shaking and tapping sides and bottom to loosen clinging particles. If not emptied in this manner, the bag may be considered an acute hazardous waste and must be disposed in accordance with local, state and federal regulations. When completely empty, offer for recycling if available, or dispose of bag in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

Conditions of Sale and Limitation of Warranty and Liability:

NOTICE: Read the entire Directions for Use and Conditions of Sale and Limitation of Warranty and Liability before buying or using this product. If the terms are not acceptable, return the product at once, unopened, and the purchase price will be refunded.

The Directions for Use of this product are believed to be adequate and must be followed carefully, it is impossible to eliminate all the risks inherently associated with the use of this product. Crop injury, ineffectiveness, or other unintended consequences may result due to such factors as weather conditions, presence or absence of other materials, or the manner of use or application, all of which are beyond the control of Northwest Ag Products, or the seller.

To the extent consistent with applicable law, the products sold to you are furnished "as is" by Northwest Ag Products. The manufacturer and the seller are subject only to the manufacturer's warranties, if any, which appear on the label of the product sold to you. Except as warranted by this label, Northwest Ag Products, the manufacturer, or the seller makes no warranties, guarantees, or representations of any kind to the buyer or the user, either express or implied, or by usage of trade, statutory or otherwise, with regard to the product sold or use of the product, including, but not limited to, merchantability, fitness for a particular purpose or use, or eligibility of the product for any particular trade usage. To the extent consistent with applicable law, Buyer's or user's exclusive remedy, and Northwest Ag Products, the manufacturer's or the seller's total liability shall be limited to damages not exceeding the cost of the product. No agent or employee of Northwest Ag Products, or the seller is authorized to amend the terms of this warranty disclaimer or the product's label or to make a presentation or recommendation different from or inconsistent with the label of this product.

To the extent consistent with applicable law, Northwest Ag Products, the manufacturer, or the seller shall not be liable for consequential, special, or indirect damages resulting from the use, handling, application, storage, or disposal of this product or for damages in the nature of penalties, and the buyer and the user waive any right that they may have to such damages.

TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE EXCLUSIVE LIABILITY OF NORTHWEST AGRICULTURAL PRODUCTS AND SELLER FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY, CONTRACT, NEGLIGENCE, TORT, STRICT LIABILITY OR OTHERWISE) RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, SHALL BE THE RETURN OF THE PURCHASE PRICE OF THE PRODUCT OR, AT THE ELECTION OF NORTHWEST AGRICULTURAL PRODUCTS OR SELLER, THE REPLACEMENT OF THE PRODUCT.

© Northwest Agricultural Products



1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: D7®
EPA Reg No: 73771-4
Product Use: Herbicide

Supplier Information: Verdesian Life Sciences, U.S., LLC
1001 Winstead Drive, Suite 480
Cary, NC 27513
1-800-868-6446

Emergency Number: 1-800-535-5053 INFOTRAC

2. HAZARDS IDENTIFICATION**CLASSIFICATION**

This chemical does not meet the hazardous criteria set forth by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200). However, this Safety Data Sheet (SDS) contains valuable information critical to the safe handling and proper use of this product. This SDS should be retained and available for employees and other users of this product.

3. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENTS	CAS NO.	% BY WEIGHT
<i>Pseudomonas fluorescens</i> , strain D7*	N/A	95.0
Other Ingredients		5.0

4. FIRST AID MEASURES**First Aid Measures:**

General Advice: Have the product container or label with you when calling a poison control center or doctor, or going for treatment. You may also contact the International Poison Center at 1-888-740-8712 for emergency medical treatment information.

If Inhaled: Move victim to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. Call a poison control center or doctor for further treatment advice.

If Swallowed: Call a poison control center or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to by a poison control center or doctor. Do not give anything by mouth to an unconscious person.

If on Skin or Clothing: In case of contact with substance, immediately flush skin with running water for at least 20 minutes.

If in Eyes: In case of contact with substance, immediately flush eyes with running water for at least 20 minutes.

Most important symptoms and effects: Harmful if inhaled.

Recommendations for immediate medical care and special treatment, if needed:

Note to Physician: Treat symptomatically. This is a non-toxic viable microbial culture of *Pseudomonas fluorescens* D7. Some individuals may be sensitive to the product.

5. FIRE FIGHTING MEASURES

Extinguishing Media: LARGE FIRE: Water spray, fog or regular foam. SMALL FIRE: Dry chemical, CO₂, water spray or regular foam.

Special Fire Fighting Procedures: Firefighters should wear NIOSH/MSHA approved self-contained breathing apparatus and full fire-fighting turn out gear. As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

Unusual Fire and Explosion Hazards: None known.

Hazardous Combustion Products: None known.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Wear appropriate protective gear for the situation, avoid direct contact. See Personal Protection information in Section 8. Spilled material is slippery; do not walk through spilled material.

Environmental Precautions: Prevent material from entering public sewer systems or any waterways. Do not flush to drain. The affected area should be removed and placed in an appropriate container for disposal.

Methods for Containment: Stop leak if you can do it without risk. **SMALL SPILLS:** Take up with sand or other noncombustible absorbent material and place into containers for later disposal. **LARGE SPILLS:** Dike far ahead of liquid spill for later disposal.

Methods for Clean-Up: See Section 13: DISPOSAL CONSIDERATIONS for more information.

7. HANDLING AND STORAGE

Handling: Harmful if inhaled. Avoid breathing spray mist. Users should wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove clothing/Personal Protective Equipment (PPE) immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Remove Personal Protective Equipment (PPE) immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

Storage: D7 must be stored in the original container at temperatures less than 32° F. Product will last longer if kept below 0° F. Store pesticides away from food, pet food, feed, seed, fertilizers and veterinary supplies.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines: No applicable exposure limits available for product or components.

Engineering Controls:

Where engineering controls are indicated by specific use conditions or a potential for excessive exposure, use local exhaust ventilation at the point of generation.

Personal Protective Equipment:

Eye/Face Protection: To avoid contact with eyes, wear protective eyewear. An emergency eyewash or water supply should be readily accessible to the work area.

Skin and Body Protection: To avoid contact with skin, wear long pants, long-sleeved shirt, shoes plus socks, and waterproof gloves. An emergency shower or water supply should be readily accessible to the work area.

Respiratory Protection: NIOSH-approved respirator with at least N-95, R-95, or P-95 filter. Repeated exposures to high concentrations of microbial proteins can cause allergic reactions.

General Hygiene Considerations: Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this material: 1) Do not store, use and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored. 2) Wash hands and face carefully before eating, drinking, using tobacco, applying cosmetics or using the toilet.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Light yellow solid powder
Odor:	Odorless
Odor threshold:	No data available
pH:	5.1
Melting point/freezing point:	<0° C (32° F)
Initial boiling point and boiling range	> 100° C (> 212° F)
Flash point:	NDA
Evaporation rate:	NDA
Flammability (solid, gas):	N/A
Upper/lower flammability or explosive limits:	N/A
Vapor pressure:	NDA
Vapor density:	NDA
Relative density:	12.48 lb/ft ³
Solubility(ies):	Soluble 100%
Partition coefficient: n-octanol/water:	NDA
Autoignition temperature:	NDA
Decomposition temperature:	NDA
Viscosity:	NDA

Note: Physical data are typical values, but may vary from sample to sample. A typical value should not be construed as a guaranteed analysis or as a specification.

10. STABILITY AND REACTIVITY

Chemical Stability: This material is stable under normal handling and storage conditions.

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

Conditions to Avoid: Temperatures above 32° F (0° C).

Incompatible Materials: Sulfuric acid, phosphoric acid, aqueous ammonia, bactericides, or soil fumigants.

Hazardous Decomposition Products: None known.

11. TOXICOLOGICAL INFORMATION

Potential Health Effects:

Likely Routes of Exposure: Inhalation, ingestion, eye and skin contact.

Eye Contact: Avoid contact with eyes. Dust may be irritating.

Skin Contact: Avoid contact with skin.

Ingestion: This product is an organic powder, avoid ingestion.

Inhalation: Avoid breathing powder dust. May cause slight discomfort to lungs when exposure to high concentrations of product dust, especially during mixing. Symptoms include nasal discharge and difficulty breathing.

Medical Conditions Aggravated by Exposure: Pre-existing respiratory disorders may be aggravated by inhalation exposure.

Toxicological Data:

Data from laboratory studies conducted on *Pseudomonas fluorescens*:

Oral: Rat LD₅₀ >5,000 mg/kg

Dermal: Rabbit LD₅₀ > 2,000 mg/kg

Inhalation: Rat 4-hr LC₅₀ – 5.3 mg/L

Eye Irritation: Rabbit - Minimally irritating

Skin Irritation: Rabbit - Slightly irritating

Skin Sensitization: Guinea pigs – Non-sensitizing

Subchronic (Target Organ) Effects: No data available.

Carcinogenicity / Chronic Health Effects: No data available.

Reproductive Toxicity: No data available.

Developmental Toxicity: No data available.

Germ Cell Mutagenicity: No data available.

Description of Symptoms: Please see Section 4 of this SDS for symptoms.

Assessment Carcinogenicity: None listed with ACGIH, IARC, NTP or OSHA.

12. ECOLOGICAL INFORMATION

Ecotoxicity:

Do not apply directly to water or to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters. Do not apply when weather conditions favor drift or runoff from treated areas.

Component Information: No data available

Persistence and Degradability: No data available

Bioaccumulations: No data available

Mobility in Soil: No data available

Other Adverse Effects: No data available

13. DISPOSAL CONSIDERATIONS**Waste Disposal Method:**

Wastes resulting from the use of this product must be disposed of on site or at an approved waste disposal facility.

Container Disposal Method:

Nonrefillable Container. Do not reuse or refill this container. Completely empty bag into application equipment by shaking and tapping sides and bottom to loosen clinging particles. If not emptied in this manner, the bag may be considered an acute hazardous waste and must be disposed in accordance with local, state and federal regulations. When completely empty, offer for recycling if available, or dispose of bag in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

14. TRANSPORTATION INFORMATION

Follow the precautions indicated in Section 7: HANDLING AND STORAGE of this SDS.

DOT:

Non Regulated

IMDG:

Non Regulated

IATA:

Non Regulated

15. REGULATORY INFORMATION**EPA FIFRA INFORMATION**

This chemical is a pesticide product registered by the United States Environmental Protection Agency and is subject to certain labeling requirements under federal pesticide law. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS), and for workplace labels of non-pesticide chemicals. The hazard information required on the pesticide label is reproduced below. The pesticide label also includes other important information, including directions for use.

HAZARDS TO HUMANS AND DOMESTIC ANIMALS. CAUTION. Harmful if inhaled. Avoid breathing spray mist. Remove contaminated clothing and wash clothing before reuse. Avoid contact with skin, eyes or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet.

U.S. FEDERAL REGULATIONS

TSCA Inventory: This product is exempted from TSCA because it is solely for FIFRA regulated use.

SARA Hazard Notification/Reporting:**Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370.66):**

Immediate

Section 313 Toxic Chemical(s):

This material does not contain any chemical components with known CAS numbers that exceed the threshold (de minimis) reporting levels established by SARA Title III, Section 313.

Reportable Quantity (RQ) under U.S. CERCLA:

None

RCRA Waste Code:

Under RCRA, it is the responsibility of the product user to determine at the time of disposal, whether a material containing the product or derived from the product should be classified as a hazardous waste.

State Information:

Other state regulations may apply. Check individual state requirements.

California Proposition 65: Not Listed.

16. OTHER INFORMATION**Key to abbreviations:**

N/A = Not applicable

NDA = No data available

OSHA = Occupational Safety and Health Administration

ACGIH = American Conference of Governmental Industrial Hygienists

IARC = International Agency for Research on Cancer

NTP = National Toxicology Program

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Date of Issue: February 7, 2017**Supersedes:** April 13, 2015



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF CHEMICAL SAFETY
AND POLLUTION PREVENTION

AUG 12 2014

MEMORANDUM

SUBJECT: Posting EPA-HQ-OPP-2013-0570 to Regulations.gov for Public Access

FROM: Susanne Cerrelli, Regulatory Action Leader
Biopesticides and Pollution Prevention Division
Office of Pesticide Programs

THRU: Robert McNally, Director
Biopesticides and Pollution Prevention Division
Office of Pesticide Programs

TO: Office of Pesticide Programs Docket

This memorandum authorizes the posting of EPA-HQ-OPP-2013-0570 to Regulations.gov for public access. Pursuant to Section 3 of the Federal Insecticide, Fungicide, and Rodenticide Act, Northwest Agricultural Products, submitted applications to the EPA, seeking to register a TGAI, Fluorescens Technical (EPA File Symbol 71975-G), and a new EP, D7 (EPA File Symbol 71975-U). These pesticide products contain a new active ingredient, *Pseudomonas fluorescens* strain D7. The EP containing *Pseudomonas fluorescens* strain D7 is proposed for use in field applications for suppression of downy brome (cheatgrass), medusahead, Japanese brome, and jointed goatgrass on fields of turf and grasses grown for seed, alfalfa, wheat, barley, triticale, oat, and rangeland. Given that these pesticide products contain a new active ingredient and that their registration would result in the first food, and outdoor uses for *Pseudomonas fluorescens* strain D7, the EPA is requesting comments on its overall proposal to register such pesticide products, the underlying risk assessments, and other documents, as specified below, that are associated with this proposal.

AUG 12 2014

The following documents will be available for a 15-day public comment period from: _____

to: AUG 27 2014 :

- A. Draft *Pseudomonas fluorescens* strain D7 Registration Action Document (BRAD)
- B. draft label for the manufacturing-use product, Fluorescens Technical (File Symbol 71975-G), and
- C. draft label for the end-use pesticide product, D7 (EPA File Symbol 71975-U).

Submit your comments, identified by Docket ID No. EPA-HQ-OPP-2013-0570, by one of the following methods:

- www.regulations.gov: Follow the on-line instructions for submitting comments.
- Mail: Office of Pesticide Programs Regulatory Public Docket, EPA Docket Center (EPA/DC) (Mail Code 28221T), 1200 Pennsylvania Ave., NW., Washington, DC 20460-0001.
- Hand Delivery: EPA Docket Center (EPA/DC), EPA West Building, Room 3334, 1301 Constitution Ave., NW., Washington, DC 20004. Such deliveries are only accepted during the Docket's normal hours of operation, and special arrangements should be made for deliveries of boxed information.

The EPA's policy is that all comments received will be included in the public docket without change and may be made available online at <http://www.regulations.gov>, including any personal information provided, unless the comment includes information claimed to be Confidential Business Information (CBI) or other information whose disclosure is restricted by statute. Do not submit information that you consider to be CBI or otherwise protected through <http://www.regulations.gov> or e-mail. The <http://www.regulations.gov> Web site is an "anonymous access" system, which means the EPA will not know your identity or contact information unless you provide it in the body of your comment. If you send an e-mail comment directly to the EPA without going through <http://www.regulations.gov>, your e-mail address will be automatically captured and included as part of the comment that is placed in the public docket and made available on the Internet. If you submit an electronic comment, the EPA recommends that you include your name and other contact information in the body of your comment and with any disk or CD-ROM you submit. If the EPA cannot read your comment due to technical difficulties and cannot contact you for clarification, the EPA may not be able to consider your comment. Electronic files should avoid the use of special characters, avoid any form of encryption, and be free of any defects or viruses. For additional information about the EPA's public docket, visit the EPA Docket Center homepage at <http://www.epa.gov/dockets/>.

Should you have any questions regarding this memorandum, please contact Ms. Susanne Cerrelli by telephone at (703) 308-8077 or via email at cerrelli.susanne@epa.gov.



BIOPESTICIDES REGISTRATION ACTION DOCUMENT

Pseudomonas fluorescens strain D7

Pesticide Chemical (PC) Code: 016418

**U.S. Environmental Protection Agency
Office of Pesticide Programs
Biopesticides and Pollution Prevention Division**

August 28, 2014

A handwritten signature in black ink that reads "R. McNally".

Robert McNally, Director

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I. EXECUTIVE SUMMARY

Background

On October 5, 2012, Ag-Chem Consulting on behalf of Northwest Agricultural Products submitted applications for a new technical grade active ingredient (TGAI), Fluorescens Technical (EPA File Symbol 71975-G), and a new end-use product (EP), D7 (EPA File Symbol 71975-U), to the United States Environmental Protection Agency (EPA) under section 3 of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). These products both contain the new active ingredient, *Pseudomonas fluorescens* strain D7.

Pseudomonas fluorescens strain D7 is a naturally occurring bacterium originally isolated from winter wheat roots. On February 14, 2012, an Experimental Use Permit no. 71975-EUP-1 was issued to Northwest Agricultural products for experimental use on a total of 1,020 acres in Oregon and Washington states. This permit is effective from March 1, 2012 to March 1, 2015.

In September 2009, EPA completed a Final Registration Review Decision for *Pseudomonas fluorescens*, Registration Review Case 6006 (<http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OPP-2007-0567-0014>). In its decision, EPA concluded that the standards of Registration Review were met for the *Pseudomonas fluorescens* and identified no general risk concerns. This strain will now be considered as part of the *Pseudomonas fluorescens* Registration Review Case 6006.

The EP containing *Pseudomonas fluorescens* strain D7 is proposed for use in field applications for suppression of downy brome (cheatgrass), medusahead, Japanese brome, and jointed goatgrass on fields of turf and grasses grown for seed, alfalfa, wheat, barley, triticale, oat, and rangeland. The proposed EP label contains applications as a seed treatment and also by ground or aerial spray. The label directs the user to apply the EP before weed seeds germinate in the spring or autumn when daytime temperatures are below 50°F and just prior to expected rainfall. It can be applied up to 4 times per year for a maximum annual application of 8g/acre.

EPA scientists reviewed product analysis, toxicology, and nontarget organism data and information (40 CFR §§ 158.2120, 158.2140, and 158.2150, respectively) submitted to support the registration of the proposed pesticide products. They found that, overall, such data and information are adequate for risk assessment purposes, fulfill the current microbial pesticide data requirements, and support registration of the product under FIFRA section 3(c)(5).

Product Analysis

For the purposes of FIFRA section 3(c)(5) registration, the product analysis data requirements for the TGAI (also the manufacturing use product) and EP were fulfilled by acceptable guideline studies. These data requirements include product chemistry and composition, analysis of samples, physical and chemical characteristics.

Toxicology

The applicant submitted adequate mammalian toxicology data and information to support the pesticide products. An acute injection toxicity/pathogenicity study submitted with the original application and conducted with high dosages of *Pseudomonas fluorescens* strain D7, showed

adverse effects including mortality, abnormal clinical signs, transient weight loss with resultant decreased absolute body weight, abnormal gross necropsy findings, and altered organ weights. This injection study was conducted at an inappropriate excessive dose. The applicant repeated the acute injection study at an appropriate lower dose with additional controls to account for observed results. This repeated injection toxicity/pathogenicity study along with the acute oral and pulmonary toxicity/pathogenicity studies, showed that *Pseudomonas fluorescens* strain D7 is not toxic or pathogenic via these routes of exposure. In light of the results of the acute toxicity/pathogenicity data, EPA did not require testing at higher tiers (i.e., Tiers II and III).

Tolerance Exemption

In its application to the EPA in 2012, Ag-Chem Consulting on behalf of Northwest Agricultural Products provided a petition, data and other information to support an exemption from the requirement for a tolerance for residues of *Pseudomonas fluorescens* strain D7 when used in or on growing crops and rangeland.

Occupational Exposure

Despite the low toxicological profile of residues of the active ingredient, *Pseudomonas fluorescens* strain D7, in or on all agricultural commodities, the EPA is requiring baseline personal protective equipment (PPE) for handlers that, due to their occupation, may be subject to prolonged or repeated exposure to the active ingredient. The label on D7, the end-use product, directs handlers working with *Pseudomonas fluorescens* strain D7 in agricultural settings to wear a long-sleeved shirt, long pants, socks, shoes, waterproof gloves, and a dust/mist filtering respirator meeting National Institute for Occupational Safety and Health (NIOSH) standards of at least N-95, R-95, or P-95.

Nontarget Organisms

P. fluorescens occurs naturally in soil and water (Palleroni, 2005), and strain D7 is a root-associated bacterium that was isolated originally from the West Coast region of the United States. Soil-dwelling nontarget organisms in those areas are expected to currently have some exposure to this bacterium. The nontarget organism data requirements have been adequately addressed for the purposes of FIFRA section 3(c)(5) registration, based on the submitted data, rationales, and limited anticipated exposure to nontarget organisms. The specific findings for each nontarget organism are addressed in Section IV below.

Public Participation

On October 1, 2009, the EPA announced a new policy to provide a more meaningful opportunity for the public to participate in major registration decisions before they occur. According to this policy, the EPA intends to provide a public comment period prior to making a registration decision for, at minimum, the following types of applications: new active ingredients; first food uses; first outdoor uses; first residential uses; or any other registration actions for which the Agency believes there may be significant public interest.

Consistent with the policy of making registration actions more transparent, the pesticide products containing *Pseudomonas fluorescens* strain D7 were subject to a 15-day comment period. In addition to containing a new active ingredient, the registration of the pesticide product will result

in the first outdoor and food uses for *Pseudomonas fluorescens* strain D7. The docket identification number associated with these registration actions, and accessed through either <http://www.regulations.gov> or <http://www.epa.gov/pesticides/regulating/registration-status.html>, is EPA-HQ-OPP-2013-0570. During this comment period, no comments were received.

Registration Decision

Therefore EPA maintains that based upon the risk assessment and information submitted in support of registration of the Fluorescens Technical (TGAI) and the D7 EP, it is appropriate to issue these registrations. The basis for this decision can be found in the risk assessment for *Pseudomonas fluorescens* strain D7 which is characterized throughout this BRAD.

II. ACTIVE INGREDIENT OVERVIEW

Biological Name: *Pseudomonas fluorescens* strain D7

Culture Deposit: Agricultural Research Service Culture Collection NRRL B-18293

OPP Chemical Code: 016418

Type of Pesticide: Microbial Pesticide –Herbicide

See Appendix B for specific information (e.g., use sites, application rates, methods of application, formulation types, and target pests) regarding the pesticide products containing this active ingredient.

III. REGULATORY BACKGROUND

A. Applications for Pesticide Product Registration

On October 5, 2012, Ag-Chem Consulting (address: 12208 Quinque Lane, Clifton, VA 20124) on behalf of Northwest Agricultural Products (address: 821 South Chestnut Avenue, Pasco, WA 99301) submitted applications for a new TGAI, Fluorescens Technical (EPA File Symbol 71975-G), and a new EP, D7 (EPA File Symbol 71975-U), to the EPA under section 3 of FIFRA.

On October 30, 2013 (78 FR 64937), EPA announced receipt of the application to register a pesticide product containing a new active ingredient for use in agriculture (outdoors). EPA opened a 30-day public comment period pursuant to the provisions of FIFRA section 3(c)(4). No comments were received following this publication.

B. Food Tolerance Exemption

Concurrent with its registration applications and under Federal Food, Drug, and Cosmetic Act (FFDCA) section 408(d), Northwest Agricultural Products submitted a petition to establish an exemption from the requirement for a tolerance for residues of the pesticide active ingredient, *Pseudomonas fluorescens* strain D7 [Pesticide Petition (PP) 2F8103] in or on growing crops and rangeland. EPA published a Notice that Northwest Agricultural Products filed a petition to establish an exemption of the requirement for a tolerance for residues of *Pseudomonas fluorescens* strain D7 in or on growing crops and rangeland in the *Federal Register* of September 12, 2013 (78 FR 56185) and opened a 30-day comment period. While rangeland is not a food

commodity and “growing crops” is not a recognized commodity term used by the Agency in tolerance actions, the Agency is interpreting the petitioner’s request as seeking a tolerance exemption for “all food commodities.” The term “growing crops” is quite broad and does not limit that types of food commodities that it covers; therefore, the Agency believes a reasonable interpretation of that term allows for establishment of an exemption from the requirement of a tolerance for “all food commodities.”

One comment was received in the docket for the petition for *Pseudomonas fluorescens* strain D7 tolerance exemption that expressed general opposition to the sale of pesticides, and to their negative effects on bees and human beings. The comment was not specific to *Pseudomonas fluorescens* strain D7 and was not found to be relevant to the proposed exemption of the requirement for a tolerance. For *Pseudomonas fluorescens* strain D7, no hazard to bees was identified and the risk posed to adults, infants, and children is likely to be minimal because of the low acute oral toxicity/pathogenicity potential of *Pseudomonas fluorescens* strain D7. The exposure to bees to this pesticide is expected to be low based on the label application instructions.

IV. RISK ASSESSMENT

In the Federal Register of October 26, 2007 (72 FR 61002), the EPA issued a Final Rule on the data requirements to support registration of microbial pesticides and updated the definition for microbial pesticides. The rule became effective on December 26, 2007. The data and information evaluated for this BRAD were considered in light of these requirements.

The EPA classifies each data submission with an indication of the usefulness of the information contained in the documents for risk assessment. A rating of “acceptable” indicates the study is scientifically sound and is useful for risk assessment. A “supplemental” rating indicates the data provide some information that can be useful for risk assessment. The studies may have certain aspects determined not to be scientifically acceptable (“supplemental: upgradeable”). If a study is rated as “supplemental: upgradeable,” EPA always provides an indication of what is lacking or what can be provided to change the rating to “acceptable.” If there is simply a “supplemental” rating, the reviewer will often state that the study is not required by 40 CFR Part 158. Both “acceptable” and “supplemental” studies may be used in the risk assessment process as appropriate. An “unacceptable” rating indicates that new data must be submitted.

For the acute toxicity data requirements, Toxicity Categories are assigned based on the hazard(s) identified from studies and/or other information submitted to the EPA in support of a pesticide registration. The EPA classifies the active ingredient or particular product into Toxicity Category I, II, III, or IV, where Toxicity Category I indicates the highest toxicity and Toxicity Category IV indicates the lowest toxicity (see 40 CFR § 156.62).

A. Product Analysis Assessment (40 CFR § 158.2120)

For purposes of registration under FIFRA section 3(c)(5), the EPA determined that all product analysis data requirements for *Pseudomonas fluorescens* strain D7 have been fulfilled. Refer to Tables 1, and 2, in Appendix A for a summary of the data requirements, including both generic and product-specific information.

B. Human Health Assessment (40 CFR § 158.2140)

1. Toxicity

All applicable mammalian toxicology data requirements supporting the request for an exemption of the requirement for a tolerance for residues of *Pseudomonas fluorescens strain D7* in or on all food commodities have been fulfilled with data submitted by the applicant or scientific rationale. Furthermore, Tier II and Tier III studies were not required for *Pseudomonas fluorescens strain D7* because of the lack of acute toxicity/pathogenicity in the Tier I studies.

The toxicity and pathogenicity tests (dermal, toxicity) and irritation tests (acute eye and primary dermal irritation) that address potential routes of exposure to the active ingredient are all classified in Toxicity Category IV (see below or U.S. EPA 2014a and b) and revealed little to no toxicity attributed to *Pseudomonas fluorescens strain D7*. Finally, the applicant reported that no hypersensitivity incidents occurred during the research, development, and testing of this active ingredient.

The overall conclusions from all toxicological information submitted by the applicant are briefly described below, in sections IV(B)(1)(a) and IV(B)(1)(b) (see pages 8–11), and summarized in Table 3 in [Appendix A](#).

a. Acute Toxicity/Pathogenicity – Tier I

Acute Injection Toxicity/Pathogenicity – Rat (OCSP Guideline Number 885.3200) (MRID 49349701)

A study was repeated to re-evaluate the acute intravenous toxicity infectivity and pathogenicity, of a microbial pest control agent (MPCA), *Pseudomonas fluorescens D7*, at a single exposure of 10^6 and 10^7 CFU/rat doses. The MPCA test substance, inactivated MPCA, or sterile filtrate was injected into the tail vein of one of four groups of rats. A control group (untreated) was conducted concurrently. The animals were observed frequently on day of dosing for mortality and signs of pharmacological and/or toxicological effects and once daily thereafter for 21 days. Tissue and blood samples taken at interim sacrifices from the group receiving the active test substance were cultured to provide quantitative measurements of the test microbe's clearance pattern. There was no mortality in any group during the study. During observations for clinical signs, all animals appeared normal for the duration of the study. The gross necropsy conducted at termination of the study revealed no observable abnormalities. The test organism had cleared completely from Groups IV and V (MPCA) blood, kidneys, mesenteric lymph nodes, lungs, and brain, liver, spleen and cecum contents by Day 7. After two consecutive interim sacrifices showed no growth of test organism in the organs plated, no further tissue samples were taken. The test substance *Pseudomonas fluorescens D7* was determined to be non-toxic and not pathogenic or infective to rats when injected intravenously at a dose of 3.4×10^7 CFU/rat or at 3.7×10^6 CFU/rat. EPA determined this study to be acceptable.

This study (MRID 49349701) addresses EPA recommendations to repeat an acute injection toxicity study using a lower dose of the microorganisms that includes additional controls such as filtered culture medium, and autoclaved medium to account for the observed injection results. This study supersedes the previously submitted acute injection toxicity/pathogenicity in rat study (MRID 48966402) that tested *Pseudomonas fluorescens strain D7* and showed adverse effects on rats following a single intravenous injection administration of 1.3×10^8 CFU/rat, including

mortality, abnormal clinical signs; transient weight loss, abnormal gross necropsy findings, and altered organ weights.

Acute Oral Toxicity/Pathogenicity – Rat (OCSPP Guideline Number 885.3050)

(MRID 48966403)

Sprague-Dawley rats, 8 week old, (12/sex) were given a single oral dose of MPCA, *Pseudomonas fluorescens* strain D7, of 1.3×10^9 CFU/animal. The animals were observed three times on day 0 after dosing and daily through day 21 with interim scheduled sacrifices on Days 3, 7, and 14. Five males and five females were treated with autoclaved *Pseudomonas fluorescens* strain D7 as inactive MPCA controls, two untreated animals per sex were used as “shelf controls,” and two animals per sex were designated as untreated controls.

No observable abnormalities were found during observations for clinical signs or at necropsy, and there were no toxicologically relevant differences between the body weights of the treated animals and those of controls. Relative to their respective controls, MPCA-treated females had increased relative liver weights (+16.0%; $p < 0.05$), and MPCA-treated males had increased relative spleen weights (+16.7%; $p < 0.05$), and these differences correlated with increased mean absolute weights of these same organs (+11.7% and +27.1% for MPCA-treated female absolute liver and MPCA-treated male absolute spleen weights, respectively). No CFUs (or in one instance a single individual count of < 100 CFU/g) were recovered from the brain, lungs, liver, kidneys, or lymph nodes of any active-treated animal. *Pseudomonas fluorescens* strain D7 was found in feces, urine, and cecum contents of MPCA-treated animals and appeared to be completely cleared by day 14 following oral administration to rats. Based on the results of this study, *Pseudomonas fluorescens* strain D7 does not appear to be toxic, infective, and/or pathogenic in rats when dosed at 1.3×10^9 CFU/animal. The EPA rated this study as acceptable.

Acute Pulmonary Toxicity/Pathogenicity – Rat (OCSPP Guideline Number 885.3150)

(MRID 489664-04)

Groups of 12 week old Sprague Dawley rats (3/sex/Group) were exposed by the intratracheal route to *Pseudomonas fluorescens* strain D7 in sterile PBS at a constant dose volume of 0.1 mL/animal and a dose of 4.6×10^8 cfu/animal. Eight males and eight females were treated with autoclaved *Pseudomonas fluorescens* strain D7 as autoclaved controls; five males and five females were not treated and used as untreated control; and four males and four females were not treated and used as shelf controls. The animals were then observed for up to 21 days, with interim sacrifices on day 0 (all groups) and days 3, 7, and 14 (active-MCPA group).

There were no test substance related clinical signs, gross necropsy findings, or differences in organ weights. Two males in the active test material treated group sacrificed on day 3 lost weight and one female in autoclaved test material treated group sacrificed on day 21 did not gain weight during the first week but gained weight by day 14. All other animals gained weight prior to scheduled sacrifice. The test organisms were not seen or were present at < 100 cfu/g in lungs from the animals sacrificed after dosing on day 0. The test organisms were not seen or were present at < 100 cfu/g in blood, brain, lungs, spleen, liver, kidneys, mesenteric lymph nodes, and cecum content removed from animals sacrificed on days 3 and 7. Based on these results, *Pseudomonas fluorescens* strain D7 does not appear to be toxic, infective, and/or pathogenic in rat when dosed at 4.6×10^8 cfu /animal. The EPA rated this study as acceptable.

Acute Dermal Toxicity/Pathology – Rabbit (OCSP Guideline Number 870.1200)

(MRID 489664-05)

Five male and five female New Zealand White rabbits, 16-18 weeks old, were dermally exposed to a 2000 mg/kg bw dose of *Pseudomonas fluorescens* strain D7 moistened with 2.0 mL of deionized water/g test substance for 24 hours to an area of approximately 10% of body surface area. Following exposure, the animals were observed for a period of 14 days. All animals survived and had no abnormal systemic clinical signs during the study. Very slight to well-defined Erythema was noted on all dose sites on day 1 and resolved by day 4. With the exception of one female that lost weight during the second week, all animals gained weight throughout the study. No observable abnormalities were found at necropsy. The dermal LD₅₀ for males was greater than 2000 mg/kg bw; for females was greater than 2000 mg/kg bw; and for both sexes combined was greater than 2000 mg/kg bw. Based on the results of this study, *Pseudomonas fluorescens* strain D7 is of low toxicity. EPA classified the acute dermal toxicity of *Pseudomonas fluorescens* strain D7 as Toxicity Category IV and rated this study as acceptable.

Primary Eye Irritation – Rabbit (OCSP Guideline Number 870.2400) (MRID 49100801)

100 mg of undiluted *Pseudomonas fluorescens* strain D7 (Batch No. 201109210301; purity 95%; pH not reported) was instilled as supplied into the conjunctival sac of the right eye of three male and three female New Zealand White rabbits. Untreated left eyes served as controls. Animals were observed at 1, 24, 48, and 72 hours after test material instillation. Irritation was scored by the method of Draize and classified by the system of Kay and Calandra.

No corneal opacity, iritis, or conjunctival irritation was noted on any rabbit throughout the study. *Pseudomonas fluorescens* strain D7 was not irritating to the eye and EPA classified the acute eye irritation as Toxicity Category IV for primary eye irritation. The EPA rated this study as acceptable.

Primary Dermal Irritation – Rabbit (OCSP Guideline Number 870.2500)

(MRID 49100802)

Three male and three female New Zealand White rabbits were dermally exposed to 500 mg of *Pseudomonas fluorescens* strain D7 moistened with 1.0 mL of DI water for 4 hours on an approximately 2.5 x 2.5 cm area of the body surface. The animals were observed at 1, 24, 48, and 72 hours after patch removal. Irritation was scored by the method of Draize. No dermal irritation was noted on any animal during the study. The primary irritation index was 0.0. *Pseudomonas fluorescens* strain D7 was not irritating and EPA classified the dermal irritation toxicity as Toxicity Category IV. The EPA rated this study as acceptable.

Hypersensitivity incidents (OCSP Guideline Number 885.3400)

The applicant reported that no hypersensitivity incidents, including immediate-type or delayed-type reactions of humans and domestic animals, occurred during research, development, or testing of *Pseudomonas fluorescens* strain D7

b. Acute Toxicology and Subchronic Toxicity/Pathogenicity – Tier II; Reproductive, Fertility Effects, Carcinogenicity, Immunotoxicity, and Infectivity/Pathogenicity Analysis – Tier III

Tier II and Tier III studies were not required for *Pseudomonas fluorescens* strain D7 based on the lack of acute toxicity/pathogenicity in the Tier I data requirements.

c. Endocrine Disruptors

As required by the Administrator under the Federal Food, Drug, and Cosmetic Act (FFDCA), the EPA has developed the Endocrine Disruptor Screening Program (EDSP) and has begun to implement the screening program that is to be used to test all pesticides to determine whether certain substances (including pesticide active and other ingredients) may have an effect in humans or wildlife similar to an effect produced by a “naturally occurring estrogen, or other such endocrine effects as the Administrator may designate.” FFDCA section 408(p)(4) authorizes the Administrator, by order, to exempt from the requirements of the Endocrine Disruptor Screening Program a biologic substance or other substance if a determination is made that the substance is anticipated to not produce any effect in humans similar to an effect produced by a naturally occurring estrogenic substance. Between October 2009 and February 2010, EPA issued test orders/data call-ins for the first group of 67 chemicals, which contains 58 pesticide active ingredients and 9 inert ingredients. *Pseudomonas fluorescens* strain D7 is not among the group of 58 pesticide active ingredients on the initial list to be screened under the EDSP.

The EPA believes that *Pseudomonas fluorescens* strain D7 is a substance that would not produce any effect in humans similar to an effect produced by a naturally occurring estrogenic substance. As such, and pursuant to Section 408(p)(4), the EPA will determine in the future whether it can exempt *Pseudomonas fluorescens* strain D7 from the requirements of the Section 408(p)(4) EDSP. In the event the EPA does determine to exempt this substance from the EDSP, an order will be issued. For further information on the status of the EDSP, the policies and procedures, the list of 67 chemicals, the test guidelines and the Tier 1 screening battery, please visit our website: <http://www.epa.gov/endo/>.

2. Federal Food, Drug, and Cosmetic Act (FFDCA) Considerations

Section 408(c)(2)(A)(i) of FFDCA allows the EPA to establish an exemption of the requirement of a tolerance (the legal limit for a pesticide chemical residue in or on a food) only if the EPA determines that the exemption is “safe.” Section 408(c)(2)(A)(ii) of FFDCA defines “safe” to mean that “there is a reasonable certainty that no harm will result from aggregate exposure to the pesticide chemical residue, including all anticipated dietary exposures and all other exposures for which there is reliable information.” This includes exposure through drinking water and in residential settings, but it does not include occupational exposure. Pursuant to section 408(c)(2)(B) of FFDCA, in establishing or maintaining in effect an exemption from the requirement for a tolerance, the EPA must take into account the factors set forth in section 408(b)(2)(C) of FFDCA, which require the EPA to give special consideration to exposure of infants and children to the pesticide chemical residue in establishing a tolerance exemption, and to “ensure that there is a reasonable certainty that no harm will result to infants and children from aggregate exposure to the pesticide chemical residue....” Additionally, section 408(b)(2)(D) of FFDCA requires that the EPA consider “available information concerning the cumulative effects of [a particular pesticide's] . . . residues and other substances that have a common mechanism of toxicity.”

The EPA performs a number of analyses to determine the risks from aggregate exposure to pesticide residues. First, the Agency determines the toxicity of a pesticide. Second, the EPA examines exposure to the pesticide through food, drinking water, and through other exposures that occur as a result of pesticide use in residential settings. Consistent with section 408(b)(2)(D)

of FFDCA, the EPA has reviewed the available scientific data and other relevant information, and considered its validity, completeness, and reliability and the relationship of this information to human risk. The Agency also considered available information concerning the variability of the sensitivities of major identifiable subgroups of consumers, including infants and children. Based on the acute toxicity/pathogenicity data and information discussed previously and presented in Table 3 in Appendix A, the data required for a FFDCA risk assessment for *Pseudomonas fluorescens* strain D7 have been fulfilled.

a. *Aggregate Exposure*

In examining aggregate exposure, section 408 of FFDCA directs EPA to consider available information concerning exposures from the pesticide residue in food and all other nonoccupational exposures, including drinking water from ground water or surface water and exposure through pesticide use in gardens, lawns, or buildings (residential and other indoor uses).

Food Exposure and Risk Characterization: The EPA found that increased dietary exposure to *Pseudomonas fluorescens* strain D7, a naturally occurring bacterium, is anticipated to be negligible. For the proposed use of *Pseudomonas fluorescens* strain D7 as an herbicide, the applications are made before crop plants emerge, or as seed treatment, and consequently oral exposure to residues from such use is expected to be minimal. *Pseudomonas fluorescens* strain D7 and other closely related *Pseudomonas fluorescens* bacteria already exist in the soil environment. The EPA concluded that the risk posed to adults, infants, and children is likely to be minimal because of the low acute oral toxicity/pathogenicity potential of *Pseudomonas fluorescens* strain D7.

Drinking Water Exposure and Risk Characterization: Exposure to residues of *Pseudomonas fluorescens* strain D7 in consumed drinking water is not likely to increase because there are no use sites for the pesticide with direct applications to water. There is a possibility of spray drift from aerial and ground applications or runoff of prepared fields and rangelands into surface waters. Ground water is not expected to have significant exposure to *Pseudomonas fluorescens* strain D7 since, like other microorganisms, this microbial pesticide would likely be filtered out by the particulate nature of many soil types. If it were to be transferred to surface or ground waters that are intended for eventual human consumption (e.g., through spray drift or runoff) and directed to wastewater treatment systems or drinking water facilities, it likely would not survive the conditions water is subjected to in such systems or facilities, including chlorination, pH adjustments, filtration, and/or occasionally high temperatures (Centers for Disease Control and Prevention 2009; U.S. EPA 2004, and DeFelice et.al., 1993). In the remote likelihood that *Pseudomonas fluorescens* strain D7 is present in drinking water (e.g., water not subject to treatment systems or facilities), its target pest specificity and available data indicate no toxicity and/or pathogenicity is likely to occur with any drinking water exposure to *Pseudomonas fluorescens* strain D7 that results from pesticide applications made in accordance with good agricultural practices (see section IV(B)(1)(a) on pages 8–10 and Table 3 in Appendix A).

Non-occupational, Residential Risk Characterization: Given that *Pseudomonas fluorescens* strain D7 use sites do not include residential settings and because the bacterium is naturally-occurring, EPA determined that non-occupational exposure to the bacterium is unlikely. Repeated exposures to the *Pseudomonas fluorescens* strain D7 microorganism from pesticidal applications do not exceed EPA's level of concern, particularly in light of available data that

demonstrate *Pseudomonas fluorescens* strain D7 is not toxic (acute dermal toxicity and acute pulmonary toxicity/ pathogenicity), is non-irritating (primary dermal irritation), and is not pathogenic when used as labeled in accordance with good agricultural practices (acute pulmonary toxicity/pathogenicity, and acute injection toxicity/pathogenicity) (see section IV(B)(1)(a) on pages 8–11 and Table 3 in Appendix A).

b. Cumulative Effects from Substances with a Common Mechanism of Toxicity

Section 408(b)(2)(D)(v) of FFDCFA requires that, when considering whether to establish, modify, or revoke a tolerance exemption, the EPA consider “available information concerning the cumulative effects of [a particular pesticide’s] . . . residues and other substances that have a common mechanism of toxicity.” The EPA has not found *Pseudomonas fluorescens* strain D7 to share a common mechanism of toxicity with other substances. *Pseudomonas fluorescens* strain D7 does not appear to be toxic to humans via dietary, dermal and pulmonary exposure. For the purposes of the tolerance action, therefore, the EPA has assumed that *Pseudomonas fluorescens* strain D7 does not have a common mechanism of toxicity with other substances. Thus, section 408(b)(2)(D)(v) of the FFDCFA does not apply. For information regarding the EPA’s efforts to determine which chemicals have a common mechanism of toxicity and to evaluate the cumulative effects of such chemicals, see the EPA’s website at <http://www.epa.gov/pesticides/cumulative>.

c. Determination of Safety for the United States Population, Infants and Children

In considering the establishment of a tolerance or tolerance exemption for a pesticide chemical residue, FFDCFA section 408 (b)(2)(C) provides that the EPA shall assess the available information about consumption patterns among infants and children, special susceptibility of infants and children to pesticide chemical residues, and the cumulative effects on infants and children of the residues and other substances with a common mechanism of toxicity. In addition, FFDCFA section 408 (b)(2)(C) provides that the EPA shall apply an additional tenfold (10X) margin of exposure (safety) for infants and children in the case of threshold effects to account for prenatal and postnatal toxicity and the completeness of the database on toxicity and exposure unless the EPA determines that a different margin of exposure (safety) will be safe for infants and children. This additional margin of exposure (safety) is commonly referred to as the Food Quality Protection Act Safety Factor. In applying this provision, the EPA either retains the default value of 10X or uses a different additional safety factor when reliable data available to the EPA support the choice of a different factor.

Based on the acute toxicity and pathogenicity data/information discussed in section IV(B)(1)(a) (see pages 8–11) and Table 3 in Appendix A, the EPA concludes that there are no threshold effects of concern to infants, children, or adults when *Pseudomonas fluorescens* strain D7 is used as labeled in accordance with good agricultural practices. As a result, the EPA concludes that no additional margin of exposure (safety) is necessary to protect infants and children and that not adding any additional margin of exposure (safety) will be safe for infants and children.

Moreover, based on the same data/information and EPA analysis as presented directly above, the Agency is able to conclude that there is a reasonable certainty that no harm will result to the United States population, including infants and children, from aggregate exposure to the residues of *Pseudomonas fluorescens* strain D7 when it is used—as labeled and in accordance with good

agricultural practices—as an herbicide. Such exposure includes all anticipated dietary exposures and all other exposures for which there is reliable information. The EPA has arrived at this conclusion because, considered collectively, the data and information available on *Pseudomonas fluorescens* strain D7 do not demonstrate toxic or pathogenic potential to mammals, including infants and children.

3. Occupational Exposure and Risk Characterization

The EPA does not expect handler exposure to *Pseudomonas fluorescens* strain D7 to pose any undue risk. Regardless, appropriate personal protective equipment (PPE) and precautionary statements are required on pesticide product labels to mitigate any potential risks to pesticide handlers due to prolonged or numerous exposures. Handlers applying D7 in agricultural settings must wear a dust/mist filtering respirator, waterproof gloves, long-sleeved shirt, long pants, socks and shoes.

4. Human Health Risk Characterization

The EPA considered human exposure to *Pseudomonas fluorescens* strain D7 in light of the standard for registration in FIFRA and the relevant safety factors in FFDCA. The Agency determined that no unreasonable adverse effects to the United States population in general, and to infants and children in particular, will result when products containing *Pseudomonas fluorescens* strain D7 are used in accordance with EPA-approved labeling.

C. Environmental Assessment (40 CFR § 158.2150)

Four original guideline studies with the TGAI and three sets of data waiver rationale were submitted to meet data requirements for nontarget organisms per 40 CFR Part 158.2150 for *Pseudomonas fluorescens* strain D7, which are sufficient to fulfill the relevant microbial pesticide data requirements and for risk assessment purposes. Further testing of nontarget organisms at higher tier levels (i.e., Tiers II, III, and IV) is not required. Adverse effects to nontarget organisms, including federally listed threatened and endangered species, are not expected to result from the proposed registration of *P. fluorescens* strain D7 when applied in accordance with the directions on the proposed label.

For a summary of the generic data requirements described in sections IV(C)(1) (see pages 14–15), refer to Table 4 in [Appendix A](#).

1. Ecological Exposure and Risk Characterization

According to the proposed label for the EP, *P. fluorescens* strain D7 is intended for use in suppression of downy brome, medusahead, Japanese brome, and jointed goatgrass on wheat, barley, triticale, oats, and rangeland. The EP containing 95% *P. fluorescens* strain D7 is a freeze-dried powder that is to be mixed in water and applied as a direct spray to the soil surface at a rate of 2 g/acre (4×10^{11} cells/acre). The label directs the user to apply the EP before weed seeds germinate in the spring or autumn when daytime temperatures are below 50°F. The EP is to be applied just prior to expected rainfall, and can be applied up to 4 times per year for a maximum annual application of 8g/acre. The EP may also be used as a seed treatment to control the listed weeds at planting.

The proposed EP label indicates that the product is applied by spray (except for seed treatments), and may be applied using aerial equipment. Aerial sprays are generally expected to have greater potential for nontarget exposure compared to other application methods (e.g., ground sprays, sprays using hand-held equipment). However, because the EP is to be applied directly to the soil surface, in autumn or spring when temperatures are cooler, and at preemergence, the potential exposure of nontarget organisms to the EP is expected to be more limited. Spray drift may result in some exposure to nearby areas, including aquatic environments. However, based on the Tier I aerial agricultural application scenario in the AgDRIFT spray drift model, assuming fine to medium droplet size, a maximum of 12.5% of the amount applied is expected to reach aquatic areas. *P. fluorescens* also occurs naturally in soil and water (Palleroni, 2005). As discussed above, strain D7 is a root-associated bacterium which was isolated originally from the West Coast region of the United States, so soil-dwelling nontarget organisms in those areas currently have some exposure to this bacterium.

Birds and Mammals

The guideline study submitted for the avian oral toxicity/pathogenicity testing requirement showed no adverse effects in the bird species tested (Northern bobwhite, *Colinus virginianus*). *P. fluorescens* strain D7 also is not likely to grow at a bird's high body temperatures (see McNab, 1966). Based on expected relatively low exposure and lack of adverse effects observed in birds exposed to *P. fluorescens* strain D7, risk to nontarget birds resulting from the proposed registration is minimal.

An acute oral toxicity/pathogenicity study with laboratory rats indicated no adverse effects of *P. fluorescens* strain D7 when administered at a dose of 1.3×10^9 CFU/animal (MRID No. 48966403). As discussed above, other studies with laboratory mammals also showed no adverse effects upon exposure to *P. fluorescens* strain D7 (USEPA, 2014a; 2014b). Some wild mammals may be exposed to *P. fluorescens* strain D7 in treated areas, but the exposure of most wild mammals is expected to be limited because of the root-borne nature of *P. fluorescens* strain D7 (i.e., it is a rhizobacterium), application timing (e.g., pre-emergence) and type of use (e.g., applied to soil surface). Since adverse effects were not observed in the mammalian studies, risk to wild mammals is expected to be low from the proposed registration of the new a.i.

Nontarget Insects and Honey Bees

The guideline study submitted to meet the requirement for nontarget insect testing did not show toxicity or pathogenicity to ladybird beetles (*Hippodamia convergens*) upon a 7-day dietary exposure to corn earworm (*Helicoverpa zea*) sprayed with *P. fluorescens* strain D7 at 1×10^6 cfu/ml. The applicant also provided a study with honey bees to support a previous Experimental Use Permit for *P. fluorescens* D7 (MRID No. 48668301) which showed no adverse effects at a dose of 1×10^7 cfu/ml over seven days. This study was classified as supplemental due to the short duration (USEPA, 2012), so the applicant submitted rationale (MRID No. 49177701) to address the honey bee data requirement for the proposed section 3 registration of *P. fluorescens* strain D7. The rationale referenced the former study and also cited a literature study (Johnson et al., 1993) that involved honey bees as a vector for the dispersal of another strain of this microorganism, *Pseudomonas fluorescens* strain A506, to apple and pear blossoms without observable impact on honey bees.

Exposure to nontarget insects and honey bees may occur in the treated areas. However, under the recommended application conditions (cool, below 50°F, and wet), insects including honey bees are not likely active, thus no significant exposure of these insects to *P. fluorescens* strain D7 is expected.

Based on the above information (no hazard and low exposure), adverse effects to nontarget honey bees and insects are not likely from the proposed registration of the new a.i.

Nontarget Plants

P. fluorescens occurs naturally in soil and water. *P. fluorescens* strain D7, the a.i., was isolated initially from the West Coast region of the United States. No adverse effects of the a.i. on tested dicots and most monocots were shown in greenhouse, growth chamber or field studies.

Exposure to nontarget plants is expected with the proposed registration of *P. fluorescens* strain D7. Scientific rationale submitted for a waiver of the requirement for Nontarget Plant Testing is based on its selective mode of action on monocotyledonous weeds (particularly to *Bromus* spp.) and limited number of seasonal applications to soil surfaces, and the microorganism's reported ecology. The rationale provided was sufficient to conclude that the proposed uses of *P. fluorescens* strain D7 to suppress certain weeds (downy brome, medusa head, Japanese brome, and jointed goat grass) is not expected to result in increased exposure to, or adverse effects in nontarget plants of economic importance.

Freshwater Fish and Invertebrates

The studies submitted for the nontarget freshwater fish and invertebrate testing requirements showed no toxicity/pathogenicity of *P. fluorescens* strain D7 to *Oncorhynchus mykiss* (rainbow trout) and *Daphnia magna* when these aquatic animals were exposed to *P. fluorescens* strain D7. Some exposure to freshwater fish and invertebrates in nearby aquatic environments may occur with proposed applications of *P. fluorescens* D7, especially if the proposed treatments are applied in aerial sprays. However, as described above, the exposure of freshwater fish and invertebrates would be somewhat limited because of the type of use (e.g., applied directly to soil surfaces and before the rain) of *P. fluorescens* D7 and limited number of applications in autumn and spring, respectively, when it is cool (below 50°C) and wet. Based on the studies submitted and anticipated low exposure to strain D7 sprayed onto soil surfaces, adverse effects on nontarget freshwater organisms are not likely.

Marine/Estuarine Fish and Invertebrates

The applicant did not submit a guideline study to meet the requirement for nontarget marine/estuarine fish and invertebrate testing, but submitted scientific rationale in lieu of testing. This testing is conditionally required if significant exposure of nontarget marine/estuarine fish and invertebrates to *P. fluorescens* strain D7 is expected. Similar to the nontarget organisms in fresh water environments, *P. fluorescens* strain D7 is not expected to reach marine/estuarine environments in significant quantities, thus significant exposure of the estuarine/marine fish and invertebrates to strain D7 is not likely as a result of the proposed registration of the a.i. Therefore, adverse effects to marine/estuarine fish and invertebrates are not anticipated.

2. Environmental Fate Data

As the data and information provided are sufficient to fulfill the Tier I nontarget organism data requirements and allow for nontarget organism risk assessment for *Pseudomonas fluorescens* strain D7, further testing at higher levels (Tiers II, III, and IV) is not required.

3. Threatened and Endangered Species Assessment

Since EPA has determined that no effects are anticipated for any nontarget species exposed to *Pseudomonas fluorescens* strain D7 as a result of the proposed labeled applications, effects to federally-listed threatened and endangered species and their designated critical habitats are also not expected. Therefore, a “No Effect” determination is made for direct and indirect effects to listed species and their designated critical habitats resulting from the proposed uses of *Pseudomonas fluorescens* strain D7, as labeled.

V. ENVIRONMENTAL JUSTICE

The EPA seeks to achieve environmental justice—the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income—with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal environmental programs and policies. Meaningful involvement means that (1) potentially affected community residents have an appropriate opportunity to participate in decisions about a proposed activity that will affect their environment and/or health; (2) the public’s contribution can influence the regulatory agency’s decision; (3) the concerns of all participants involved will be considered in the decision-making process; and (4) the decision-makers seek out and facilitate the involvement of those potentially affected. The EPA has this goal for all communities and persons across the United States.

To help address potential environmental justice issues, during the 15-day public participation comment period, the EPA sought information on any groups or segments of the population who, as a result their location, cultural practices, or other factors, may have atypical, unusually high exposure to *Pseudomonas fluorescens* strain D7, compared to the general population. The EPA received no public comments on this particular matter.

For additional information regarding environmental justice issues, please visit the EPA’s website at <http://www.epa.gov/compliance/environmentaljustice/index.html>.

VI. RISK MANAGEMENT DECISION

Section 3(c)(5) of FIFRA permits for the registration of a pesticide provided that all the following determinations are made:

- (1) Its composition is such as to warrant the claims for it;
- (2) Its labeling and other material required to be submitted comply with the

- requirements of FIFRA;
- (3) It will perform its intended function without unreasonable adverse effects on the environment; AND
 - (4) When used in accordance with widespread and commonly recognized practice, it will not generally cause unreasonable adverse effects on the environment.

To satisfy criterion 1, the *Pseudomonas fluorescens* strain D7 products, the TGAI and EP, have well-known properties. The EPA has no knowledge that would contradict the claims made on the labels, and the pesticide products are not expected to cause unreasonable adverse effects on the environment when used according to label instructions. Criterion 2 is satisfied by the product labels, as well as the data and information presented in this document. The Agency believes that the *Pseudomonas fluorescens* strain D7 pesticide products will not cause any unreasonable adverse effects on the environment and based on cited field testing publications these products offer biocontrol of certain weed species, satisfying criterion 3. Criterion 4 is satisfied in that the *Pseudomonas fluorescens* strain D7 pesticide products are not expected to cause unreasonable adverse effects when used according to label instructions. Therefore, both the MP and the EP, D7, which contains *Pseudomonas fluorescens* strain D7 as a new active ingredient, are eligible for registration under FIFRA section 3(c)(5) for the labeled uses.

VII. ACTIONS REQUIRED OF THE REGISTRANT

A. Final Printed Labeling

Before the manufacturing-use product, *Pseudomonas fluorescens* strain D7 TGAI and the end-use product, D7, may be released for shipment, the applicant is required to provide appropriate final printed labeling to the EPA.

B. Terms of Registration

The EPA is not requiring additional information on the registration of these two products.

C. Reporting of Adverse Effects and Hypersensitivity Incidents

Notwithstanding the information stated in the previous sections, it should be clearly understood that certain specific data must be reported to the EPA as a requirement for maintaining the federal registration for a pesticide product. Reports of all incidents of adverse effects to the environment must be submitted to the EPA under the provisions stated in FIFRA section 6(a)(2). Additionally, all incidents of hypersensitivity (including both suspected and confirmed incidents) must be reported to the EPA under the provisions of 40 CFR § 158.2140(d).

VIII. GLOSSARY OF ACRONYMS AND ABBREVIATIONS

BRAD	Biopesticides Registration Action Document
CFR	Code of Federal Regulations
CFU	colony forming units
cSt	centistokes
EDSP	Endocrine Disruptor Screening Program
EP	end-use pesticide product
EPA	United States Environmental Protection Agency (the “Agency”)
FFDCA	Federal Food, Drug, and Cosmetic Act
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FR	Federal Register
g/mL	grams per milliliter
lb/gal	pounds per gallon
LD ₅₀	median lethal dose. A statistically derived single dose that can be expected to cause death in 50% of the test animals when administered by the route indicated (oral, dermal, or inhalation). It is expressed as a weight of substance per unit weight of animal (e.g., mg/kg).
mg/kg	milligrams per kilogram
MP	manufacturing-use pesticide product
MPCA	microbial pest control agent
MRID No.	Master Record Identification Number
NIOSH	National Institute for Occupational Safety and Health
OPP	Office of Pesticide Programs
PC Code	Pesticide Chemical Code
PP	Pesticide Petition
PPE	personal protective equipment
TGAI	technical grade of the active ingredient
U.S.	United States

IX. BIBLIOGRAPHY

A. Studies Submitted to Support the Active Ingredient, *Pseudomonas fluorescens* strain D7 and Pesticide Product Registrations for the Fluorescens Technical and the EP, D7

<u>MRID No.</u>	<u>Study Information</u>
48497800	Northwest Agricultural Products (2011) Submission of Product Chemistry Data in Support of the Experimental Use of Bacterium <i>Pseudomonas fluorescens</i> Strain D7 on Aggressive Weeds. Transmittal of 1 Study.
48497801	Brooks, M. (2011) D7, Product Chemistry, Group: Product Identity, Composition and Analytical Test Guidelines and Group B: Physical and Chemical Properties Test Guidelines. Project Number: NAP01. Unpublished study prepared by NorthWest Agricultural Products. 21 p.
48524500	Northwest Agricultural Products (2011) Submission of Product Chemistry Data in Support of the Experimental Use of D7. Transmittal of 1 Study.
48524501	Brooks, M. (2011) D7, Product Chemistry, Deposition of a Sample in a Nationally Recognized Culture Collection. Discussion of Formation of Unintentional Impurities. Analysis of Samples. Project Number: NAP02. Unpublished study prepared by Ag-Chem Consulting. 7 p.
48548901	Kennedy, A. (2011) Effect of <i>Pseudomonas</i> Strain D7 on Nontarget Vegetation. Project Number: NAP003. Unpublished study prepared by Washington State University. 13p.
48668300	Northwest Agricultural Products (2011) Submission of Toxicity Data in Support of the Experimental Use of <i>Pseudomonas fluorescens</i> Strain D7. Transmittal of 1 Study.
48668301	Younger, C. (2011) <i>Pseudomonas fluorescens</i> D7: Honey Bee, <i>Apis mellifera</i> , Non-target Insect Microbial Testing: Final Report. Project Number: 14619/10. Unpublished study prepared by Stillmeadow, Inc. 12p.
48724301	Brooks, M. (2012) Metabolite Analysis of <i>Pseudomonas</i> Strain D7. Project Number: NAP04. Unpublished study prepared by Ag-Chem Consulting, LLC. 33p.
48966400	Northwest Agricultural Products (2012) Submission of Product Chemistry and Toxicity Data in Support of the Application for Registration of D7 and Fluorescens Technical. Transmittal of 10 Studies.
48966401	Wend, C. (2012) Identification of <i>Pseudomonas fluorescens</i> Strain D7. Project Number: NAP20121004. Unpublished study prepared by Northwest Ag. Products. 27p.
48966402	Monds, K. (2011) <i>Pseudomonas fluorescens</i> D7: Intravenous Toxicity / Pathogenicity Study in Rats: Final Report. Project Number: 14620/10. Unpublished study prepared by Stillmeadow, Inc. 34p.

- 48966403 Doig, A. (2012) *Pseudomonas fluorescens* Strain D7: Acute Oral Toxicity / Pathogenicity Study in Rats: Final Report. Project Number: 15730/11. Unpublished study prepared by Stillmeadow, Inc. 29p.
- 48966404 Monds, K. (2012) *Pseudomonas fluorescens* Strain D7: Acute Pulmonary Toxicity / Pathogenicity Study in Rats: Final Report. Project Number: 15728/11. Unpublished study prepared by Stillmeadow, Inc. 30p.
- 48966405 Monds, K. (2012) *Pseudomonas fluorescens* Strain D7: Acute Dermal Toxicity / Pathogenicity Study in Rabbits: Final Report. Project Number: 15729/11. Unpublished study prepared by Stillmeadow, Inc. 12p.
- 48966406 Brooks, M. (2012) D7, Product Chemistry, Stability to Normal and Elevated Temperatures, Metals and Metal Ions, Analysis of Samples, Storage Stability and Corrosion Characteristics. Project Number: NAP20121002. Unpublished study prepared by Northwest AG Product. 17p.
- 48966407 Younger, C. (2012) *Pseudomonas fluorescens* Strain D7: Ladybird Beetle Non-target Insect Microbial Testing. Project Number: 16338/12. Unpublished study prepared by Stillmeadow, Inc. 11p.
- 48966408 Hartwell, T. (2011) *Pseudomonas fluorescens* Strain D7: Microbial Pest Control Agent (MPCA) Freshwater Fish Test with *Oncorhynchus mykiss* (Rainbow Trout): Final Report. Project Number: 14622/10. Unpublished study prepared by Stillmeadow, Inc. 17p.
- 48966409 Younger, C. (2011) *Pseudomonas fluorescens* D7: Acute Oral Toxicity Study in Bobwhite Quail: Final Report. Project Number: 14716/10. Unpublished study prepared by Stillmeadow, Inc. 17p.
- 48966410 Hartwell, T. (2011) *Pseudomonas fluorescens* D7: Microbial Pest Control Agent (MPCA) Freshwater Aquatic Invertebrate Test with *Daphnia magna*: Final Report. Project Number: 14623/10. Unpublished study prepared by Stillmeadow, Inc. 27p.
- 49021100 Northwest Agricultural Products (2012) Submission of Fate Data in Support of the Application for Registration of *Fluorescens* Technical and D7. Transmittal of 1 Study.
- 49021101 Brooks, M. (2012) Effect of *Pseudomonas* Strain D7 on Nontarget Vegetation - Supplemental Report. Project Number: NAP003A. Unpublished study prepared by U.S. Dept. of Agriculture/Pacific West Area. 165p.
- 49100800 Northwest Agricultural Products (2013) Submission of Toxicity Data in Support of the Applications for Registration of D7 and *Fluorescens* Technical. Transmittal of 2 Studies.
- 49100801 Kuhn, J. (2013) *Pseudomonas fluorescens* Strain D7 Acute Eye Irritation in Rabbits. Project Number: 17085/12. Unpublished study prepared by Stillmeadow, Inc. 16p.
- 49100802 Kuhn, J. (2013) *Pseudomonas fluorecens* Strain D7: Acute Dermal Irritation in Rabbits. Project Number: 17085/12. Unpublished study prepared by Stillmeadow, Inc. 10p.

- 49157600 Northwest Agricultural Products (2013) Submission of Toxicity Data in Support of the Applications for Registration of Fluorescens Technical and D7. Transmittal of 1 Study.
- 49157601 Younger, C. (2013) *Pseudomonas fluorescens* Strain D7: Ladybird Beetle Non-Target Insect Microbial Testing. Project Number: 16338/12. Unpublished study prepared by Stillmeadow, Inc. 12p.
- 49177700 Northwest Agricultural Products (2013) Submission of Product Chemistry, Toxicity, and Fate Data in Support of the Applications for Registration of Fluorescens Technical and D7. Transmittal of 3 Studies.
- 49177701 Brooks, M. (2013) *Pseudomonas* Strain D7 Nontarget Insect Testing/ Supplemental Report. Project Number: NAP7162012A1. Unpublished study prepared by Ag-Chem Consulting. 71p.
- 49177702 Brooks, M. (2013) Effect of *Pseudomonas* Strain D7 on Nontarget Vegetation-Supplemental Report 2. Project Number: NAP003B. Unpublished study prepared by Washington State University and U.S. Dept. of Agriculture. 36p.
- 49177703 Brooks, M. (2013) *Pseudomonas* Strain D7 Discussion of Formation of Unintentional Ingredients: Supplemental Report. Project Number: NAP71612013. Unpublished study prepared by Northwest Agricultural Products. 10p.
- 49349700 Northwest Agricultural Products (2014) Submission of Toxicity Data in Support of the Applications for Registration of Fluorescens Technical and D7. Transmittal of 1 Study.
- 49349701 Doig, A. (2014) *Pseudomonas fluorescens* D7: Intravenous Toxicity/Pathogenicity Study in Rats. Project Number: 17873/13. Unpublished study prepared by Stillmeadow, Inc. 38p.

B. Environmental Protection Agency Risk Assessment Memoranda

US Environmental Protection Agency (USEPA). 2012. Memorandum from S. Borges (OPP/BPPD) to S. Cerrelli, Re: Environmental risk assessment for *Pseudomonas fluorescens* strain D7 in response to an application for a FIFRA Section 5 Experimental Use Permit. Dated February 6, 2012.

USEPA. 2014a. Memorandum from I. Barsoum (OPP/BPPD) to S. Cerrelli, Re: Review of Acute Toxicity/Pathogenicity study for section 3 registration of the TGAI, Fluorescens Technical, and the EP, D7, containing the active ingredient *Pseudomonas fluorescens* strain D7. Dated April 15, 2014.

USEPA. 2014b. Memorandum from I. Barsoum (OPP/BPPD) to S. Cerrelli, Re: Review of Acute Toxicity/Pathogenicity study for section 3 registration of the TGAI, Fluorescens Technical, and the EP, D7, containing the active ingredient *Pseudomonas fluorescens* strain D7. Dated April 15, 2014.

USEPA. 2014c. Memorandum from I. You, Ph.D. through S. Borges (OPP/BPPD) to S. Cerrelli Environmental risk assessment for the FIFRA Section 3 registration of the TGAI, *Fluorescens*

Technical (EPA Reg. No. 71975-G), and the EP, D7 (EPA Reg. No. 71975-U), containing the active ingredient *Pseudomonas fluorescens* Strain D7. Dated July 18, 2014.

C. Other References

Centers for Disease Control and Prevention. 2009. Drinking Water - Water Treatment. Available from http://www.cdc.gov/healthywater/drinking/public/water_treatment.html.

DeFelice K, Wollenhaupt N, Buchholz D. 1993. Aquifers and Soil Filter Effect. Available from <http://extension.missouri.edu/p/WQ24>.

U.S. EPA. 2004. Primer for Municipal Wastewater Treatment Systems. EPA 832-R-04-001. Available from <http://www.epa.gov/npdes/pubs/primer.pdf>

Johnson, K. B., V. O. Stockwell, D. M. Burgett, D. Sugar, and J. E. Loper. 1993. Dispersal of *Erwinia amylovora* and *Pseudomonas fluorescens* by Honey Bees from Hives to Apple and Pear Blossoms. *Phytopathology* 83:478-484.

Kremer, R. J. and A. C. Kennedy. 1996. Rhizobacteria as Biocontrol Agents for Weeds. *Weed Technology* 10:601-609.

McNab, B. K. 1966. An Analysis of the Body Temperatures of Birds. *The Condor* 68:47-55.

Palleroni, N. J. 2005. *Pseudomonas*. Pp. 323 – 379. In: *Bergey's Manual of Systematic Bacteriology*, Vol. 2. D. J. Brenner, N. R. Krieg, and J. T. Staley (Eds.) Springer, New York, New York

Skipper, H. D. A. G. Ogg, and A. C. Kennedy. 1996. Root Biology of Grasses and Ecology of Rhizobacteria for Biological Control. *Weed Technology* 10: 610-620.

**APPENDIX A. MICROBIAL PESTICIDES DATA REQUIREMENTS
(40 CFR PART 158 – SUBPART V)**

TABLE 1. Product Analysis Data Requirements for the Active Ingredient (TGAI), *Pseudomonas fluorescens* strain D7 and the End-Use Pesticide Product (EP), D7 (40 CFR § 158.2120)

Harmonized Guideline Number	Data Requirement	Results	MRID No.
885.1100	Product Identity	Submitted data fulfill the requirement for product identity and composition.	48966401
885.1200	Manufacturing Process	Submitted data fulfill the requirement for manufacturing process.	48497801
885.1250	Deposition of a Sample in a Nationally Recognized Culture Collection	<i>Pseudomonas fluorescens</i> strain D7 is on deposit at Agricultural Research Service Culture Collection as NRRL B-18293	
885.1300	Discussion of Formation of Unintentional Ingredients	Submitted data fulfill the requirement for preventing and detecting any microbial contaminants.	4917703
885.1400	Analysis of Samples	Submitted data fulfill the requirement for analysis of samples.	48966406
885.1500	Certification of Limits	Submitted data fulfill the requirement for manufacturing process.	CSFs dated 9/25/12

TABLE 2. Physical and Chemical Characteristics for the Technical Grade of the Active Ingredient (TGAI), <i>Pseudomonas fluorescens</i> strain D7 and the End-Use Pesticide Product (EP),D7 (40 CFR § 158.2120)			
Harmonized Guideline Number	Data Requirement	Results	MRID No.
830.6302	Color	Brown	48497801
830.6303	Physical State	Granular	
830.6304	Odor	Sweet sugar smell	
830.6313	Stability to Normal and Elevated Temperatures, Metals, and Metal Ions	Stability to Metals: N/A Stability to Elevated Temperatures: This product is not stable at elevated temperatures and must be stored refrigerated or frozen. This product will be stored in paper and used immediately when tank mixed.	N/A
830.6317	Storage Stability	Submitted data fulfill the requirement for storage stability and demonstrate stability for a test period of 361 days.	48966406
830.6319	Miscibility	Not applicable (chemical is solid).	
830.6320	Corrosion Characteristics	Submitted data fulfill the requirement for corrosion characteristics	48966406
830.7000	pH	The pH of a 1% solution is 5.1	48497801
830.7100	Viscosity	Not applicable to a solid	
830.7300	Density/Relative Density/Bulk Density (Specific Gravity)	12.48 lbs/ ft ³	48497801

TABLE 3. Toxicology Data Requirements for the Active Ingredient *Pseudomonas fluorescens* strain D7 and the End Use Pesticide Product D7 (40 CFR § 158.2140)

Harmonized Guideline Number	Data Requirement	Results	MRID No.
<i>Tier I</i>			
885.3050	Acute Oral Toxicity/Pathogenicity	<i>Pseudomonas fluorescens</i> strain D7 does not appear to be toxic, infective, and/or pathogenic in rats, when dosed at 1.3 X 10 ⁹ CFU/animal. Classification: Acceptable	48966403
885.3150	Acute Pulmonary Toxicity/Pathogenicity	<i>Pseudomonas fluorescens</i> strain D7 does not appear to be toxic, infective, and/or pathogenic in rat, when dosed at 4.6 x 10 ⁸ cfu / animal. Classification: Acceptable	48966404
885.3200	Acute Injection Toxicity/ Pathogenicity	Average CFU counts of the cecum contents were 8.6 x 10 ⁴ , 5.5 x 10 ⁵ , 2.9 x 10 ⁵ , and 2.1 x 10 ² CFU/g on days 3, 7, 14, and 21, respectively. <i>Pseudomonas fluorescens</i> strain D7 was TOXIC and/or PATHOGENIC as tested in this study. Classification: Acceptable , however, injection with the active MPCA at a dose of 1.3 x 10 ⁸ CFU/rat resulted in mortality, abnormal clinical signs; transient weight loss with resultant decreased absolute body weight, abnormal gross necropsy findings, and altered organ weights.	48966402
		This study supersedes MRID 48966402 and was conducted to evaluate the acute intravenous toxicity and infectivity of the microbial pest control agent (MPCA), <i>Pseudomonas fluorescens</i> D7, at two concentration exposures and at adequate post-exposure observation period. No abnormalities were seen during daily observations or at necropsy. There was no mortality in any group during the study. The test organism had cleared completely from the active 10 ⁶ CFU/rat and active 10 ⁷ CFU/rat groups blood, kidneys, mesenteric lymph nodes, lungs, brain, liver, spleen and cecum contents by Day 7. The observed differences in spleen weights for groups treated with live <i>Pseudomonas fluorescens</i> D7 are considered a normal immune response during the clearance phenomenon. The test substance <i>Pseudomonas fluorescens</i> D7 was determined to be non-toxic to rats when injected intravenously at a dose of 3.4 x 10 ⁷ CFU/rat or at 3 .7 x 10 ⁶ CFU/rat . Classification: Acceptable	49349701

TABLE 3. Toxicology Data Requirements for the Active Ingredient *Pseudomonas fluorescens* strain D7 and the End Use Pesticide Product D7 (40 CFR § 158.2140)

Harmonized Guideline Number	Data Requirement	Results	MRID No.
885.3400	Hypersensitivity Incidents	The applicant reported that no hypersensitivity incidents, including immediate-type or delayed-type reactions of humans and domestic animals, occurred during research, development, or testing of the TGAI. Any future hypersensitivity incidents must be reported to EPA (refer to test note #3 of 40 CFR § 158.2140(d)).	
885.3500	Cell Culture	N/A	
870.1100	Acute Oral Toxicity	This requirement addressed by Acute Oral Toxicity/pathogenicity study described above. Classification: Acceptable	48966403
870.1200	Acute Dermal Toxicity	Dermal LD ₅₀ Males >2000 mg/kg bw; Females > 2000 mg/kg bw; Combined > 2000 mg/kg bw. Based on the results of this study, <i>Pseudomonas fluorescens</i> strain D7 is of low toxicity. Classification: Acceptable TOXICITY CATEGORY IV	48966405
870.1300	Acute Inhalation Toxicity	This requirement addressed by Acute pulmonary Toxicity/pathogenicity study described above Classification: Acceptable	48966404
870.2400	Acute Eye Irritation	No corneal opacity, iritis, or conjunctival irritation was noted on any rabbit throughout the study. <i>Pseudomonas fluorescens</i> strain D7 was not irritating to the eye. Classification: Acceptable TOXICITY CATEGORY IV	49100801
870.2500	Primary Dermal Irritation	No dermal irritation was noted on any animal during the study. The primary irritation index was 0.0. Classification: Acceptable TOXICITY CATEGORY IV	49100802
<i>Tiers II and III</i>			
Not required for <i>Pseudomonas fluorescens</i> strain D7 based on the lack of acute toxicity/pathogenicity in the Tier I studies.			

TABLE 4. Nontarget Organism Toxicity and Environmental Fate Data Requirements for the Technical Grade of the Active Ingredient TGAI, *Pseudomonas fluorescens* strain D7. (40 CFR § 158.2150)

Harmonized Guideline Number	Data Requirement	Results	MRID No.
<i>Tier I</i>			
885.4050	Avian Oral Toxicity	An avian oral test indicated that <i>P. fluorescens</i> strain D7 is not toxic or pathogenic to Northern bobwhite (<i>Colinus virginianus</i>) dosed at 2.1 x 10 ⁹ cfu/kg body wt/day. Classification: Acceptable	48966409
885.4100	Avian Inhalation Toxicity/Pathogenicity	Not required as the nature of the microbial pesticide does not indicate potential pathogenicity to birds or relatedness to any known bird pathogens (refer to test note #3 of 40 CFR § 158.2150(e)).	N/A
885.4150	Wild Mammal Toxicity/Pathogenicity	Wild mammal testing was not conducted nor was a waiver requested. Studies conducted with <i>P. fluorescens</i> strain D7 on laboratory animals are appropriate for use in risk assessment. Acceptable studies with laboratory rats indicated no concerns for toxicity/pathogenicity in mammals. Classification: Acceptable	48966403, 48966402
885.4200	Freshwater Fish Toxicity/Pathogenicity	A freshwater fish test with <i>P. fluorescens</i> strain D7 showed no toxic or pathogenic effect on Rainbow trout (<i>Oncorhynchus mykiss</i>) dosed at 1 x 10 ⁶ cfu/ml. Classification: Acceptable	48966408
885.4240	Freshwater Invertebrate Toxicity/Pathogenicity	A freshwater invertebrate study with <i>P. fluorescens</i> strain D7 showed no adverse effects on mobility or reproduction of <i>Daphnia magna</i> at exposure to 1 x 10 ⁶ cfu/ml of test medium. Classification: Acceptable	48966410
885.4280	Estuarine/Marine Fish and Invertebrate Testing	Scientific rationale was insufficient to conclude that no adverse effects are expected on nontarget fish and invertebrates for all applications. <i>P. fluorescens</i> strain D7 is not to be applied directly to water and thus is not expected to reach estuarine or marine environments in significant amounts. However, aerial applications over large areas may lead to some exposure of <i>P. fluorescens</i> D7 in nearby estuarine/marine environments. Classification: Supplemental	No MRID, but a letter (dated June 3, 2013) requesting a waiver for Estuarine/Marine Fish and Invertebrate Testing was submitted.
885.4300	Nontarget Plant Testing	Additional data and published literature submitted were sufficient to support the nontarget plant testing requirement for <i>P. fluorescens</i> strain D7. Classification: Acceptable	49021101, 48966401
885.4340	Nontarget Insect Testing	A laboratory bioassay with adult ladybird beetles (<i>Hippodamia convergens</i>) at 1X the field application rate showed no adverse effects of <i>P. fluorescens</i> strain D7 to the test organism (<i>Helicoverpa zea</i>) within 7 days of testing. The study is not of sufficient duration and was not carried out at the maximum hazard dose of 10X. Classification: Supplemental	49157601 49177701
885.4380	Honey Bee Testing	Scientific rationale was sufficient to conclude that no adverse effects of <i>P. fluorescens</i> strain D7 on honey bees are likely to occur. Because of recommended preemergence uses in cool and wet (< 50°F) conditions, the exposure of nontarget honey bees to D7, even when it occurs, is expected to be low. Classification: Acceptable	49177701
<i>Tiers II, III, and IV</i>			
Not required for based on the acceptability of the data and other information provided for Tier I.			

APPENDIX B. PESTICIDE PRODUCTS

EPA File Symbol	Registration Name	Percentage Active Ingredient	Formulation Type	Use Site(s)	Method(s) of Application	Application Rate(s)	Target Pest
71975-G	Fluorescens Technical	95%	Technical	Manufacturing use only	N/A	N/A	Downy Brome (cheatgrass), Medusahead, Japanese Brome, and Jointed Goatgrass
71975-U	D7	95%	End-use product	Agricultural turf and grasses grown for seed, alfalfa; wheat, barley, triticale, oat, and rangeland	Ground application, Aerial	2g/acre (see label for dilution instructions)	
					Seed treatments	2-4 g/100 lbs. of seed	



U.S. ENVIRONMENTAL PROTECTION AGENCY
 Office of Pesticide Programs
 Biopesticides and Pollution Prevention Division (7511P)
 1200 Pennsylvania Avenue NW
 Washington, DC 20460

NOTICE OF PESTICIDE REGISTRATION

Registration
 Reregistration

(under FIFRA, as amended)

EPA Reg.
 Number:
71975-4

Date of Issuance:
August 29, 2014

Term of
 Issuance: **Unconditional**

Name of Pesticide Product:
D7

Name and Address of Registrant (include ZIP Code):

Northwest Agricultural Products
821 South Chestnut Ave.
Pasco WA 99301

Note: Changes in labeling differing in substance from that accepted in connection with this registration must be submitted to and accepted by the Biopesticides and Pollution Prevention Division prior to use of the label in commerce. In any correspondence on this product always refer to the above EPA registration number.

On the basis of information furnished by the registrant, the above named pesticide is hereby registered under the Federal Insecticide, Fungicide and Rodenticide Act.

Registration is in no way to be construed as an endorsement or recommendation of this product by the Agency. In order to protect health and the environment, the Administrator, on his or her motion, may at any time suspend or cancel the registration of a pesticide in accordance with the Act. The acceptance of any name in connection with the registration of a product under this Act is not to be construed as giving the registrant a right to exclusive use of the name or to its use if it has been covered by others.

This registration does not eliminate the need for continual reassessment of the pesticide. If EPA determines at any time, that additional data are required to maintain in effect an existing registration, the Agency will require submission of such data under section 3(c)(2)(B) of FIFRA.

This product is unconditionally registered in accordance with FIFRA section 3(c)(5) and is subject to the following terms and conditions:

1. Revise the EPA Registration number on the label to read, "EPA Reg. No. 71975-4."
2. Submit two (2) copies of the revised final printed labeling before you release the product for shipment

A stamped copy of the label is enclosed for your records.

Signature of Approving Official:

Robert McNally, Director
 Biopesticides and Pollution Prevention Division (7511P)

Date:

August 29, 2014

Appendix B

Idaho's Noxious Weed List

APPENDIX B: Idaho's Noxious Weed List

Scientific Name	Common Name
<i>Acroptilon repens</i>	Russian Knapweed
<i>Aegilops cylindrica</i>	Jointed Goatgrass
<i>Anchusa arvensis</i>	Small Bugloss
<i>Azolla pinnata</i>	Feathered Mosquito Fern
<i>Berteroa incana</i>	Hoary Alyssum
<i>Bryonia alba</i>	White Bryony
<i>Butomus umbellatus</i>	Flowering Rush
<i>Carduus acanthoides</i>	Plumeless Thistle
<i>Carduus nutans</i>	Musk Thistle
<i>Centaurea calcitrapa</i>	Purple Starthistle
<i>Centaurea debeauxii ssp. thuillieri</i>	Meadow Knapweed
<i>Centaurea diffusa</i>	Diffuse Knapweed
<i>Centaurea iberica</i>	Iberian Starthistle
<i>Centaurea solstitialis</i>	Yellow Starthistle
<i>Centaurea stoebe ssp. micranthos</i>	Spotted Knapweed
<i>Centaurea triumphetti</i>	Squarrose Knapweed
<i>Chondrilla juncea</i>	Rush Skeletonweed
<i>Chrysanthemum leucanthemum</i>	Oxeye Daisy
<i>Cirsium arvense</i>	Canada Thistle
<i>Cobomba caroliniana</i>	Fanwort
<i>Conium maculatum</i>	Poison Hemlock
<i>Convolvulus arvensis</i>	Field Bindweed
<i>Crupina vulgaris</i>	Common Crupina
<i>Cynoglossum officinale</i>	Houndstongue
<i>Cytisus scoparius</i>	Scotch Broom
<i>Echium vulgare</i>	Vipers Bugloss
<i>Egeria densa</i>	Brazilian Elodea
<i>Eichhornia crassipes</i>	Water Hyacinth
<i>Euphorbia esula</i>	Leafy Spurge
<i>Heracleum mantegazzianum</i>	Giant Hogweed
<i>Hieracium aurantiacum</i>	Orange Hawkweed
<i>Hieracium caespitosum</i>	Meadow Hawkweed
<i>Hieracium glomeratum</i>	Yellow Devil Hawkweed
<i>Hieracium piloselloides</i>	Tall Hawkweed
<i>Hydrcharis morsus-ranae</i>	Common/European Frogbit
<i>Hydrilla verticillata</i>	Hydrilla
<i>Hyoscyamus niger</i>	Black Henbane
<i>Impatiens glandulifera</i>	Policeman's Helmet
<i>Iris pseudocorus</i>	Yellow Flag Iris

Scientific Name	Common Name
<i>Isatis tinctoria</i>	Dyer's Woad
<i>Lepidium draba ssp. draba</i>	Hoary Cress (Whitetop)
<i>Lepidium latifolium</i>	Perennial Pepperweed
<i>Linaria genistifolia ssp. dalmatica</i>	Dalmatian Toadflax
<i>Linaria vulgaris</i>	Yellow Toadflax
<i>Lythrum salicaria</i>	Purple Loosestrife
<i>Milium vernale</i>	Milium
<i>Myriophyllum aquaticum</i>	Parrotfeather Milfoil
<i>Myriophyllum heterophyllum</i>	Variable-Leaf-Milfoil
<i>Myriophyllum spicatum</i>	Eurasian Watermilfoil
<i>Nardus stricta</i>	Matgrass
<i>Nymphoides pelata</i>	Yellow Floating Heart
<i>Onopordum acanthium</i>	Scotch Thistle
<i>Phragmites australis</i>	Common Reed (Phragmites)
<i>Polygonum bohemicum</i>	Bohemian Knotweed
<i>Polygonum cuspidatum</i>	Japanese Knotweed
<i>Polygonum sachalinense</i>	Giant Knotweed
<i>Potamogeton crispus</i>	Curlyleaf Pondweed
<i>Salvia aethiopsis</i>	Mediterranean Sage
<i>Salvinia molesta</i>	Giant Salvinia
<i>Senecia jacobaea</i>	Tansy Ragwort
<i>Solanum rostratum</i>	Buffalobur
<i>Sonchus arvensis</i>	Perennial Sowthistle
<i>Sorghum halepense</i>	Johnsongrass
<i>Tamarix ssp.</i>	Saltcedar
<i>Trapa natans</i>	Water Chestnut
<i>Tribulus terrestris</i>	Puncturevine
<i>Zygophyllum fabago</i>	Syrian Beancaper

Source: Idaho Noxious Weed Campaign (<http://idahoweedawareness.com/vfg/fieldguide.html>)

Appendix C

Recipient Mailing List

APPENDIX C: Recipient Mailing List

The Honorable Michael Crapo
United States Senator
251 East Front Street, Suite 205
Boise, ID 83702

The Honorable Michael Simpson
Idaho House of Representatives
802 West Bannock, Suite 600
Boise, ID 83702

The Honorable C.L. "Butch" Otter
Governor of Idaho
P.O. Box 83720
Boise, ID 83720

The Honorable Bert Brackett
Idaho Senate
48331 Three Creek Highway
Rogerson, ID 83302

The Honorable Richard Sykes
Mayor of Mountain Home
160 South 3rd Street East
Mountain Home, ID 83647

Mountain Home City Council
160 South 3rd Street East
Mountain Home, ID 83647

The Honorable Megan Blanksma
Idaho House of Representatives
595 W. Thacker Road
Hammett, ID 83627

Mr. Bud Corbus
Elmore County Commission
150 South 4th East
Mountain Home, ID 83647

Mr. Wes Wootan
Elmore County Commission
150 South 4th Street East
Mountain Home, ID 83647

Col. Billie F. Ritchie
Special Assistant, Military Affairs, Retired
150 South 3rd Street East
Mountain Home, ID 83647

BLM State Office
1387 South Vinnell Way
Boise, ID 83709

Mr. Virgil Moore
Idaho Fish and Game - HQ
600 South Walnut Street
Boise, ID 83712

Mr. Dennis McLerran
USEPA - Region 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101

Ruby Mountain/Jarbidge Ranger District
140 Pacific Avenue
Wells, NV 89835

Ms. Barbara Schmidt
Idaho Fish and Wildlife Office
1387 South Vinnell Way, Room 368
Boise, ID 83709

Mr. Craig Gehrke
The Wilderness Society
950 West Bannock Street, Suite 605
Boise, ID 83702

Ms. Laura Douglas
BLM Boise District
3948 Development Avenue
Boise, ID 83705

Mountain Home Chamber of Commerce
205 North 3rd Street East
Mountain Home, ID 83647

Mr. Charles Cooper
Ada County Fish and Game League
6015 Lubkin Street
Boise, ID 83704

Idaho Conservation League
P.O. Box 844
Boise, ID 83701

Mr. Lou Lunte
The Nature Conservancy
950 Bannock Street, Suite 210
Boise, ID 83702

Mr. Zack Waterman
The Sierra Club
503 W Franklin Street
Boise, ID 83702

Nathan Small, Chairman
Shoshone-Bannock Tribes
P.O. Box 306
Fort Hall, ID 83203

Theodore Howard, Chairman
Shoshone-Paiute Tribes of Duck Valley
P.O. Box 219
Owyhee, NV 89832

Joe DeLaRosa, Chairman
Burns Paiute Tribe
100 Pasigo Street
Burns, OR 97720

Bradley Crutcher, Chairman
Paiute-Shoshone Tribes of Fort McDermitt
P.O. Box 457
McDermitt, NV 89421

Darren Parry, Chairman
Northwestern Banda, Shoshone Brigham
City Tribal Office
707 N Main Street
Brigham City, UT 84302

Appendix D

Intergovernmental Coordination Letters

APPENDIX D: Intergovernmental Coordination Letters

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DEPARTMENT OF THE AIR FORCE
366 CIVIL ENGINEER SQUADRON (ACC)
MOUNTAIN HOME AIR FORCE BASE IDAHO



19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

Mr. Craig Gehrke
The Wilderness Society
950 West Bannock St
Suite 605
Boise ID 83702

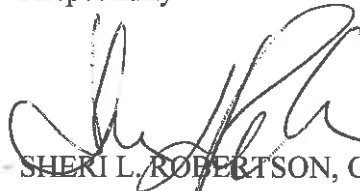
Dear Mr. Gehrke

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Respectfully



SHERI L. ROBERTSON, CIV, USAF

1 Attachment:

1-Description of Proposed Action and Alternatives



DEPARTMENT OF THE AIR FORCE
366 CIVIL ENGINEER SQUADRON (ACC)
MOUNTAIN HOME AIR FORCE BASE IDAHO



19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

Col. Billie F. Ritchie USAF (RET)
Special Assistant Military Affairs
150 South 3rd Street East
Mountain Home ID 83680

Dear Col. Ritchie

The 366th Fighter Wing (FW) at Mountain Home Air Force Base (MHAFB) is preparing an Environmental Assessment (EA) to analyze the treatment of noxious and invasive plant species at MHAFB and the Mountain Home Range Complex (MHRC) using a bioherbicide, *Pseudomonas fluorescens*, to control cheatgrass (*Bromus tectorum*) and other invasive annual grasses in native sagebrush-steppe and rangeland habitats (Attachment).

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DEPARTMENT OF THE AIR FORCE
366 CIVIL ENGINEER SQUADRON (ACC)
MOUNTAIN HOME AIR FORCE BASE IDAHO



19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

Mr. Charles Cooper
Ada County Fish and Game League
6015 Lubkin Street
Boise ID 83704

Dear Mr. Cooper

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DEPARTMENT OF THE AIR FORCE
366 CIVIL ENGINEER SQUADRON (ACC)
MOUNTAIN HOME AIR FORCE BASE IDAHO



19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

BLM State Office
1387 South Vinnell Way
Boise ID 83709

Dear Sir/Madam

The 366th Fighter Wing (FW) at Mountain Home Air Force Base (MHAFB) is preparing an Environmental Assessment (EA) to analyze the treatment of noxious and invasive plant species at MHAFB and the Mountain Home Range Complex (MHRC) using a bioherbicide, *Pseudomonas fluorescens*, to control cheatgrass (*Bromus tectorum*) and other invasive annual grasses in native sagebrush-steppe and rangeland habitats (Attachment).

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366 CIVIL ENGINEER SQUADRON (ACC)
MOUNTAIN HOME AIR FORCE BASE IDAHO



19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

Mr. Dennis McLerran
USEPA – Region 10
1200 Sixth Avenue
Suite 900
Seattle WA 98101

Dear Mr. McLerran

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366 CIVIL ENGINEER SQUADRON (ACC)
MOUNTAIN HOME AIR FORCE BASE IDAHO



19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

The Honorable Richard Sykes
Mayor of Mountain Home
160 South 3rd East
Mountain Home ID 83647

Dear Mayor Sykes

The 366th Fighter Wing (FW) at Mountain Home Air Force Base (MHAFB) is preparing an Environmental Assessment (EA) to analyze the treatment of noxious and invasive plant species at MHAFB and the Mountain Home Range Complex (MHRC) using a bioherbicide, *Pseudomonas fluorescens*, to control cheatgrass (*Bromus tectorum*) and other invasive annual grasses in native sagebrush-steppe and rangeland habitats (Attachment).

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MOUNTAIN HOME AIR FORCE BASE IDAHO



19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

The Honorable Michael Simpson
Idaho House of Representatives
802 West Bannock
Suite 600
Boise ID 83702

Dear Mr. Simpson

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MOUNTAIN HOME AIR FORCE BASE IDAHO



19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

The Honorable C.L. "Butch" Otter
Governor of Idaho
P.O. Box 83720
Boise ID 83720

Dear Governor Otter

The 366th Fighter Wing (FW) at Mountain Home Air Force Base (MHAFB) is preparing an Environmental Assessment (EA) to analyze the treatment of noxious and invasive plant species at MHAFB and the Mountain Home Range Complex (MHRC) using a bioherbicide, *Pseudomonas fluorescens*, to control cheatgrass (*Bromus tectorum*) and other invasive annual grasses in native sagebrush-steppe and rangeland habitats (Attachment).

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DEPARTMENT OF THE AIR FORCE
366 CIVIL ENGINEER SQUADRON (ACC)
MOUNTAIN HOME AIR FORCE BASE IDAHO



19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

Mountain Home Chamber of Commerce
205 North 3rd Street
Mountain Home ID 83647

Dear Sir/Madam

The 366th Fighter Wing (FW) at Mountain Home Air Force Base (MHAFB) is preparing an Environmental Assessment (EA) to analyze the treatment of noxious and invasive plant species at MHAFB and the Mountain Home Range Complex (MHRC) using a bioherbicide, *Pseudomonas fluorescens*, to control cheatgrass (*Bromus tectorum*) and other invasive annual grasses in native sagebrush-steppe and rangeland habitats (Attachment).

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366 CIVIL ENGINEER SQUADRON (ACC)
MOUNTAIN HOME AIR FORCE BASE IDAHO



19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

Ruby Mountain/Jarbridge Ranger District
140 Pacific Avenue
Wells NV 89835

Dear Sir/Madam

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19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

Ms. Barbara Schmidt
Idaho Fish and Wildlife
1387 South Vinnell Way
Room 368
Boise ID 83709

Dear Ms. Schmidt

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MOUNTAIN HOME AIR FORCE BASE IDAHO



19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

The Honorable Michael Crapo
United States Senator
251 East Front Street
Suite 205
Boise ID 83702

Dear Senator Crapo

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19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

The Honorable Bert Brackett
Idaho Senate
48331 Three Creek Highway
Boise ID 83302

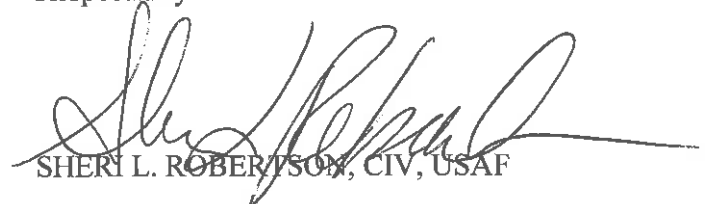
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366 CIVIL ENGINEER SQUADRON (ACC)
MOUNTAIN HOME AIR FORCE BASE IDAHO



19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

Ms. Laura Douglas
BLM Boise District
3948 Development Ave
Boise ID 83705

Dear Ms. Douglas

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366 CIVIL ENGINEER SQUADRON (ACC)
MOUNTAIN HOME AIR FORCE BASE IDAHO



19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

Mr. Wes Wootan
Elmore County Commission
150 South 4th East
Mountain Home ID 83647

Dear Mr. Wootan

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19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

Ms. Jessica Ruehrwien
The Sierra Club
503 West Franklin
Boise ID 83702

Dear Ms. Ruehrwien

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19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

The Honorable Pete Nielsen
Idaho House of Representatives
4303 Southwest Easy Street
Mountain Home ID 83647

Dear Representative Nielsen

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19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

Mr. Lou Lunte
The Nature Conservancy
950 Bannock Street
Suite 210
Boise ID 83702

Dear Mr. Lunte

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Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

Mountain Home City Council
160 South 3rd Street
Mountain Home ID 83647

Dear Sir/Madam

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1-Description of Proposed Action and Alternatives



DEPARTMENT OF THE AIR FORCE
366 CIVIL ENGINEER SQUADRON (ACC)
MOUNTAIN HOME AIR FORCE BASE IDAHO



19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

Mr. Virgil Moore
Idaho Fish and Game Headquarters
600 Walnut Street
Boise ID 83712

Dear Mr. Moore

The 366th Fighter Wing (FW) at Mountain Home Air Force Base (MHAFB) is preparing an Environmental Assessment (EA) to analyze the treatment of noxious and invasive plant species at MHAFB and the Mountain Home Range Complex (MHRC) using a bioherbicide, *Pseudomonas fluorescens*, to control cheatgrass (*Bromus tectorum*) and other invasive annual grasses in native sagebrush-steppe and rangeland habitats (Attachment).

The environmental analysis for the proposal is being conducted by the 366 FW in accordance with the Council on Environmental Quality guidelines pursuant to the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, we solicit your comments concerning the proposal and any potential environmental consequences of the action. We also request information regarding other recently completed, ongoing, or proposed projects in the vicinity that may create cumulative impacts in association with the proposed action. Please provide any comments you have within 30 days of the date of this letter.

Please forward your written comments, questions, or if you would like to discuss the proposal further please feel free to contact me at (208) 828-2299. Thank you for your assistance.

Respectfully



SHERI L. ROBERTSON, CIV, USAF

1 Attachment:
1-Description of Proposed Action and Alternatives



DEPARTMENT OF THE AIR FORCE
366 CIVIL ENGINEER SQUADRON (ACC)
MOUNTAIN HOME AIR FORCE BASE IDAHO



19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

Idaho Conservation League
P.O. Box 844
Boise ID 83701


Dear Sir/Madam

The 366th Fighter Wing (FW) at Mountain Home Air Force Base (MHAFB) is preparing an Environmental Assessment (EA) to analyze the treatment of noxious and invasive plant species at MHAFB and the Mountain Home Range Complex (MHRC) using a bioherbicide, *Pseudomonas fluorescens*, to control cheatgrass (*Bromus tectorum*) and other invasive annual grasses in native sagebrush-steppe and rangeland habitats (Attachment).

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1-Description of Proposed Action and Alternatives



DEPARTMENT OF THE AIR FORCE
366 CIVIL ENGINEER SQUADRON (ACC)
MOUNTAIN HOME AIR FORCE BASE IDAHO



19 APR 17

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

Mr. Bud Corbus
Elmore County Commission
150 South 4th East
Mountain Home ID 83647

Dear Mr. Corbus

The 366th Fighter Wing (FW) at Mountain Home Air Force Base (MHAFB) is preparing an Environmental Assessment (EA) to analyze the treatment of noxious and invasive plant species at MHAFB and the Mountain Home Range Complex (MHRC) using a bioherbicide, *Pseudomonas fluorescens*, to control cheatgrass (*Bromus tectorum*) and other invasive annual grasses in native sagebrush-steppe and rangeland habitats (Attachment).

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SHERI L. ROBERTSON, CIV, USAF

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1-Description of Proposed Action and Alternatives



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 366TH FIGHTER WING (ACC)
MOUNTAIN HOME AIR FORCE BASE IDAHO



16 May 2017

Colonel Jefferson J. O'Donnell
Commander
366 Gunfighter Avenue, Suite 331
Mountain Home AFB ID 83648

Chairman Bradley Crutcher
Paiute-Shoshone Tribes of Fort McDermitt
P.O. Box 457
McDermitt NV 89421

Dear Chairman Crutcher

The 366th Fighter Wing (FW) at Mountain Home Air Force Base (MHAFB) is preparing an Environmental Assessment (EA) to analyze the treatment of noxious and invasive plant species at MHAFB and the Mountain Home Range Complex (MHRC) using a bioherbicide, *Pseudomonas fluorescens*, to control cheatgrass (*Bromus tectorum*) and other invasive annual grasses in native sagebrush-steppe and rangeland habitats (see Attachment).

In accordance with Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments*, and Section 106 of the *National Historic Preservation Act* (NHPA) (36 Code of Federal Regulations Parts 800.2, 800.3, and 800.4) the 366 FW would like to initiate Government-to-Government consultation regarding this proposal. The 366 FW would like to discuss the proposal in detail with you, and to understand and consider any comments, concerns, and suggestions you may have. In particular, the Air Force requests your input as to the status of any traditional resources that may be located within the proposed project area. Please provide any comments you have within 30 days of the date of this letter.

On behalf of the 366 FW, I look forward to discussing the proposal with you while being mindful of and addressing your concerns. Please let us know when you are available and your expectations for discussions. Do not hesitate to call me at (208) 828-2366 to arrange dates and times to your convenience.

Sincerely


JEFFERSON J. O'DONNELL, Col, USAF

Attachment:
Description of Proposed Action and Alternatives



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 366TH FIGHTER WING (ACC)
MOUNTAIN HOME AIR FORCE BASE IDAHO



16 May 2017

Colonel Jefferson J. O'Donnell
Commander
366 Gunfighter Avenue, Suite 331
Mountain Home AFB ID 83648

Chairman Joe DeLaRosa
Burns Paiute Tribe
100 Pasigo Street
Burns OR 97720

Dear Chairman DeLaRosa

The 366th Fighter Wing (FW) at Mountain Home Air Force Base (MHAFB) is preparing an Environmental Assessment (EA) to analyze the treatment of noxious and invasive plant species at MHAFB and the Mountain Home Range Complex (MHRC) using a bioherbicide, *Pseudomonas fluorescens*, to control cheatgrass (*Bromus tectorum*) and other invasive annual grasses in native sagebrush-steppe and rangeland habitats (see Attachment).

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JEFFERSON J. O'DONNELL, Col, USAF

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Description of Proposed Action and Alternatives



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 366TH FIGHTER WING (ACC)
MOUNTAIN HOME AIR FORCE BASE IDAHO



16 May 2017

Colonel Jefferson J. O'Donnell
Commander
366 Gunfighter Avenue, Suite 331
Mountain Home AFB ID 83648

Chairman Blaine Edmo
Shoshone-Bannock Tribes
P.O. Box 306
Fort Hall ID 83203

Dear Chairman Edmo

The 366th Fighter Wing (FW) at Mountain Home Air Force Base (MHAFB) is preparing an Environmental Assessment (EA) to analyze the treatment of noxious and invasive plant species at MHAFB and the Mountain Home Range Complex (MHRC) using a bioherbicide, *Pseudomonas fluorescens*, to control cheatgrass (*Bromus tectorum*) and other invasive annual grasses in native sagebrush-steppe and rangeland habitats (see Attachment).

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Sincerely


JEFFERSON J. O'DONNELL, Col, USAF

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Description of Proposed Action and Alternatives



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 366TH FIGHTER WING (ACC)
MOUNTAIN HOME AIR FORCE BASE IDAHO



16 May 2017

Colonel Jefferson J. O'Donnell
Commander
366 Gunfighter Avenue, Suite 331
Mountain Home AFB ID 83648

Chairman Theodore Howard
Shoshone-Paiute Tribes of Duck Valley Indian Reservation
P.O. Box 219
Owyhee NV 89832

Dear Chairman Howard

The 366th Fighter Wing (FW) at Mountain Home Air Force Base (MHAFB) is preparing an Environmental Assessment (EA) to analyze the treatment of noxious and invasive plant species at MHAFB and the Mountain Home Range Complex (MHRC) using a bioherbicide, *Pseudomonas fluorescens*, to control cheatgrass (*Bromus tectorum*) and other invasive annual grasses in native sagebrush-steppe and rangeland habitats (see Attachment).

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Sincerely


JEFFERSON J. O'DONNELL, Col, USAF

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Description of Proposed Action and Alternatives



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 366TH FIGHTER WING (ACC)
MOUNTAIN HOME AIR FORCE BASE IDAHO



16 May 2017

Colonel Jefferson J. O'Donnell
Commander
366 Gunfighter Avenue, Suite 331
Mountain Home AFB ID 83648

Chairman Shane Warner
Northwestern Band Shoshone
Brigham City Tribal Office
707 North Main Street
Brigham City UT 84302

Dear Chairman Warner

The 366th Fighter Wing (FW) at Mountain Home Air Force Base (MHAFB) is preparing an Environmental Assessment (EA) to analyze the treatment of noxious and invasive plant species at MHAFB and the Mountain Home Range Complex (MHRC) using a bioherbicide, *Pseudomonas fluorescens*, to control cheatgrass (*Bromus tectorum*) and other invasive annual grasses in native sagebrush-steppe and rangeland habitats (see Attachment).

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Sincerely


JEFFERSON J. O'DONNELL, Col, USAF

Attachment:
Description of Proposed Action and Alternatives

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Appendix E

Comments Received and Air Force Response

APPENDIX E: Comments Received and Air Force Response

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IDAHO
CONSERVATION
LEAGUE

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB, ID 83648

May 4, 2017.

Re: Treatment of Noxious and Invasive Plant Species at MHAFB and the MHRC

Dear Ms. Robertson,

Thank you for considering our comments on the 366th Fighter Wing's (FW) environmental analysis for the treatment of noxious and invasive plant species at Mountain Home Air Force Base (MHAFB) and the Mountain Home Range Complex (MHRC). As Idaho's largest statewide conservation organization, we represent members who have a deep personal interest in protecting public lands from noxious weed infestations and restoring native plant communities.

We support the FW's efforts to implement an effective weed management program that utilizes new and innovative approaches. Noxious and invasive weeds pose a serious threat to the ecological integrity of public lands, and we recognize the need to prevent or control their spread across the western U.S. However, we believe that the FW should also do more to address the root of the problem. While treatment is an important aspect of managing this issue, the FW should place additional emphasis on preventing the initial introduction of weed seeds, minimizing disturbance of soils from management activities, and control the vectors for the spread of weeds into the area.

Please keep us on the mailing list for this project and all other projects on the Mountain Home Air Force Base and the Mountain Home Range Complex. Feel free to contact us if you have any questions on our comments.

Sincerely,

A handwritten signature in black ink, appearing to read "Austin Hopkins".

Austin Hopkins
Conservation Associate
(208) 345-6933 x23
ahopkins@idahoconservation.org

A handwritten signature in black ink, appearing to read "John Robison".

John Robison
Public Lands Director
(208) 345-6933 x 13
jrobison@idahoconservation.org

Idaho Conservation League comments on the EA for Treatment of Noxious and Invasive Plant Species at MHAFB

Purpose and Need for Action

We believe that the FW should take a stronger leadership role in the proactive management of noxious and invasive weeds. The most effective way to do so is to focus on prevention by aggressively addressing root causes of noxious weed dispersal. Prevention and detection are the cheapest and most effective weed control methods. Yet this EA provides minimal detail as to how preventative measures will be utilized as part of the treatment protocol. Rather, the documents focus on reactive methods such as herbicide application and aerial herbicide application. Simply treating current infestations of weeds does little to prevent future problems and ensures that the cycle of treatment and infestation will continue into the foreseeable future.

Herbicide Application

Even with more proactive steps to reduce the spread of noxious weeds, we realize that existing infestations do need to be treated and that herbicide can play an important role in managing noxious weeds. Because of the serious ecological damage caused by noxious weeds, we support the judicious use of herbicides when careful analysis demonstrates its appropriateness on a site-specific basis. However, the environmental costs of herbicide use must always be carefully weighed against the benefits in light of alternative methods of noxious weed control and prevention. The burden rests on the FW to demonstrate, via analyses of the characteristics of specific herbicides, identification of suitable and unsuitable sites and weather conditions for both aerial spraying and hand spraying. In addition, the EA should include a review of past compliance of spraying operations with operating guidelines. The FW should also require pre and post-treatment monitoring to assess treatment implementation and effectiveness as well as to assess any effects on water quality and non-target species. The FW needs to be able to demonstrate that proposed herbicide application treatments will not adversely impact non-target species, overall ecosystem integrity or public health. Non-herbicide treatments and prevention techniques should be utilized in situations where neither aerial or hand-sprayed herbicide application can be safely managed.

Reliance on Previous NEPA Documentation

This EA relies heavily upon previous NEPA documents that have been prepared to address the impacts of cheatgrass reduction efforts. Pursuant to §102(2)(c) of the NEPA, every federal agency must consider the following with regards to their proposed action:

- (i) the environmental impact of the proposed action,
- (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,
- (iii) alternatives to the proposed action,
- (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and
- (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

In this instance, we are concerned that the previous documents referenced in this EA do not provide sufficient analysis specific to use of the bioherbicide *P. fluorescens*, strain D7 (PFD7)? Our concerns over the lack of specificity are detailed below.

Cumulative/Comingling Impacts

The herbicide PDF7 is proposed to be utilized in conjunction with ten (10) other herbicides throughout MHAFB. This EA focuses on the impacts of the isolated use of PDF7; however we are concerned as to whether there are cumulative impacts due to comingling of multiple herbicides that have yet to be analyzed as part of this EA.

Notice to Public of Intent to Spray

The EA states that the intent to spray is made available to the public via an announcement on the MHAFB's website. We are curious as to the efficacy of this approach and whether MHAFB or the FW has a means to receive and document any complaints or other comments received by the public and associated with spray application. We encourage the FW to announce its intent to spray via radio/newspaper in addition to MHAFB website in an effort to ensure the broadest audience is aware of the upcoming action.

EPA Approval of New PDF7 Strain

Verdesian Life Sciences, manufacturer of PFD7, is currently developing a new formulation that will improve product shelf life and availability of PFD7. The EA states that this should be available in the fall of 2017, but it is unclear if this new strain will have gone through the USEPA's verification process. Prior to use, this new strain must be verified by the EPA and approved for use under the proposed conditions and application method.

Aerial Herbicide Application

We have concerns about the potential for adverse impacts of aerial herbicide drifting outside of target areas and into aquatic environments, particularly over smaller streams and intermittent channels. There appears to be no discussion on buffer zones around water bodies, which are necessary to ensure potentially harmful herbicides do not enter water bodies, even intermittent ones.

Recent research indicates that the potential for drift, especially for liquid application of herbicides or pesticides can far exceed anticipated buffers. Typical estimates of pesticide drift following aerial application range from 100 meters (330 feet) to 1600 meters (5250 feet)¹. In a summary of 16 studies on drift compiled by Northwest Coalition for Alternatives to Pesticides, chemicals were detected as far away from the application as samples were taken, so these numbers cannot give a definite answer to the question of how far pesticides can drift. Drift does occur over much greater distances than anticipated. For example, cool-air-drainage conditions carried forestry applications of the insecticides

¹ Crabbe, R.S. 1984. Effect of atmospheric turbulence on windborne drift of aerial forest sprays. In P.W. Voisey, (ed.) *Proc. symposium on the future role of aviation in agriculture*. National Research Council of Canada.

orthene and trichlorfon over 1.25 miles in Washington's Cascade Mountains². Moderate winds carried carbaryl over 2 miles from a Vermont apple orchard³. Using a fluorescent tracer, drift was measured 4 miles from an insecticide application on a California oat field⁶. From Colorado wheat fields during hot weather, 2,4-D and dicamba drifted between 5 and 10 miles⁴. In central Washington, winds and hilly terrain combine to cause 2,4-D to drift for 10 to 50 miles and Paraquat to drift for up to 20 miles⁵.

The potential for drift needs to be fully addressed to ensure that clean water, wildlife, native species and local residents are protected. As an alternative, the FW should consider limiting the application of higher-risk herbicides to ground-based backpack sprayers or ATV-mounted sprayers.

Duration of herbicide

The FW should analyze how long the herbicides and subsequent compounds persist in the landscape and how easily they are transported off site.

Monitoring

As stated above, the FW should conduct pre and post-monitoring work to assess if herbicides are being applied consistent with all applicable guidance documents, if the herbicides are being effective in treating noxious weeds, and if the treatments avoided impacting water quality and non-target species.

² Markin, G.P. 1982. Drift of insecticidal spray by cold air drainage winds in western mountains. Research Note PSW-360. Berkeley, CA: U.S. Dept. of Agriculture, Forest Service, Pacific Southwest Forest and Range Experiment Station.

³ Currier, W.W., G.B. Maccollom, and G.L. Baumann. 1982. Drift residues of air-applied carbaryl in an orchard environment. *J. Econ. Entomol.* 75:1062-1068. ⁶ Murray, J.A. and L.M. Vaughan. 1970. Measuring pesticide drift at distances to four miles. *J. Appl. Meteorol.* 9:79-85.

⁴ Robinson, E. and L.F. Fox. 1978. 2,4-D herbicides in central Washington. *Air Pollut. Cont. Assoc.* 28(10):1015- 1020.

⁵ Glantz, C.S., M.N. Schwartz, and P.J. Perrault. 1989. An assessment of the meteorological conditions associated with herbicide drift in the Horse Heaven hills/Badger Canyon/Tri-Cities Area during the period from August 6 through 11, 1988. Battelle Pacific Northwest Laboratories.



United States Department of the Interior

U.S. Fish and Wildlife Service

Idaho Fish and Wildlife Office

1387 S. Vinnell Way, Room 368

Boise, Idaho 83709

Telephone (208) 378-5243

<http://www.fws.gov/idaho>



Ms. Sheri Robertson
Chief, Environmental Management
366 CES/CEIE
1030 Liberator Street
Mountain Home AFB, ID 83648

MAY 15 2017

Subject: Mountain Home Air Force Base Bioherbicide and Chemical Treatments – Elmore and Owyhee Counties, Idaho
In Reply Refer to: 01EIFW00-2017-CPA-0009

Dear Ms. Robertson:

This correspondence is in response to your letter dated April 19, 2017, and received by the U.S. Fish and Wildlife Service (Service) on April 26, 2017, requesting review comments on the Mountain Home Air Force Base's (MHAFB) Description of the Proposed Action and Alternatives (Proposed Action), dated April 2017, to use the bioherbicide *Pseudomonas fluorescens* to control cheatgrass (*Bromus tectorum*) and other invasive annual grasses in native sagebrush-steppe and rangeland habitats at MHAFB and the Mountain Home Range Complex (MHRC), Elmore and Owyhee counties, Idaho. The Service recognizes the importance of this and other tools for the control of cheatgrass and other invasive nonnative annual grasses. Control of invasive nonnative annual grasses is the first step in minimizing threats associated with fine fuels that contribute to the increased frequency and intensity of wildfires, and loss of a diverse native herbaceous understory in the sagebrush-steppe ecosystem. Control of cheatgrass is a critical step to restore and maintain resistant and resilient sagebrush landscapes required for sagebrush-obligate species. Implementation of this proposal is desirable, as it will increase understanding of this new biocontrol tool for cheatgrass control in southern Idaho. The Proposed Action also includes use of other chemical treatments to control undesirable plant species that have recently been approved for use on adjacent Bureau of Land Management lands.

Bioherbicide Technical Assistance

The Service applauds the addition of new tools such as use of bioherbicides for control of cheatgrass and other invasive annual grasses on MHAFB and the MHRC. We recognize the need to proactively implement treatments to meet sagebrush-steppe habitat objectives across landscapes regardless of land ownership, including on MHAFB-administered lands. The Idaho Fish and Wildlife Office's (IFWO) "Strategic Habitat Conservation in Idaho" identifies two priority landscapes with strategies that target sagebrush-steppe habitat conservation through partnerships. One of these landscapes, the Owyhee Uplands Priority Landscape, includes sagebrush-steppe habitat on lands managed by MHAFB.

Through this landscape conservation strategy, the IFWO actively collaborates with Federal, State, and private landowners, and other interested parties, for conservation and restoration of sagebrush habitats within Idaho, as well as across state lines as part of the “All Hands, All Lands” management approach directed by the Department of Interior Secretarial Order 3336 for Rangeland Fire Prevention, Management and Restoration. In the collaborative spirit of the “All Hands, All Lands” management approach, we encourage MHAFB to share their experiences in the use of bioherbicides for cheatgrass control with Federal, State, and private partners so that lessons learned from the successful use of this tool can be used to assist other land managers in southern Idaho.

The Service is also available to provide technical assistance on the use of bioherbicides in sagebrush-steppe ecosystems. Supervisory Biologist, Mike Gregg, of the Mid-Columbia River National Wildlife Refuge Complex (MCRNWRC) has experience in the use of bioherbicides. Mike can provide technical assistance for development of the Proposed Action as well as participate in site-specific project design and implementation, as Military Interdepartmental Purchase Request (MIPR) funding is available.

Section 7 Consultation: Slickspot Peppergrass

One species listed under the Endangered Species Act (Act) of 1973, as amended, is known to occur on MHAFB and MHRC lands. *Lepidium papilliferum* (slickspot peppergrass), a southwestern Idaho endemic plant species listed as threatened under the Act, is found on the Juniper Butte Range as well as along some Bureau of Land Management-administered rights-of-way permitted to MHAFB. While the effects of bioherbicide use on slickspot peppergrass are not known at this time, MHAFB’s Proposed Action states that bioherbicides will not be used on the Juniper Butte Range. The Proposed Action also states that the Service will be contacted later in the project planning process to determine the need for additional section 7 consultation, to address the effects of bioherbicide use as well as the use of other recently-approved chemical herbicides on slickspot peppergrass. The Service looks forward to working with MHAFB regarding any additional section 7 consultation needs for the Proposed Action.

Conclusion


The Service appreciates the opportunity to provide comments on bioherbicide use and additional chemical herbicide use in the MHAFB’s Proposed Action. We look forward to providing technical assistance on site-specific projects as well as learning from MHAFB’s experiences with this new biological tool for cheatgrass control in southern Idaho. Please contact Mike Gregg of the Mid-Columbia River National Wildlife Refuge Complex at (509) 942-8185 or Barbara

Ms. Sheri Robertson
Mountain Home Air Force Base
Mountain Home Air Force Base Bioherbicide and Chemical Treatments

01EIFW00-2017-CPA-0009

Schmidt of the Idaho Fish and Wildlife Office at (208) 378-5259 if you have questions concerning this letter.

Sincerely,


for Gregory M. Hughes
State Supervisor
RUSS HOLDER

cc: MHAFFB, Mountain Home (Zahniser, Scott)
MCRNWRC, Burbank, WA (Gregg)
USFWS, Region 1, Portland (Stavrakas)



United States Department of the Interior
BUREAU OF LAND MANAGEMENT
Boise District Office
3948 Development Avenue
Boise, Idaho 83705



In Reply, Refer To:
9105, 6711 (ID100)

MAY 19 2017

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St
Mountain Home AFB ID 83648

Dear Ms. Robertson:

Thank you for the opportunity to review and comment on the Air Force's proposal to treat noxious and invasive plant species on the Mountain Home Air Force Base and Mountain Home Range Complex. This letter contains support for your proposed project and comments to help guide your analysis.

Also per your request, the Boise District BLM has completed three EAs for the use of the bioherbicide *Pseudomonas fluorescens* strain D7 on a limited basis for research purposes. As the use of D7 has not been approved for use on BLM-managed lands except for research, D7 treatment areas cannot exceed 50 acres in size. These projects include 50 acres within the area burned in the Soda Fire in Owyhee County (2015), 2 acres in the Orchard Research site in Ada County (2016), and 47 acres in the Bannister Basin in Payette County (2017 or 2018).

Below are additional comments or issues identified by my staff based on the information contained in the scoping document:

- From the text and maps, the land status (ownership) acreage is unclear. We are assuming proposed treatments are entirely on military lands; however, if there are any BLM-managed lands involved, please identify them and notify us immediately. We would need to be a cooperating agency for the EA and issue a BLM decision.
- If any BLM lands are involved, although sulfometuron methyl (Oust®, Landmark®) was included in the BLM's Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic EIS (PEIS), its use is not allowed on BLM lands in Idaho, per the 2001 Idaho BLM Information Memorandum #050.
- Consider referencing Appendix B – Standard Operating Procedures, from the PEIS.
- It is unclear from the maps exactly which areas of the MHAFB complex are being considered for D7 application.

- As the efficacy of D7 has not been fully proven, many studies are ongoing to evaluate and document its efficacy. Consider implementing treatments of D7 in replicated plots to help inform the efficacy studies.
- The proposal mentions the use of D7 "In long-term field trials, the bacteria reduced fall annual grass weeds to near zero, when desirable plants (perennial grasses and other native species) were present." We suggest the D7 be applied either in sites with a perennial plant component present or where desired perennial grasses are seeded to improve the likelihood of success of the bacterium treatment.

We appreciate the opportunity to review and comment on this proposal. If you have any questions or require clarification, please contact Kathi Kershaw, Resource Coordinator, at (208) 384-3359 or kkershaw@blm.gov. She will be able to assist you with your needs.

Sincerely,



Lara Douglas
District Manager



IDAHO DEPARTMENT OF FISH AND GAME
SOUTHWEST REGION
3101 South Powerline Road
Nampa, Idaho 83686

C.L. "Butch" Otter / Governor
Virgil Moore / Director

May 19, 2017

Ms. Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator St.
Mountain Home AFB, ID 83648

RE: IDFG Comments on the Description of the Proposed Action and Alternatives for the Mountain Home Air Force Base proposed use of bioherbicide *Pseudomonas fluorescens*

Dear Sheri,

Idaho Department of Fish and Game (Department) has reviewed the Description of the Proposed Action and Alternatives (DOPAA) prepared by the Mountain Home Air Force Base (MHAFB) dated April 2017. The Department understands the MHAFB is preparing an Environmental Assessment (EA) to analyze the use of a bioherbicide, *Pseudomonas fluorescens*, Strain D7 (PFD7), to help control cheat grass in native sagebrush-steppe habitats.

Fish and wildlife are property of all Idaho citizens, and the Department and the Idaho Fish and Game Commission are expressly charged with statutory responsibility to preserve, protect, perpetuate, and manage all fish and wildlife in Idaho (Idaho Code 36-103(a)). In fulfillment of our statutory charge and direction as provided by the Idaho Legislature, we offer the following comments.

The Department applauds your efforts for using cutting-edge tools into your noxious and invasive plant control program. We are very curious on how effective PFD7 may be in controlling cheat grass within your project area. The Department recommends you emphasize a monitoring and reporting plan in your final assessment so you can share your experience with the Department and others who are interested in controlling cheat grass. The Department views the proposed action as a positive step towards gaining better control of aggressive annual grasses and helping to restore native sagebrush-steppe habitats.

Keeping Idaho's Wildlife Heritage

Thank you for the opportunity to review and comment on the Description of the Proposed Action and Alternatives.

Sincerely,



Bradley B Compton
Regional Supervisor

BC//tpb

ecc: Kiefer & Vecellio/HQ

cc: Gold file



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
ENVIRONMENTAL REVIEW
AND ASSESSMENT

May 19, 2017

Sheri Robertson
Chief Environmental Management
366 CES/CEIE
1030 Liberator Street
Mountain Home AFB, Idaho 83648

Dear Ms. Robertson:

The U. S. Environmental Protection Agency has reviewed the U.S. Air Force notice to prepare an Environmental Assessment (EA) for the proposed Treatment of Noxious and Invasive Plant Species Project at the Mountain Home Air Force Base and Mountain Home Range Complex in Elmore County, Idaho (EPA Region 10 Project No. 17-0022-DoD). Our review was conducted in accordance with our responsibilities under the National Environmental Policy Act and Section 309 of the Clean Air Act that specifically directs the EPA to review and comment in writing on environmental impacts associated with all major federal actions.

According to the notice, the USAF proposes to augment the existing invasive and noxious weed control program with three new herbicides (Aminopyralid, Rimsulfuron, Sulfometuron/Chlorsulfuron) and one biopesticide (*Pseudomonas fluorescens* or PFD7) for the control of cheatgrass and other invasive annual grasses in native sagebrush-steppe and rangeland habitats. The project analysis area is approximately 128,458 acres, encompassing the MHAFB and MHRC. The proposed project would reduce noxious weed and invasive plant impacts to the USAF mission readiness, while allowing the Department of Defense (DoD) to meet its mandate to manage natural ecosystems and maintain compliance with state, federal, and other regulatory requirements. The proposed EA analysis tiers to the *Saylor Creek Air Force Range Cheatgrass Reduction Plan Implementation EA* (MHAFB, 2000) and two Bureau of Land Management (BLM) Programmatic Environmental Impact Statements for Vegetation Treatments using herbicides on the BLM lands in 17 western states.^{1,2}

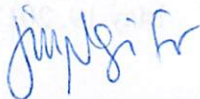
We understand that the use of herbicides is a necessary strategy to control noxious and invasive plant species, especially where cheatgrass infestation is significant, threatens the sagebrush steppe ecosystem, and is difficult to control using other techniques. As the EA proposal does not identify the resources and issues to address during EA development, we offer the attached comments to help inform the USAF of the information that we believe will be important for disclosure during the NEPA process.

¹ <https://www.blm.gov/nhp/spotlight/VegEIS/>

² <http://cdm15879.contentdm.oclc.org/cdm/ref/collection/p15879coll9/id/455654>

Thank you for the opportunity to provide comments on this project early and we look forward to continued involvement in its subsequent NEPA processes. If you have questions about our comments, please contact me at (206) 553-6322 or by electronic mail at mbabaliye.theogene@epa.gov.

Sincerely,



Theogene Mbabaliye
Environmental Review and Sediment Management Unit

Enclosure: EPA Scoping Comments on the Proposed Treatment of Noxious and Invasive Plant Species Project at the MHAFB and MHRC, Idaho.

**EPA Comments on the Proposed Treatment of
Noxious and Invasive Plant Species at the Mountain Home Air Force Base and Mountain Home
Range Complex, Elmore County, Idaho**

Environmental Effects

The EA should include the environmental effects of the proposed project on natural resources and it should also include any necessary mitigation measures that would reduce or cancel out those effects. This would involve the delineation and description of the affected environment or analysis area, indication of the impacted resources therein, the nature of the impacts, and proposed mitigation measures to reduce those impacts. The following topics would be particularly helpful information to provide to decision makers and the public:

Impacts to Water Resources

Section 303(d) of the Clean Water Act (CWA) requires the State of Idaho, and tribes with EPA-approved water quality standards (WQS), to identify the surface water bodies that do not meet the approved WQS and to develop water quality restoration plans in order to improve water quality to meet the applicable beneficial uses and associated criteria for each impaired water body (called a Total Maximum Daily Load or TMDL). As there are a number of creeks near the analysis area e.g., Clover Creek and Bruneau River, it is possible that treatments could result in potentially adverse impacts to water quality and aquatic resources. The herbicide applications could result in unintended consequences due to drift, effects on non-target species, and persistence in soils (e.g., Aminopyralid) that may erode into waterways. Because of that, the EA should disclose the waters in and around the project area that may be impacted by the proposed treatments, the nature of the potential impacts, and the potential pollutants likely to affect water quality and the state WQS. If buffers exist around waterways, the EA should also include information explaining the treatment of invasive plants within buffer zones, as well as information about aquatic invasive plant infestations and how they would be treated to prevent deterioration of water quality within the waterbodies.

Please also note that the antidegradation provisions of the CWA prohibit degrading water quality within water bodies that are currently meeting WQS. As a result, the EA should indicate how the proposed action would meet the anti-degradation policy of the State of Idaho. See 40 CFR 131, as well as the Idaho WQS, for more information regarding beneficial uses, water quality criteria, and anti-degradation policies³. In addition, point source discharges of biological and chemical pesticides that leave a residue in waters of the U.S. are required to comply with National Pollutant Discharge Elimination System (NPDES)⁴ requirements. The EPA is the currently authorized NPDES permitting authority for pesticide application activities at federal facilities in Idaho. See the EPA website for more information. The EA should include a discussion of NPDES permitting requirements and indicate whether the proposed action would require authorization from the NPDES Program, as well as efforts made to date to obtain authorization if necessary.

The proposed chemical treatment may also impact waters that serve as sources of drinking water. The 1996 amendments to the Safe Drinking Water Act require federal agencies that manage lands including drinking water sources to protect these source waters. The analysis of impacts should identify all

³ <https://adminrules.idaho.gov/rules/current/58/0102.pdf>

⁴ <https://www.epa.gov/npdes/pesticide-permitting>; <https://www.epa.gov/npdes/pesticide-applications-1>

drinking water sources, any potential contamination of these sources that may result from the treatments, and measures that would be taken to protect these sources.

Chemical Treatments

Providing the best available information on chemicals is essential in evaluating chemical use in invasive plant control and eradication. If other alternatives, such as prevention and mechanical controls, are not feasible, the use of herbicides may provide less environmental impact than the establishment of invasive plants. The potential impacts of herbicide use, such as sub-lethal effects on wildlife, reduced breeding/survival of sensitive species, secondary/cumulative effects, and unintended effects should be discussed in the EA.

The USAF should analyze and disclose information on the herbicides that are registered for the intended use, achieve the desired results, and have minimal adverse effects on environmental resources and human health. Liquid and granular herbicides can be applied broadcast, banded, as spots, or directed to specific plants using appropriate the application technology. These application technologies can include mechanized ground equipment or manual applicators such as backpack sprayers or tree injectors. The use of global positioning systems, specialized application equipment, and careful attention to weather conditions can enhance application accuracy and minimize off-site chemical movement. Computational models can be used to assess the effectiveness of alternative drift control practices and predict the environmental fate of chemicals before their use.

Since chemical treatment is one of several available vegetation management alternatives, the USAF should discuss the screening process used in deciding that chemical applications are necessary, in addition to other weed treatments already in use on USAF lands. The USAF should coordinate with the relevant State of Idaho programs in order to ensure that any new herbicides to be added to the current regime are registered for the intended use.

Integrated Pest Management (IPM)

The EPA supports IPM because it represents a prudent approach to understanding and dealing with environmental concerns. IPM promotes a thoughtful awareness of the pest management inherent in natural systems through an understanding of pest life cycles and control techniques. It does not rule out the use of pesticides, but requires thoughtful consideration of their use. The EPA endorses the concept of Integrated Vegetation Management or Integrated Pest Management for a number of reasons:

1) Uncertainties

Despite the substantial amount of scientific information that the EPA reviews prior to registering a pesticide, it is virtually impossible to identify all conceivable risks and to address all the uncertainties of pesticide use. Over time, new risks are often uncovered. Some past examples include: eggshell thinning caused by dichloro-diphenyl-trichloroethane, groundwater contamination, pesticides that mimic hormones, and the more recent discovery that pesticides in combination may behave synergistically with a great multiplier effect. Because science cannot practically assure safety through any testing regime, we advocate that any pesticide use should always be approached with caution.

2) Overuse of pesticide causes problems

Aside from the potential for toxicity in humans, the overuse of pesticides may cause problems such as: 1) killing beneficial organisms that would otherwise help control pests; 2) promoting

development of pesticide resistance in pests, which starts a cycle of needing more pesticides; 3) resurgence of pest populations, and 4) impacts to the environment.

3) *Economics*

Integrated pest management, when viewed by traditional economics, often results in lower costs than conventional pest management. If other costs are considered, then the attractiveness of IPM increases. Some of these other costs may include the potential long term human health effects of pesticide exposures, including more sensitive/vulnerable populations, environmental impacts, and effects on non-target animals and plants.

Impacts to Vegetation and Wildlife

Application of herbicides such as aminopyralid have the potential to damage a variety of vegetation communities, including macrophytic species (wetland vegetation), grasslands, and forbs, resulting in reduced growth, curling, chlorosis and/or necrosis and plant death. In particular, the use of aerial applications may harm non-target forage and cover species than other methods. It is also possible that the number of acres treated annually may increase in years in which herbicides are applied aerially, which would increase the adverse effects of herbicide application to non-target vegetation in those areas. The EA should discuss whether such impacts would occur as a result of the project and the mitigation measures necessary to minimize these impacts.

Herbicide treatments could also impact wildlife and livestock due primarily to direct spray, accidental spills, drift, and ingestion of contaminated vegetation, prey species, or water. Effects to animals could include death, damage to vital organs, decrease in growth, decrease in reproductive output and condition of offspring, and increased susceptibility to predation. Wildlife could experience disruption of dispersal and foraging, which could expose some species to greater predation related to habitat and cover losses. Overall, terrestrial and aquatic applications of herbicides are likely to alter vegetation and have secondary effects on animals, including food availability and habitat quality. The EA should also evaluate these potential impacts and discuss how they would be minimized.

Endangered Species Act

Herbicide application to control vegetation may impact federally endangered, threatened or candidate species listed under the Endangered Species Act, critical habitat, and/or state sensitive species. The EA should identify listed species under the ESA and other sensitive species within the analysis area. This evaluation should also describe critical habitat, identify impacts from herbicide use, and discuss how this project's herbicide application will meet ESA requirements, including Section 7 consultations with the U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration. Because waterbodies on or near the analysis area may be fish-supporting, the Air Force should take a conservative approach towards using herbicides and reduce impacts to fish species. Special attention should be given to herbicides for which the EPA's analysis of potential harm to species is incomplete.

Pollinator Protection

In May 2015, the Federal Pollinator Task Force issued a *National Strategy to Promote the Health of Honey Bees and other Pollinators*⁵ which tasked federal agencies with helping to improve pollinator health. In the strategy, the DoD is tasked with supporting habitat restoration projects for pollinators, to direct military service installations to use, when possible, pollinator-friendly native landscaping, and to minimize the use of pesticides harmful to pollinators through integrated vegetation and pest

⁵ <https://www.epa.gov/pollinator-protection/federal-pollinator-health-task-force-epas-role>

management practices. The DoD previously issued a September 2014 policy, *DoD Policy to Use Pollinator-Friendly Management Prescriptions*⁶, to the Military Services. The 2014 policy discussed using native landscaping, when possible, to avoid using pesticides in sensitive habitats, to coordinate with other agencies and non-governmental organizations on habitat and pollinator issues, and to emphasize habitat restoration for pollinators in National Public Lands Day projects. We recommend that this project EA describe how any proposed herbicide treatments will align with the DoD policy and the national strategy on protecting pollinators.

Air Quality and Emissions

Air quality protection should be addressed in the EA. The types of fuels used during the project activities, increased traffic during operations, and any related Volatile Organic Compounds (VOCs) and sulfur oxide (SO_x)/nitrogen oxide (NO_x) emissions should be disclosed. Their relative effects on air quality and human health should be evaluated. Dust particulates from ground disturbing activities and ongoing operation of the roadways are important concerns. The EA should evaluate the air quality impacts of the proposed project, and detail the necessary mitigation measures necessary to reduce the impacts. This analysis should also address and disclose the projects' potential effects on all criteria pollutants under the National Ambient Air Quality Standards (NAAQS); including ozone, visibility impairment, and air quality related values, to protect any affected Class I Airsheds. The EA should also assess any significant concentrations of hazardous air pollutants and the impacts on public health.

Currently, there is agreement that continued increases in greenhouse gas emissions can contribute to climate change. Impacts of climate change may include changes in hydrology, weather patterns, precipitation rates, and chemical reaction rates. The EA should, therefore, discuss how changes in climate could potentially impact the proposed project and how the proposed project can impact the climate. For example, changes in plant growth, resulting from increased carbon dioxide (CO₂) in the atmosphere, could affect herbicide efficiency either through uptake rates of the active ingredient or by increased biomass that enables plants to withstand herbicides' effectiveness. The EA should quantify and disclose emissions from the project activities and consider mitigation measures to reduce the emissions, even if they (actual and predicted) would be below the 25-ton threshold. Potential mitigation measures for greenhouse gas emissions could be the use of energy efficient equipment and limiting idling when possible.

Landscape Approach and Cumulative Effects

Because the proposed project impacts may extend to other private, state, and/or federally owned lands, the EA should assess the effects of the vegetation treatments using a landscape approach. Where infestations cross jurisdictional boundaries, a coordinated effort will increase the likelihood of bringing the invasive population to a manageable level. The EA process should use a landscape approach in assessing cumulative effects and identify what assumptions will be used with respect to adjacent non-USAF lands, as well as the mechanisms for cooperating with other landowners to disclose the sum of individual effects of all projects on local environment. Cumulative effects result from the effects of the proposed action when added to other past, present and reasonably foreseeable future projects in and outside the analysis area, including those by entities not affiliated with the USAF.

The EPA has issued guidance for commenting on the assessment of cumulative impacts, *Consideration of Cumulative Impacts in EPA Review of NEPA Documents*⁷. The guidance document states that in order

⁶ <http://www.dodnaturalresources.net/USA004736-14 - IE signed DoD Policy to Use pollinator-Friendly Mgmt.pdf>

⁷ <https://www.epa.gov/sites/production/files/2014-08/documents/cumulative.pdf>

to assess the adequacy of the cumulative impacts assessment, there are five key areas to consider. We will assess whether the cumulative effects' analysis:

1. Identifies resources, if any, that are being cumulatively impacted;
2. Determines the appropriate geographic (within natural ecological boundaries) area and the time period over which the effects have occurred and will occur;
3. Looks at all past, present, and reasonably foreseeable future actions that have affected, are affecting, or would affect resources of concern;
4. Describes a benchmark or baseline; and,
5. Include scientifically defensible threshold levels.

Public Participation and Environmental Justice

The EA should disclose what efforts were taken to ensure effective public participation during the development of the impacts analysis. In addition, if low income communities, or communities of color, will be impacted by the proposed project, the EA should disclose what efforts were taken to meet the federal government environmental justice requirements consistent with Presidential Executive Order 12898 (*Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*).

Restoration

Ground disturbance during the project can promote the spread of invasive species. It is common that, after invasive plant removal, restoration may be necessary in order to prevent re-establishment. The project analysis should discuss effectiveness monitoring to help ensure that the restoration work will be successful. Restoration activities could focus on an ecosystem approach, as well as long-term impacts. Planting of native species and restoring natural processes should be considered among the highest priorities in assisting the return of stressed natural communities and creating high quality habitats. Restoring hydrology to a wetland or riparian site, returning a stream to its natural channel, reintroducing fire, and creating conditions that allow natural processes (large woody debris, carbon storage, nutrient cycling) to occur are all activities that have great potential for restoration success.

Monitoring

Since the USAF has been herbicides in the project area for many years, we recommend that the Air Force discuss the monitoring data collected to date, and the relevance of the existing results to this proposed project. We also recommend that the proposed project be designed to include an effective feedback element, which includes both implementation and effectiveness monitoring. Monitoring is a necessary and crucial element in identifying and understanding the consequences of actions. For the proposed project, monitoring would show whether the proposed treatments would be effective in managing invasive plant populations and in reducing environmental impacts. This information would also be helpful in planning future land management activities.

The EA should include information and assurances regarding adequate monitoring and evaluation to determine if application rates are effective, buffers are sufficient, drift is minimized, and specific goals and endpoints are being met. There should also be commitment to using the best available techniques for monitoring, evaluating, and mitigating impacts from those herbicides that are known to be persistent and that migrate through soil into groundwater.

Appendix F

Status of the Flora and Fauna of Mountain Home Air
Force Base and Mountain Home Range Complex

APPENDIX F: Status of the Flora and Fauna of Mountain Home Air Force Base and Mountain Home Range Complex

Common Name	Scientific Name	Type	MHAFB	SCR	JBR	ES	BLM	SGCN	USFWS	PIF	MBTA
Great Basin Spadefoot	<i>Spea intermontana</i>	amphibian		SCR							
Black-throated Sparrow	<i>Amphispiza bilineata</i>	bird				ES		Teir 2			MBTA
Greater Sage-Grouse	<i>Centrocercus urophasianus</i>	bird		SCR	JBR			Tier 1	BMC	SCC	
Burrowing Owl	<i>Athene cunicularia</i>	bird	MHAFB	SCR	JBR	ES		Tier 2	BMC		MBTA
Sage Thrasher	<i>Oreoscoptes montanus</i>	bird	MHAFB	SCR	JBR	ES		Tier 2	BMC		MBTA
Ferruginous Hawk	<i>Buteo regalis</i>	bird		SCR	JBR			Tier 2	BMC		MBTA
Long-Billed Curlew	<i>Numenius americanus</i>	bird	MHAFB	SCR				Tier 2	BMC		MBTA
Golden Eagle	<i>Aquila chrysaetos</i>	bird	MHAFB	SCR	JBR	ES		Tier 2			MBTA
Sagebrush Sparrow	<i>Artemisiospiza nevadensis</i>	bird	MHAFB	SCR	JBR	ES		Tier 2			MBTA
Grasshopper Sparrow	<i>Aminodramus savannarum</i>	bird		SCR				Tier 2			MBTA
American White Pelican	<i>Pelecarus erythrorhynchos</i>	bird	MHAFB					Tier 2			MBTA
White-Faced Ibis	<i>Plegadis chihi</i>	bird	MHAFB					Tier 2			MBTA
California Gull	<i>Larus californicus</i>	bird	MHAFB					Tier 2 B			MBTA
Short-Eared Owl	<i>Asio flammeus</i>	bird		SCR	JBR			Tier 3	BMC		MBTA
Sandhill Crane	<i>Grus canadensis</i>	bird				ES		Tier 3	BMC		MBTA
Common Nighthawk	<i>Chordeilus minor</i>	bird	MHAFB	SCR	JBR	ES		Tier 3			MBTA
Rufous Hummingbird	<i>Selasporus rufus</i>	bird	MHAFB						BMC	SCC	MBTA
Loggerhead Shrike	<i>Lanius ludovicianus</i>	bird	MHAFB	SCR	JBR	ES			BMC		MBTA
Brewer's Sparrow	<i>Spizella breweri</i>	bird	MHAFB	SCR	JBR	ES			BMC		MBTA
Bald Eagle	<i>Haliaeetus leucocephalus</i>	bird	MHAFB						BMC		MBTA
Swainson's Hawk	<i>Buteo swainsoni</i>	bird	MHAFB	SCR	JBR	ES			BMC		MBTA
Vesper Sparrow	<i>Pooecetes gramineus</i>	bird	MHAFB	SCR	JBR	ES			BMC		MBTA
Lesser Yellowlegs	<i>Tringa flavipes</i>	bird				ES			BMC		MBTA
Mourning Dove	<i>Zenaida macroura</i>	bird	MHAFB	SCR	JBR	ES			BMC		MBTA

Common Name	Scientific Name	Type	MHAFB	SCR	JBR	ES	BLM	SGCN	USFWS	PIF	MBTA
Sharp-Shinned Hawk	<i>Accipiter striatus</i>	bird		SCR					BMC		MBTA
Marsh Wren	<i>Cistothorus palustris</i>	bird		SCR					BMC		MBTA
Chukar	<i>Alectoris chukar</i>	bird				ES					
Red-Tailed Hawk	<i>Buteo jamaicensis</i>	bird	MHAFB	SCR	JBR	ES					MBTA
Rough-Legged Hawk	<i>Buteo lagopus</i>	bird	MHAFB	SCR	JBR	ES					MBTA
Willet	<i>Catoptrophorus semipalmatus</i>	bird				ES					MBTA
Northern Harrier	<i>Circus cyaneus</i>	bird	MHAFB	SCR	JBR	ES					MBTA
Northern Flicker	<i>Colaptes auratus</i>	bird	MHAFB	SCR	JBR	ES					MBTA
Common Raven	<i>Corvus corax</i>	bird	MHAFB	SCR	JBR	ES					MBTA
Tundra Swan	<i>Cygnus columbianus</i>	bird	MHAFB			ES					MBTA
Horned Lark	<i>Eremophila alpestris</i>	bird	MHAFB	SCR	JBR	ES					MBTA
Prairie Falcon	<i>Falco mexicanus</i>	bird	MHAFB	SCR	JBR	ES					MBTA
American Kestrel	<i>Falco sparverius</i>	bird	MHAFB	SCR	JBR	ES					MBTA
Black-necked Stilt	<i>Himantopus mexicanus</i>	bird				ES					MBTA
Dark-Eyed Junco	<i>Junco hyemalis</i>	bird	MHAFB	SCR	JBR	ES					MBTA
Short-billed Dowitcher	<i>Limnodromus griseus</i>	bird				ES					MBTA
Western Screech-owl	<i>Megascops kennicottii</i>	bird		SCR		ES					MBTA
Savannah Sparrow	<i>Passerculus sandwichensis</i>	bird				ES					MBTA
Black-Billed Magpie	<i>Pica hudsonia</i>	bird	MHAFB	SCR	JBR	ES					MBTA
Western Meadowlark	<i>Sturnella neglecta</i>	bird	MHAFB	SCR	JBR	ES					MBTA
European Starling	<i>Sturnus vulgaris</i>	bird	MHAFB	SCR	JBR	ES					
American Robin	<i>Turdus migratorius</i>	bird	MHAFB	SCR	JBR	ES					MBTA
Western Kingbird	<i>Tyrannus verticalis</i>	bird	MHAFB	SCR	JBR	ES					MBTA
White-Crowned Sparrow	<i>Zonotrichia leucophrys</i>	bird	MHAFB	SCR	JBR	ES					MBTA
Spotted Sandpiper	<i>Actitis macularia</i>	bird	MHAFB								MBTA

Common Name	Scientific Name	Type	MHAFB	SCR	JBR	ES	BLM	SGCN	USFWS	PIF	MBTA
Red-Winged Blackbird	<i>Agelaius phoeniceus</i>	bird		SCR							MBTA
Northern Pintail	<i>Anas acuta</i>	bird	MHAFB								MBTA
American Widgeon	<i>Anas americana</i>	bird	MHAFB	SCR							MBTA
Northern Shoveler	<i>Anas clypeata</i>	bird	MHAFB								MBTA
Green-Winged Teal	<i>Anas crecca</i>	bird		SCR							MBTA
Cinnamon Teal	<i>Anas cyanoptera</i>	bird	MHAFB								MBTA
Blue-Winged Teal	<i>Anas discors</i>	bird	MHAFB								MBTA
Mallard Duck	<i>Anas platyrhynchos</i>	bird	MHAFB	SCR							MBTA
Gadwall	<i>Anas strepera</i>	bird	MHAFB								MBTA
Black-Chinned Hummingbird	<i>Archilochus alexandri</i>	bird	MHAFB								MBTA
Ruby-Throated Hummingbird	<i>Archilochus colubris</i>	bird	MHAFB								MBTA
Lesser Scaup	<i>Aythya affinis</i>	bird	MHAFB								MBTA
Redhead	<i>Aythya americana</i>	bird	MHAFB								MBTA
Cedar Waxwing	<i>Bombycilla cedrorum</i>	bird	MHAFB								MBTA
Canada Goose	<i>Branta Canadensis</i>	bird	MHAFB								MBTA
Great Horned Owl	<i>Bubo virginianus</i>	bird	MHAFB		JBR						MBTA
Bufflehead	<i>Bucephala albeola</i>	bird	MHAFB								MBTA
Common Goldeneye	<i>Bucephala clangula</i>	bird	MHAFB								MBTA
California Quail	<i>Callipepla californica</i>	bird	MHAFB	SCR							MBTA
Pine Siskin	<i>Carduelis pinus</i>	bird	MHAFB								MBTA
American Goldfinch	<i>Carduelis tristis</i>	bird	MHAFB								MBTA
House Finch	<i>Carpodacus mexicanus</i>	bird	MHAFB								MBTA
Turkey Vulture	<i>Cathartes aura</i>	bird		SCR	JBR						MBTA
Killdeer	<i>Charadrius vociferous</i>	bird	MHAFB	SCR							MBTA
Lark Sparrow	<i>Chondestes grammacus</i>	bird	MHAFB	SCR							MBTA

Common Name	Scientific Name	Type	MHAFB	SCR	JBR	ES	BLM	SGCN	USFWS	PIF	MBTA
Rock Dove	<i>Columba livia</i>	bird	MHAFB								
Western Wood Pewee	<i>Contopus sordidulus</i>	bird	MHAFB								MBTA
American Crow	<i>Corvus brachyrhynchos</i>	bird	MHAFB								MBTA
Yellow-Rumped Warbler	<i>Dendroica coronata</i>	bird		SCR							MBTA
Yellow Warbler	<i>Dendroica petechia</i>	bird	MHAFB								MBTA
Hammond's Flycatcher	<i>Empidonax hammondi</i>	bird	MHAFB								MBTA
Gray Flycatcher	<i>Empidonax wrightii</i>	bird			JBR						MBTA
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	bird	MHAFB	SCR							MBTA
Merlin	<i>Falco columbarius</i>	bird		SCR							MBTA
Gyr Falcon	<i>Falco rusticolus</i>	bird		SCR							MBTA
American Coot	<i>Fulica americana</i>	bird	MHAFB	SCR							MBTA
Barn Swallow	<i>Hirundo rustica</i>	bird	MHAFB								MBTA
Bullock's Oriole	<i>Icterus bullockii</i>	bird	MHAFB		JBR						MBTA
Song Sparrow	<i>Melospiza melodia</i>	bird			JBR						MBTA
Brown-Headed Cowbird	<i>Molothrus ater</i>	bird	MHAFB		JBR						MBTA
Ruddy Duck	<i>Oxyura jamaicensis</i>	bird	MHAFB								MBTA
House Sparrow	<i>Passer domesticus</i>	bird	MHAFB								MBTA
Fox Sparrow	<i>Passerella iliaca</i>	bird			JBR						MBTA
Lazuli Bunting	<i>Passerina amoena</i>	bird	MHAFB								MBTA
Gray Partridge	<i>Perdix perdix</i>	bird		SCR							
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	bird		SCR	JBR						MBTA
Common Poorwill	<i>Phalaenoptilus nuttallii</i>	bird			JBR						MBTA
Wilson's Phalarope	<i>Phalaropus tricolor</i>	bird	MHAFB								MBTA
Ring-Necked Pheasant	<i>Phasianus colchicus</i>	bird	MHAFB								
Black-headed Grosbeak	<i>Pheucticus melanocephus</i>	bird	MHAFB								MBTA

Common Name	Scientific Name	Type	MHAFB	SCR	JBR	ES	BLM	SGCN	USFWS	PIF	MBTA
Spotted Towhee	<i>Pipilo maculatus</i>	bird		SCR							MBTA
Western Tanager	<i>Piranga ludoviciana</i>	bird	MHAFB								MBTA
Black-Capped Chickadee	<i>Poecile atricapillus</i>	bird	MHAFB								MBTA
Mountain Chickadee	<i>Poecile gambeli</i>	bird		SCR							MBTA
American Avocet	<i>Recurvirostra americana</i>	bird	MHAFB								MBTA
Bank Swallow	<i>Riparia riparia</i>	bird	MHAFB								MBTA
Rock Wren	<i>Salpinctes obsoletus</i>	bird	MHAFB		JBR						MBTA
Say's Phoebe	<i>Sayornis saya</i>	bird			JBR						MBTA
Broad-Tailed Hummingbird	<i>Selasphorus platycercus</i>	bird	MHAFB								MBTA
Mountain Bluebird	<i>Sialia currucoides</i>	bird		SCR							MBTA
Western Bluebird	<i>Sialia mexicana</i>	bird		SCR							MBTA
Red-Breasted Nuthatch	<i>Sitta canadensis</i>	bird	MHAFB								MBTA
Chipping Sparrow	<i>Spizella passerina</i>	bird	MHAFB		JBR						MBTA
Calliope Hummingbird	<i>Stellula calliope</i>	bird	MHAFB								MBTA
Eurasian Collared Dove	<i>Streptopelia decaocto</i>	bird	MHAFB								
Barn Owl	<i>Tyto alba</i>	bird	MHAFB								MBTA
Yellow-Headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	bird	MHAFB								MBTA
Colorado Fairy Shrimp	<i>Branchinecta coloradensis</i>	invertebrate		SCR							
Silver-Haired Bat	<i>Lasionycteris noctivagans</i>	mammal	MHAFB				Type 2	Tier 2			
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	mammal		SCR?			Type 2	Tier 3			
Western Small-Footed Myotis	<i>Myotis ciliolabrum</i>	mammal		SCR	JBR		Type 2	Tier 3			
Little Brown Bat	<i>Myotis lucifugus</i>	mammal	MHAFB		JBR		Type 2	Tier 3			
Kit Fox	<i>Vulpes macrotis</i>	mammal			JBR	ES	Type 2				
Big Brown Bat	<i>Eptesicus fuscus</i>	mammal	MHAFB				Type 2				
Long-Eared Myotis	<i>Myotis evotis</i>	mammal	MHAFB	SCR			Type 2				

Common Name	Scientific Name	Type	MHAFB	SCR	JBR	ES	BLM	SGCN	USFWS	PIF	MBTA
Yuma Myotis	<i>Myotis yumanensis</i>	mammal	MHAFB	SCR			Type 2				
Western Pipistrelle	<i>Pipistrellus hesperus</i>	mammal		SCR	JBR		Type 2				
Piute Ground Squirrel	<i>Urocitellus mollis</i>	mammal	MHAFB	SCR			Type 2				
Coyote	<i>Canis latrans</i>	mammal	MHAFB	SCR	JBR	ES					
Ord's Kangaroo Rat	<i>Dipodomys ordii</i>	mammal	MHAFB	SCR	JBR	ES					
Feral Horse	<i>Equus caballus</i>	mammal				ES					
Black-Tailed Jackrabbit	<i>Lepus californicus</i>	mammal	MHAFB	SCR	JBR	ES					
White-Tailed Jackrabbit	<i>Lepus townsendii</i>	mammal			JBR	ES					
Desert Woodrat	<i>Neotoma lepida</i>	mammal	MHAFB	SCR	JBR	ES					
Mule Deer	<i>Odocoileus hemionus</i>	mammal	MHAFB	SCR	JBR	ES					
Cougar	<i>Puma concolor</i>	mammal			JBR	ES					
Merriam's Ground Squirrel	<i>Spermophilus canus</i>	mammal				ES					
Mountain Cottontail	<i>Sylvilagus nuttallii</i>	mammal	MHAFB	SCR	JBR	ES					
American Badger	<i>Taxidea taxus</i>	mammal	MHAFB	SCR	JBR	ES					
Pronghorn Antelope	<i>Antilocapra americana</i>	mammal		SCR	JBR						
Elk	<i>Cervus canadensis</i>	mammal		SCR							
North American Porcupine	<i>Erethizon dorsatus</i>	mammal		SCR							
Sagebrush Vole	<i>Lemmyscus curtatus</i>	mammal		SCR	JBR						
Bobcat	<i>Lynx rufus</i>	mammal			JBR						
Yellow-Bellied Marmot	<i>Marmota flaviventris</i>	mammal			JBR						
Montane Vole	<i>Microtus montanus</i>	mammal	MHAFB		JBR						
Bushy-Tailed Woodrat	<i>Neotoma cinerea</i>	mammal	MHAFB	SCR							
Feral Rabbit	<i>Oryctolagus cuniculus</i>	mammal	MHAFB								
Great Basin Pocket Mouse	<i>Perognathus parvus</i>	mammal	MHAFB	SCR							
Deer Mouse	<i>Peromyscus maniculatus</i>	mammal	MHAFB								

Common Name	Scientific Name	Type	MHAFB	SCR	JBR	ES	BLM	SGCN	USFWS	PIF	MBTA
Raccoon	<i>Procyon lotor</i>	mammal	MHAFB								
Fox Squirrel	<i>Sciurus niger</i>	mammal	MHAFB								
Vagrant Shrew	<i>Sorex vagrans</i>	mammal	MHAFB								
Least Chipmunk	<i>Tamias minimus</i>	mammal			JBR						
Northern Pocket Gopher	<i>Thomomys talpoides</i>	mammal		SCR	JBR						
Red Fox	<i>Vulpes vulpes</i>	mammal	MHAFB								
Striped Whipsnake	<i>Masticophis taeniatus</i>	reptile				ES					
Western Fence Lizard	<i>Sceloporus occidentalis</i>	reptile	MHAFB	SCR	JBR	ES					
Common Gartersnake	<i>Thamnophis sirtalis</i>	reptile	MHAFB	SCR	JBR	ES					
Western Whiptail	<i>Aspidoscelis tigris</i>	reptile	MHAFB	SCR							
Western Yellow-Bellied Racer	<i>Coluber constrictor</i>	reptile			JBR						
Western Rattlesnake	<i>Crotalus viridis</i>	reptile	MHAFB		JBR						
Western Skink	<i>Eumeces skiltonianus</i>	reptile		SCR							
Longnose Leopard Lizard	<i>Gambelia wislizenii</i>	reptile		SCR							
Short-Horned Lizard	<i>Phrynosoma douglasii</i>	reptile		SCR							
Desert Horned Lizard	<i>Phrynosoma platyrhinos</i>	reptile		SCR							
Gopher Snake	<i>Pituophis catenifer</i>	reptile	MHAFB	SCR							
Sagebrush Lizard	<i>Sceloporus graciosus</i>	reptile	MHAFB								
Side-blotched Lizard	<i>Uta stansburiana</i>	reptile		SCR							

BLM = Bureau of Land Management; ES = Emitter Sites; JBR = Juniper Butte Range; MBTA = Migratory Bird Treaty Act; MHAFB = Mountain Home Air Force Base; PIF = Partners in Flight; SCR = Saylor Creek Range; SGCN = species of greatest conservation need; USFWS = United States Fish and Wildlife Service

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