

APPENDIX G HERBICIDES, TRADE NAMES, AND TARGET SPECIES

HERBICIDES, TRADE NAMES, AND TARGET SPECIES

Table G – 1 contains a list of herbicides, a partial list of trade names, and associated targeted species addressed in this analysis. Table G – 2 outlines a Quick Guide for Treatment Methods by Species (a more detailed treatment by species can be found in Appendix I). Table G – 3 provides a quick guide to herbicide properties.

All herbicides will be applied according to label specification and protection measures required by Forest Service policy as described in this analysis (see Appendix C). Impacts on soil and water will be mitigated to meet public land water laws, state pesticide application requirements, Northern Region Soil and Water Standards, and Custer Forest Plan Standards.

One feature of the proposed action is the flexibility to use updated agents as they are registered and approved by the EPA. See Appendix E.

TABLE G – 1. EPA REGISTERED HERBICIDES AVAILABLE FOR CONTROL¹

Common Name	Partial List of Trade Names	Target Weed Species (general)
2,4-D*	Hi-Dep®, Weedar 64®, Weed RHAP®, Amine 4®, Aqua-Kleen (Amines)	Foliage applied. Selective. Some broadleaf, woody and aquatic plants susceptible. Thistles, sulfur cinquefoil, dyers woad, knapweeds, purple loosestrife, tall buttercup, whitetop
Aminopyralid	Milestone	Foliage applied. Selective. Many broadleaf weeds. Tolerated by most grasses. Perennial and biennial thistles, knapweeds, sulfur cinquefoil
Chlorsulfuron	Telar®	Foliage applied. Selective. Some broadleaf plants and grasses susceptible. Dyer's woad, thistles, common tansy, houndstongue, whitetop, tall buttercup, toadflax
Clopyralid	Stringer®, Curtail®, Transline®, Redeem®	Foliage applied. Selective. Many broadleaf and woody species susceptible. Thistles, yellow starthistle, hawkweeds, knapweeds, rush skeletonweed, oxeye daisy
Dicamba	Banvel®, Clarity®, others	Foliage applied. Selective. Some broadleaf plants, brush and vines susceptible. Houndstongue, yellow starthistle, common crupina, hawkweed, oxeye daisy, tall buttercup, blueweed, leafy spurge, tansy ragwort, knapweeds
Diuron	Diuron 4L	Applied pre- or post-emergence. Broad spectrum. Most annual and perennial broadleaf plants, grasses and some woody vegetation. Annual weeds and broadleaves for infrastructure maintenance needs such as right-of-ways
Glyphosate	Roundup®, Rodeo®, Accord®, Glyphomate®	Foliage applied. Nonselective. Most plants are susceptible. Broad spectrum for broadleaf plants and grasses. Purple loosestrife, field bindweed, yellow starthistle, thistles, cheatgrass, common crupina, toadflax
Hexazinone	Velpar®, Pronone 10G®	Broad spectrum control with some selectivity for conifers. Cheatgrass, oxeye daisy, yellow starthistle, thistles
Imazapic	Plateau®	Foliage applied. Selective. Some broadleaf plants and grasses susceptible. Cheatgrass, leafy spurge, toadflax
Imazapyr	Arsenal®, Chopper®	Applied pre- or post-emergence. Broad spectrum. Most annual and perennial broadleaf plants, grasses and woody vegetation. Dyers woad, field bindweed
Methsulfuron methyl	Escort, Ally	Applied pre- or post-emergence. Selective. Some broadleaf weeds and annual grasses. Houndstongue, thistle, sulfur cinquefoil, common crupina, dyers woad, purple loosestrife, common tansy, whitetop, blueweed
Picloram*	Tordon®, Grazon®, Pathway®	Foliage applied. Selective. Most annual and perennial broadleaf and woody plants are susceptible. Grasses are tolerant. Thistles, yellow starthistle, common crupina, hawkweeds, knapweeds, rush skeleton weed, common tansy, toadflax, leafy spurge
Sulfometuron methyl	Oust®	Applied pre- or post-emergence. Broad spectrum. Many annual and perennial grasses and broadleaf plants. Woody vegetation tolerant. Cheatgrass, whitetop, oxeye daisy, tansy ragwort, musk thistle
Triclopyr	Garlon®, Redeem®, Remedy®	Foliage applied. Selective. Woody plants, some broadleaf plants, and root-sprouting species are susceptible. Grasses are tolerant. Hawkweed, sulfur cinquefoil, purple loosestrife, knapweed, oxeye daisy, thistle

¹ EPA Registered Herbicides Available for Control under Proposed Action - Alternative 1 (Alternative 3 Proposes Using Only 2, 4-D, Picloram, Dicamba, and Glyphosate). Ammonium sulfate, an adjuvant, can also be effective as an herbicide on tall larkspur.

APPENDIX G HERBICIDES, TRADE NAMES, AND TARGET SPECIES

TABLE G – 2. QUICK GUIDE FOR TREATMENT METHODS BY SPECIES^{2,3}

(See Appendix I for Detailed Information)

Noxious Weed (Known)	Treatment Method				
	Biological	Herbicide ⁴	Grazing	Mechanical ⁵	Fire
Leafy Spurge	Flea beetles (<i>Apthona nigriscutis</i> , <i>A. lacertosa</i> , <i>A. czwalinae</i> , <i>A. adominalis</i> , <i>A. cyparissiae</i> , <i>A. flava</i>) long-horned beetle (<i>Oberea erythrocephala</i>), gall midge (<i>Spurgia esulae</i>), Leafy spurge hawkmoth (<i>Hyles euphorbiae</i>)	picloram+ dichlorophenoxyacetic (2, 4-D), imazapic, dicamba, glyphosate, 2,4-D, sulfometuron methyl.	Sheep or goat grazing	Hand pulling	In combination with other treatments
Spotted knapweed	Root weevil (<i>Cyphocleonus achates</i>), knapweed root moth (<i>Agapeta zoegana</i>), knapweed flower weevils (<i>Larinus minutus</i> and <i>Larinus obtusus</i>), etc.	aminopyralid, triclopyr, clopyralid, picloram, clopyralid +2, 4-D		Hand Pulling	
Russian knapweed		aminopyralid, triclopyr, clopyralid, imazapic Metsulfuron methyl, clopyralid +2, 4-D		Hand Pulling	
Canada thistle	Thistle stem weevil (<i>Ceutorynchus litura</i>) thistle stem gall fly (<i>Urophora cardui</i>)	aminopyralid, clopyralid +2, 4-D, picloram, picloram+2, 4-D, triclopyr, 2,4-D clopyralid, imazapic		Mowing	In combination with other treatments
Saltcedar	<i>Diorhabda elongata</i> (leaf beetle)	imazapyr, imazapyr+ glyphosate, triclopyr		Cutting	In combination with other treatments
Absinth wormwood		picloram, clopyralid +2, 4-D, triclopyr, clopyralid, dicamba, 2,4-D, glyphosate		Mowing	
Musk thistle	Thistle crown weevil (<i>Trichosirocalus horridus</i>)	aminopyralid, picloram, clopyralid, triclopyr, metsulfuron methyl, dicamba+2,4-D			
Whitetop		imazapic, metsulfuron methyl, 2,4-D			
Houndstongue		picloram, 2, 4-D, imazapic, metsulfuron methyl		Hand Pulling	
Black henbane		picloram, glyphosate			
Plumeless thistle	Thistle crown weevil (<i>Trichosirocalus horridus</i>)	aminopyralid, picloram, clopyralid, metsulfuron methyl, triclopyr, dicamba+2,4-D		Mowing	
Bull thistle	Thistle crown weevil (<i>Trichosirocalus horridus</i>)	aminopyralid, picloram, clopyralid, metsulfuron methyl, triclopyr, dicamba+2,4-D		Mowing	
Perennial sow-thistle		2,4-D, dicamba, picloram		Mowing	
Field bindweed		2,4-D, dicamba, picloram, clopyralid, dicamba+2,4-D,		Hand Pulling	
Common Burdock		2,4-D, dicamba, imazapic, clopyralid, triclopyr, clopyralid +2, 4-D,		Hand Pulling	
Purple loosestrife	Leaf feeding beetle (<i>Galerucella pusilla</i> , <i>G. californiensis</i>), Root mining weevil (<i>Hyllobius transversovitatus</i>)	triclopyr, glyphosate, imazapyr, 2, 4-D (water soluble), glyphosate, imazapyr		Hand Pulling	
E. watermilfoil		triclopyr, 2, 4-D (water soluble)			
Dalmatian toadflax	Biocontrol agents for this species can be effective in some locations	picloram+2, 4-D, imazapic, chloresulfuron			
Yellow toadflax		picloram+2, 4-D,			
St. Johnswort		picloram, picloram +2, 4-D			
Yellow starthistle	Biocontrol agents for this species can be somewhat effective in some locations	picloram, triclopyr, clopyralid, imazapyr, clopyralid +2, 4-D		Hand Pulling	
Diffuse knapweed	Biocontrol agents for this species are effective	aminopyralid, clopyralid, triclopyr, picloram, imazapic, dicamba, clopyralid +2, 4-D		Hand Pulling	
Paved Road Maintenance		diuron, diuron + sulfometuron methyl			

² Prevention and Education are not identified in the table; however, they are an ongoing part of the control of all noxious weeds.

³ Revegetation would likely be used in any situation where control of a noxious weed has resulted in the creation of bare ground patches greater than a quarter of an acre.

⁴ Herbicide selection would be based on environmental conditions such as groundwater depth, soil type, non-target vegetation, and management objectives. Herbicide selection considers the following criteria: Herbicide label considerations; Herbicide effectiveness on target species; Proximity to water and other sensitive resources; Soil characteristics; Potential unintended impacts to non-target species such as woody species or shrubs; Application method (aerial, ground, or wick applicator); Other weed species present at the site, and effectiveness of herbicides on those species (for example leafy spurge infestations with inclusions of Canada thistle); Timing of treatments (spring/fall); and Priority weed – new invaders vs. existing.

⁵ Hand pulling is a treatment that would generally be applied for small numbers of plants.

APPENDIX G HERBICIDES, TRADE NAMES, AND TARGET SPECIES

TABLE G – 3. QUICK GUIDE TO HERBICIDE PROPERTIES

Product Name	Active Ingredient(s)	Restricted ⁶	Signal ⁷	Human Health Findings				Persist - ence	Mobility	Bird	Fish	Bee	Wild - life
				Cancer ⁸	Repro ⁹	Neuro ¹⁰	Endo ¹¹						
Arsenal	imazapyr		Caution	Evidence of non-carcinogenicity				Mod	High				
Banvel	dicamba		Warning	Not Classifiable as a Carcinogen				Low	V High				
Confront	clopyralid; triclopyr		Danger	Not Likely to be carcinogenic (clopyralid) Not classified as a carcinogen (triclopyr)				Mod	V High				
Crossbow	triclopyr; 2,4-D		Caution	Not Classifiable as a Carcinogen			Prob	Low,- Mod	Low-Mod		Toxic		
Direx 4L	diuron		Caution	Known/Likely				Mod	Mod				
Envy2,4-D	2,4-D		Danger	Not Classifiable as a Carcinogen			Prob	Low	Low-Mod				
Escort	Metsulfuron methyl		Caution	Not Likely to be carcinogenic				Low - Mod	High				
Garlon 3A	Triclopyr (amine)		Danger	Not classified as a carcinogen				Mod	V High				
Garlon4	Triclopyr (ester)		Caution	Not classified as a carcinogen				Mod	Low		Toxic		
Karmex	diuron		Caution	Known/Likely				Mod	Mod				
Lontrel	clopyralid		Caution	Not Likely to be carcinogenic				Med	V High				
Low Vol 4D	2,4-D		Caution	Not Classifiable as a Carcinogen			Prob	Low	Low-Mod				
Milestone	aminopyralid		None	Not Likely to be carcinogenic									
Oust	sulfometuron methyl		Caution	Evidence of non-carcinogenicity				Low	Mod				
Pathfinder II	triclopyr		Caution	Not classified as a carcinogen				Mod	Low		Toxic		
Plateau	imazapic		Caution	Evidence of non-carcinogenicity				High	High				
Rodeo	glyphosate		Caution	Evidence of non-carcinogenicity				Mod	E Low				
Roundup (18% conc)	glyphosate		Caution	Evidence of non-carcinogenicity				Mod	E Low				
Roundup Pro	glyphosate		Caution	Evidence of non-carcinogenicity				Mod	E Low				
Scotts 30-5-5 wConfront	triclopyr; clopyralid		Warning	Not Likely to be carcinogenic (clopyralid) Not classified as a carcinogen (triclopyr)				Mod	V High				
Telar	Chlorsulfuron 75%		Caution	Evidence of non-carcinogenicity				Mod	High				
Topsite	imazapyr; diuron		Caution	Known/Likely (diuron)				Mod	High				
Tordon 22K	picloram	Restricted	Caution	Evidence of non-carcinogenicity				Mod	V High				
Transline	clopyralid		Caution	Not Likely to be carcinogenic				Mod	V High				
Vanquish	dicamba		Caution	Not Classifiable as a Carcinogen				Low	V High				
Velpar	hexazinone		Danger	Not Classifiable as a Carcinogen				Mod	V High				
Weedar 64	2,4-D		Danger	Not Classifiable as a Carcinogen			Prob	Low	Mod				

⁶ **Restricted.** A Restricted Use Pesticide is a pesticide that is available for purchase and use only by certified pesticide applicators or persons under their direct supervision. This designation is assigned to a pesticide product because of its relatively high degree of potential human and/or environmental hazard even when used according to label directions.

⁷ **Signal Word.** The herbicide label indicates the extent of toxicity by the signal word(s) it carries. The signal word on the label applies to the most serious method or route of exposure. For example, if a herbicide has an acute oral LD50 of 368 (which triggers the signal word "Warning") and an acute dermal LD50 of >2,000 (which triggers "Caution") and is severely and irreversibly corrosive to the eyes (which warrants "Danger"), then the label signal word is "Danger."

⁸ The EPA evaluates carcinogenicity (cancer), neurotoxicity, reproductive, teratology (birth defects), and mutagenicity (gene mutation) study results of herbicide effects to animals during the herbicide registration and re-registration processes. The study data is used to make inferences relative to human health.

Cancer column. When assessing possible cancer risk posed by a pesticide, EPA considers how strongly carcinogenic the chemical is (its potency) and the potential for human exposure. The pesticides are evaluated not only to determine if they cause cancer in laboratory animals, but also as to their potential to cause human cancer. For any pesticide classified as a potential carcinogen, the risk would depend on the extent to which a person might be exposed (how much time and to what quantity of the pesticide). The factors considered include short-term studies, long-term cancer studies, mutagenicity studies, and structure activity concerns. (The term "weight-of-the-evidence" is used in referring to such a review. This means that the recommendation is not based on the results of one study, but on the results of all studies that are available.). Diuron is a likely or known carcinogen. However, the EPA's 2002 re-registration assessment of the human and environmental scientific data reinforces a number of regulatory decisions and expert reviews that conclude the use of diuron according to product instructions does not present an unacceptable risk to human health or the environment.

⁹ **Reproductive column.** EPA Registration / re-registration studies for the herbicides addressed in this analysis did not indicate any reproductive issues.

¹⁰ **Neurotoxicity column.** EPA Registration / re-registration studies for the herbicides addressed in this analysis did not indicate any neurotoxicity issues.

¹¹ **Endocrine disruption column.** EPA Registration / re-registration studies for the herbicides addressed in this analysis did not indicate any reproductive issues except for probable issues for 2, 4-D. Based on currently available toxicity data, which demonstrate effects on the thyroid and gonads in test animals following exposure to 2, 4-D, there is concern regarding its endocrine disruption potential. There have been no studies on 2, 4-D that specifically assess its endocrine disruption potential. The EPA determined that a repeat 2-generation reproduction study is required to address these concerns. However, the EPA's 2005 re-registration assessment of the human and environmental scientific data reinforces a number of regulatory decisions and expert reviews that conclude the use of 2, 4-D according to product instructions does not present an unacceptable risk to human health or the environment.

**APPENDIX G
HERBICIDES, TRADE NAMES, AND TARGET SPECIES**

- End of Appendix G -