



Chemical Weed and Brush Control for New Mexico Rangelands

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Chemical Weed and Brush Control for New Mexico Rangelands

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Noxious woody and weedy plants inhabit much of New Mexico's rangelands. Dense stands of brush and weeds use vast quantities of water, reduce forage production and contribute to erosion. If rangelands are to reach their productive potential, noxious plants need to be managed effectively. Herbicides are effective, economical and efficient methods for controlling brush and weeds and improving and maintaining rangelands.

This circular lists current suggestions for herbicides to control woody and herbaceous weeds on rangeland. Some herbicides provide a high degree of control of certain species and a reduced degree of control of other species. However, seldom is a species eradicated. When developing a woody and herbaceous weed management program, consider all possible rangeland uses. Many woody plants and forbs are valuable sources of food and cover for wildlife and can also be important to livestock operations. A woody and herbaceous weed management program should use control methods that provide optimum benefits to both livestock and wildlife.

Herbicides are effective and safe when they are used properly (Appendix A). Misuse can result in poor woody and herbaceous weed control, increased expense, possible hazards from herbicidal drift or residues that damage or kill desirable

plants. Use the following guidelines for proper herbicide use:

- Correctly identify the plant species and evaluate the need for control.
- Consider the expected benefits and costs of herbicide and alternative control practices, as well as alternative uses of funds.
- Select and purchase the appropriate herbicide for the plant species.
- Provide and require proper safety equipment.
- Calibrate spray equipment to correctly apply the desired rate.
- Mix herbicides in a well-ventilated area, preferably outside.
- Spray under conditions that minimize drift.
- Read and follow instructions on the label.
- Keep a record of the herbicide used, time of application, weather conditions, rate of herbicide applied, date, location and applicator.

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For successful weed control, the correct quantity of herbicide mixture must be applied to a specific area. To calibrate spray equipment, see NMSU Cooperative Extension Service publications on calibrating pesticide applicators. For information about procedures for obtaining a pesticide applicator's license and other information about applying herbicides properly, contact your county Extension office.

The following suggestions for using herbicides are based upon their effectiveness under New Mexico conditions. Broadcast and individual plant treatments are presented in Table 1. Individual plant treatments are best suited for controlling thin stands of brush (usually less than 150 plants/acre) and for selective control. Broadcast treatments are useful for dense stands of target weed(s).

Suggested herbicides must be registered and labeled for use by the Environmental Protection Agency. Some of the suggested herbicides are restricted-use pesticides and require an applicator's license for purchase and use. **Because the status of herbicide label clearance is subject to change, be certain to use a current label for the herbicide's intended use.**

The user is always responsible for the effects of herbicide residue on livestock and crops, as well as for problems that arise from drift or other herbicide movement from the user's property to that of others.

The label is a legal document and violation of it is a federal offense.

Always read and follow carefully the instructions on the container label. Especially note any grazing restrictions that apply to the herbicide.

Table 1. Herbicides for controlling undesirable brush and weeds on rangelands.

Plant controlled	Trade name and product rate/acre	Herbicide common name and active ingredient	Spray volume per acre or individual plant	Time of application	Remarks
African Rue	Arsenal 3 pt	Imazapyr 3/4 lb	10 to 25 gal for ground broadcast.	Spray only actively growing plants.	Caution: Arsenal and Velpar L will damage or kill any other sprayed vegetation.
	OR Velpar L 2 ml/plant	Hexazinone	Individual plant treatment.	Anytime of year.	
Bindweed, Field	Banvel 1 pt to 1 qt	Dicamba 1/2 to 1 lb	10 to 25 gal for ground broadcast application. Use surfactant as per label.	Summer fallow prior to planting and when weeds are actively growing or in late summer or fall prior to killing frost or post-bloom. Follow-up applications should be made in spring to control seedlings.	For suppression, refer to label for crop rotation restrictions.
	OR Clarity, Overdrive 4 to 8 oz	Dicamba: diflufenzopyr (5:2 mixture) 1/4 to 1/2 lb			
	OR Weedmaster 1 pt to 1 qt	OR Dicamba: 2,4-D (1:3 mixture) 1/2 to 1 lb			
	OR Tordon 22K** 1 to 2 qt	OR Picloram 1/2 to 1 lb			
	Paramount 5 to 8 oz	Quinlorac 1/4 to 3/8 lb	10 to 25 gal for ground broadcast. Add 1 to 2 pints MSO.		
	OR Roundup* 4 to 5 qt	OR Glyphosate 4 to 5 lb		Full bloom to early seed stage.	

* Formulated as 4 lb active ingredient per gallon product
 ** Restricted use product

Table 1. Herbicides for controlling undesirable brush and weeds on range lands.

Plant controlled	Trade name and product rate/acre	Herbicide common name and active ingredient	Spray volume per acre or individual plant	Time of application	Remarks
Bindweed, Field (continued)	OR Tank mix 1 qt Roundup + 1/2 pt Banvel, Clarity	OR Glyphosate 1 lb + dicamba 1/2 lb		Mid-to late-bloom.	
	OR Landmaster BW 3 1/5 pt	OR Glyphosate: 2,4-D (1: 1 1/4 mixture) 1 lb		Fallow or post harvest when bindweed has 10 inch runners.	
	OR 2,4-D* 2 to 3 qt	OR 2,4-D 2 to 3 lb		Bud stage or summer; follow in early August.	
Bitter sneezeweed, broomweed (annual or common), camphorweed, cocklebur, horehound, ragweed, sunflower, thistles, upright prairie coneflower, horsemint, pepperweed, buckwheat, knapweed, lakeweed, and others	2,4-D 1 pt to 1 qt	2,4-D 1/2 to 1 lb	2 to 4 gal water for aerial spray; 10 to 25 gal for ground broadcast application. Add surfactant as needed.	Spring weeds 4 to 6 inches high, before blooming, good growing conditions.	Use 2,4-D amine or low volatile ester. Do not spray near susceptible crops.
	OR Weedmaster 1 pt to 1 qt	OR Dicamba: 2,4-D (1:3 mixture) 1/2 to 1 lb			
	OR Tank mix 1/4 to 1/2 pt Banvel with 3/4 to 1 1/2 pt 2,4-D*	OR Dicamba: 1/8 to 1/4 lb + 2,4-D 3/8 to 3/4 lb			
	OR Grazon P+D 1 pt to 3 pt	OR Picloram: 2,4-D (1:2 mixture) 3/10 to 9/10 lb			
	OR Tank mix 1/4 to 3/4 pt Tordon 22K** with 1/2 to 1 1/2 pt 2,4-D	OR Picloram 1/16 to 3/16 lb + 2,4-D 1/4 to 3/4 lb			
	OR Ally, Escort 5/8 to 4/5 oz	OR Metsulfuron 3/8 to 1/2 oz			
Black Henbane	Tank mix Ally, Escort 1/2 oz + 3 qt 2,4-D	OR Metsulfuron 1/3 oz + 2,4-D 3 lb	10 to 25 gal for ground broadcast application. Use surfactant as per label.	Rosette to bloom.	Seedlings should be controlled the following year.
Broom snakeweed (perennial broomweed, turpentine weed)	Tordon 22K** 1 pt to 1 qt	Picloram 1/4 to 1/2 lb	2 to 4 gal water for aerial spray; 10 to 25 gal for ground broadcast application. Add surfactant as needed.	Fall, after full bloom, or spring when growing conditions are good.	Use drift control agent and add emulsifier to oil. Foliar sprays are recommended where broom snakeweed is the primary weed species.
	OR Tank mix 1 pt to 1 qt Tordon 22K** + 1 qt 2,4-D*	OR Picloram 1/4 to 1/2 lb + 1 lb 2,4-D			
	OR Grazon P+D 1 to 2 qt	OR Picloram: 2,4-D (1:4 mixture) 5/8 to 1 1/4 lb			

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Broom snakeweed (perennial broomweed, turpentine weed) (continued)	OR Weedmaster 1 1/2 to 2 qt	OR Dicamba: 2,4-D (1:3 mixture) 1 1/2 to 2 lb			
	OR Ally, Escort 5/8 to 4/5 oz	OR Metsulfuron 3/8 to 1/2 oz			
	OR Spike 20P 3 3/4 to 5 lb of pellets	OR Tebuthiuron 3/4 to 1 lb	Aerial broadcast.	Anytime during year. Optimum is prior to rainy season.	Do not use on clay loam, silty clay loam, sandy clay, silty clay or clay soils.
Bursage, skeletonleaf	2,4-D* 1 1/2 to 2 qt	2,4-D 1 1/2 to 2 lb	10 to 25 gal for ground broadcast application.	Without cultivation, spring and fall.	Treat after tillage when regrowth is 4 to 6 inches
	OR Tordon 22K** 2 qt	OR Picloram 1 lb	10 to 25 gal for ground broadcast application.	Fully leaved and actively growing.	
	OR Banvel, Clarity 1 to 2 qt	OR Dicamba 1 to 2 lb	10 to 25 gal for ground broadcast application.	Late summer and fall.	
Camelthorn	Ally, Escort 3/8 oz	Metsulfuron 1/4 oz	Individual plant treatment. Mix in 100 gal water, add 8 oz silicone surfactant.	Actively growing	Retreatment may be necessary.
	Arsenal 3/4 to 1 1/2 qt	Imazapyr 3/8 to 3/4 lb	Individual plant treatment. Mix in 100 gal water, add 8 oz silicone surfactant.	Actively growing	Retreatment may be necessary.
Catclaw mimosa, whitehorn acacia	Spike 20P 3 3/4 to 5 lb pellets	Tebuthiuron 3/4 to 1 lb	Aerial broadcast.	Anytime during year. Optimum is prior to rainy season.	Use only on sandy, loamy sand, or sandy loam soils.
	OR Tank mix 2 pt Tordon 22K** with 1 pt Remedy	OR Picloram 1/2 lb* Triclopyr 1/2 lb	2-4 gal oil-in-water emulsion as aerial spray (1 pt to 1 qt diesel oil in water to make 2-4 gal). 10 to 25 gal oil-in-water emulsion for ground broadcast (1/2 to 1 gal diesel oil-in-water to make 10-25 gal).	When leaves are fully expanded. Good growing conditions.	Do not spray near susceptible crops.
	OR Reclaim 2/3 pt to 2/3 qt	OR Clopyralid 1/4 to 1/2 lb			
	OR Tank mix 1/3 to 2/3 pt Reclaim with 1/4 to 1/2 pt Remedy	OR Clopyralid 1/8 to 1/4 lb + Triclopyr 1/8 to 1/4 lb			
	OR Spike 20P 1/4 to 1/2 oz per 3 ft of canopy diameter or height	OR Tebuthiuron 1/20 to 1/10 oz	Individual plant treatment.	Anytime during year. Optimum is prior to rainy season.	Do not apply to frozen or snowcovered ground. Distribute uniformly under canopy.
Catclaw acacia	Spike 20P 5 to 7 1/2 lb of pellets	Tebuthiuron 1 to 1 1/2 lb	Aerial broadcast.	Anytime during year. Optimum is prior to rainy season.	Use only on coarse-textured soils.

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Plant controlled	Trade name and product rate/acre	Herbicide common name and active ingredient	Spray volume per acre or individual plant	Time of application	Remarks
Catclaw acacia (continued)	OR Tank mix 2 pt Tordon 22K** with 1 pt Remedy	OR Picloram 1/2 lb + Triclopyr 1/2 lb	2-4 gal oil-in-water emulsion as aerial spray (1/2 to 1 gal diesel oil-in-water to make 2-4 gal). 10-25 oil-in-water emulsion for ground broadcast (1/2 to 1 gal diesel oil-in-water to make 10-25 gal).	When leaves are fully expanded. Good growing conditions.	Do not spray near susceptible crops.
	OR Spike 20P 1/4 to 1/2 oz per 3 ft of canopy diameter or height	OR Tebuthiuron 1/20 to 1/10 oz	Individual plant treatment.	Anytime during year. Optimum is prior to rainy season	Do not apply to frozen or snow-covered ground. Distribute uniformly under canopy.
Cattail, common	2,4-D* 6 qt per 100 gal water	2,4-D 6 lb per 100 gal water	Spray to wet with handheld equipment.	Before cattail heads appear	Reapplications necessary. Use surfactant as per label.
	OR Rodeo 5 3/4 to 7 1/2 pt	OR Glyphosate 2 7/8 to 3 3/4 lb		Early to full bloom	
	OR Habitat 2 qt	OR Imazapyr 1 lb	Broadcast	When plants are actively growing.	Use surfactant as per label.
	OR Habitat 1 gal	OR Imazapyr 2 lb	Mix in 100 gal water, spray to wet.		
Cholla, pricklypear	Tordon 22K** 4 to 6 ml per 3 ft of plant width (prickly pear) or plant height (cholla)	Picloram	Individual plant treatment.	Anytime during year. Optimum is prior to rainy season.	Apply within plant area (prickly pear) or at junction of stem and ground (cholla). Do not treat more than 25% of watershed. Herbicide is very slow acting. May take 2 to 3 years to show effect.
	OR Tordon 22K** 1 qt	OR Picloram 1/2 lb	2 to 4 gal water solution as aerial spray. 10 to 25 gal water solution as ground broadcast or individual plant treatment.	Anytime air temperature is above 60°F and has not been 32°F or below during the past 24 hours. For best results, spray when cacti are in bloom.	Do not spray near susceptible crops. Spray to wet.
	OR (cholla only) Velpar L 4 to 6 ml per 3 ft of plant height	OR Hexazinone	Individual plant treatment.	Anytime of year. Optimum is prior to rainy season.	Apply diluted Velpar L to soil surface at junction of stem and ground.
Crazyweed, silky or Lambert's; whitepoint locoweed; woolly loco	Tordon 22K** 1 qt	Picloram 1/2 lb	2 to 4 gal water for aerial spray. 10 to 25 gal for ground broadcast application. Add surfactant as per label.	When plants are actively growing and before seeds mature.	To prevent livestock poisoning, avoid grazing until plants are totally dry.
	OR Tank mix 1 qt Banvel, Clarity + 1 qt 2,4-D*	OR Dicamba 1 lb + 2,4-D 1 lb			

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Crazyweed, silky or Lambert's; whitepoint locoweed; woolly loco (continued)	OR Weedmaster 1 to 2 qt	OR Dicamba: 2,4-D (1:3 mixture) 1 to 2 lb			
	OR Ally, Escort 1/2 oz	OR Metsulfuron 3/10 oz			
	OR Grazon P+D 1 to 2 qt	OR Picloram: 2,4-D (1:4 mixture) 5/8 to 1 1/4 lb			
	OR Tank mix 1 to 2 qt Tordon 22K** with 1 1/2 to 3 pt 2,4-D*	OR Picloram 1/4 to 1/2 lb + 2,4-D 3/4 to 1 1/2 lb			
Creosotebush	Spike 20P 3 3/4 to 5 lb of pellets	Tebuthiuron 3/4 to 1 lb	Aerial broadcast.	Anytime during year. Optimum is prior to rainy season.	Use 1 lb rate when soils are loam, silt or sandy clay loam.
	OR Tordon 22K** 2-4 ml per 3 ft of canopy diameter	OR Picloram	Individual plant treatment.	Anytime of year. Optimum is prior to rainy season.	Distribute uniformly under canopy. Do not apply to frozen or snow-covered ground. Do not treat more than 25% of watershed.
	OR Velpar L 2-4 ml per 3 ft of canopy diameter	OR Hexazinone	Individual plant treatment.	Anytime of year. Optimum is prior to rainy season.	Apply undiluted Velpar L to soil surface within 3 ft of stem base. Use exact delivery handgun applicator. Do not use on clay soil. Do not apply to frozen or snow-covered ground.
	OR Spike 20P 1/4 to 1/2 oz per 3 ft of canopy diameter	OR Tebuthiuron	Individual plant treatment.	Anytime of year. Optimum is prior to rainy season.	Do not apply to frozen or snow-covered ground. Distribute pellets uniformly under canopy.
Dalmatian toadflax, Yellow toadflax	Telar 2 oz	Chlorsulfuron 1 1/2 oz	10-25 gal for ground broadcast. Add 0.25% v/v nonionic surfactant.	Actively growing in spring or fall.	See label.
	OR Tordon 22K** 1 to 2 qt	OR Picloram 1/2 to 1 lb		Through full bloom or to fall regrowth.	Especially effective after first killing frost.
Downy brome	Aatrex 1 to 2 pt	Atrazine 1/2 to 1 lb	10-25 gal for ground broadcast.	When desirable vegetation is dormant.	
	OR Gramoxone 26 oz	OR Paraquat 1/2 lb	Add 0.25% nonionic surfactant.		2 years successive treatments necessary.
	OR Oust 1 oz	OR Sulfometuron 3/4 oz		Late fall or winter.	See label.
	OR Roundup* 1/2 to 1 pt	OR Glyphosate 1/4 to 1/2 lb		After emergence and before seedset.	See label.
	OR Plateau 9 to 13 oz	OR Imazapic 1/7 to 1/5 lb	Add 1 qt /A MSO		See label.

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Plant controlled	Trade name and product rate/acre	Herbicide common name and active ingredient	Spray volume per acre or individual plant	Time of application	Remarks
Dyer's wood	2,4-D* 1 1/2 to 2 qt	2,4-D 1 1/2 to 2 lb	10-25 gal for ground broadcast.	Rosette stage.	Repeat treatments may be necessary.
	OR Ally, Escort 3/4 oz	OR Metsulfuron 4/10 oz	Add 0.25% v/v nonionic surfactant.	Actively growing plants.	
	OR Telar 1 oz	OR Chlorsulfuron 3/4 oz			
Goatgrass, jointed	Oust 1 3/10 oz	Sulfometuron 1 oz	10-25 gal for ground broadcast application or 2-4 gal for aerial broadcast.	Late fall or winter.	See label.
	OR Roundup 2 1/2 to 3 pt	OR Glyphosate 1 1/4 to 1 1/2 lb	Spot treatments.	When fully tillered.	For spot treatment.
Gumweed, curlycup	Ally, Escort 1 oz	Metsulfuron 3/5 oz	10 to 25 gal for ground broadcast or 2-4 gal for aerial broadcast. Add 0.25% v/v nonionic surfactant.	Early spring.	See label.
	OR 2,4-D* 2 qt	OR 2,4-D 2 lb			
	OR Tordon 22K** 1 pt	OR Picloram 1/4 lb			
	OR Grazon P+D 2 qt	OR Picloram: 2,4-D (1:2 mixture) 1 2/10 lb			
	OR Tank mix 1 pt Tordon 22K** with 1 qt 2,4-D*	OR Picloram 1/4 + 2,4-D 1 lb			
Halogeton	Ally, Escort 1 oz	Metsulfuron 6/10 oz	10-25 gal for ground broadcast. Add 0.25% v/v nonionic surfactant	Early spring with good growth.	
	OR 2,4-D* 2 qt	OR 2,4-D 2 lb			
Hoarycress, whitetop and related species	2,4-D* 2 qt	2,4-D 2 lb	10-25 gal for ground broadcast. Add 0.25% v/v nonionic surfactant	Before bud stage.	Repeat treatment may be necessary.
	OR Telar 1 oz	OR Chlorsulfuron 3/4 oz		Bud to early bloom.	See label.
	OR Ally, Escort 1 oz	OR Metsulfuron 3/5 oz		Bud to early bloom.	
Horsetail, smooth scouring rush	Telar 1 1/2 oz	Chlorsulfuron 1 1/8 oz	10-25 gal for ground broadcast. Add nonionic surfactant at 1 pt to 1 qt/100 gal spray solution.	Early spring.	See label.

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Horsetail, smooth scouring rush (continued)	OR Oust 1 1/2 oz	OR Sulfometuron 1 1/8 oz			
	OR MCPA (4EC) Ester 1 qt	OR 4,2-acetic acid 1 lb		Before cone heads appear.	Important to use the isooctylester formulation.
Houndstongue	2,4-D* 2 qt	2,4-D 2 lb	10-25 gal for ground broadcast. Add 0.25% v/v nonionic surfactant.	Early before bloom.	
	OR Ally, Escort 1 oz	OR Metsulfuron 3/5 oz		Before bolting.	See label.
	OR Plateau 13 oz	OR Imazapic 1/5 lb	Add MSO at 1 1/2 to 2 pt/acre.	Before bloom.	
Iris, Rocky Mountain	2,4-D* 2 qt	2,4-D 2 lb	10-25 gal for ground broadcast.	Early bloom stage.	Wet thoroughly.
Juniper (cedar)	Spike 20P 5 to 10 lb of pellets	Tebuthiuron 1 to 2 lb	Ground or aerial broadcast.	Anytime of year. Optimum is prior to rainy season.	Approved applicators. Use only on sand, loamy sand or sandy loam soils.
	OR Velpar L 4 to 6 ml per 3 ft of canopy height	OR Hexazinone	Individual plant treatment.	Anytime of year. Optimum is prior to rainy season.	Apply evenly around trees at dripline. Do not treat more than 25% of watershed. Do not apply to frozen or snow-covered ground. Treat trees under 9 ft.
	OR Tordon 22K** 4 to 6 ml per 3 ft of canopy height	OR Picloram			
Knapweed, diffuse and spotted	Tordon 22K** 1 1/2 pt	Picloram 3/8 lb	10-25 gal for ground broadcast. 3-4 gal for aerial broadcast. Add 0.25% v/v nonionic surfactant.	Rosette to mid-bolting.	
	OR Grazon P+D 2 to 3 qt	Picloram: 2,4-D (1:2 mixture) 1 1/4 to 1 7/8 lb			
	OR Tank mix 2 to 3 pt Tordon 22K** with 3 to 4 1/2 pt, 2,4-D*	OR Picloram 1/2 to 3/4 lb + 3 to 4 1/2 lb 2,4-D			
	OR 2,4-D* 2 qt	OR 2,4-D 2 lb		Early stage of flower stem elongation.	
	OR Tank mix 1 pt Banvel, Clarity with 1 qt 2,4-D*	OR Dicamba 1/2 lb + 1 lb 2,4-D	Add 0.25% v/v nonionic surfactant.	Rosette stage.	
	OR Curtail 2 to 3 qt	Clopyralid: 2,4-D (1:5 mixture) 1 1/5 to 1 4/5 lb	Add 0.25% v/v nonionic surfactant.	Rosette stage before bolting.	See label.

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Plant controlled	Trade name and product rate/acre	Herbicide common name and active ingredient	Spray volume per acre or individual plant	Time of application	Remarks
Knapweed, diffuse and spotted (continued)	OR Reclaim 1/3 to 1 1/3 pt	OR Clopyralid 1/8 to 1/2 lb			
Knapweed, Russian	Roundup* 4 4/5 qt	Glyphosate 4 4/5 lb	10-25 gal for ground broadcast.	Late bud to early flower.	Retreatment may be necessary.
	OR Tordon 22K** 1 to 2 qt	OR Picloram 1/2 to 1 lb		Early flower to frost.	
	OR Curtail 1 to 2 qt	Clopyralid: 2,4-D (1:5 mixture) 3/5 to 1 1/5 lb		Full bloom to frost.	See label.
	OR Reclaim 2/3 to 1 1/3 pt	OR Clopyralid 1/4 to 1/2 lb		Full bloom to frost.	
Larkspur, geyer	Ally, Escort 1.5 oz	Metsulfuron 9/10 oz	10-25 gal for ground broadcast. Add 0.25% v/v nonionic surfactant.	Rosette.	
	OR Tordon 22K** 1 1/2 to 2 pt	OR Picloram 3/8 to 1/2 lb		Rapidly growing.	
Larkspur, tall or duncecap	Ally, Escort 1.5 oz	Metsulfuron 9/10 oz	10-25 gal for ground broadcast. Add 0.25% v/v nonionic surfactant.	6 to 8 leaf stage; less than 8 inches tall.	
	OR Tordon 22K** 2 to 3 qt	OR Picloram 1 to 1 1/2 lb		Bud stage.	
Leafy spurge	Banvel, Clarity 2 qt	Dicamba 2 lb	10-25 gal for ground broadcast. Add 0.25% v/v nonionic surfactant.	Spring to early summer.	Retreatment is necessary.
	OR Tordon 22K** 1 to 3 pt	OR Picloram 1/2 to 1 1/2 lb			
	OR 2,4-D* 1 qt	OR 2,4-D 1 lb			
	OR Plateau 9 to 13 oz	OR Imazapic 1/7 to 1/5 lb	Add 1% v/v MSO.	Late summer through fall.	
Lotebush	Spike 20P 1/4 to 1/2 oz per 3 ft of canopy diameter or height	OR Tebuthiuron	Individual plant treatment.	Anytime of year. Optimum is prior to rainy season.	Do not apply to frozen or snow-covered ground. Distribute pellets uniformly under canopy.
	OR Velpar L 2-4 ml per 3 ft of canopy diameter or height, or 2-4 ml per inch of stem diameter	OR Hexazinone	Individual plant treatment.	Anytime of year. Optimum is prior to rainy season.	Apply diluted Velpar L to soil surface within 3 ft of stem base. Use exact delivery handgun applicator. Do not use on clay soils. Do not apply to frozen or snow-covered ground.

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Plant controlled	Trade name and product rate/acre	Herbicide common name and active ingredient	Spray volume per acre or individual plant	Time of application	Remarks
Mesquite, grassland	Remedy 1/2 to 1 pt	Triclopyr 1/4 to 1/2 lb	2 to 4 gal oil-in-water emulsion as aerial spray (1 pt to 1 qt diesel fuel oil and water to make 2 to 4 gal/acre). 10 to 25 gal oil-in-water emulsion (1/2 to 1 gal diesel fuel oil and water to make 20 to 25 gal/acre) as ground broadcast. Add surfactant as needed.	Spring to early summer, 40 to 90 days after bud break.	Apply only when soil moisture conditions are good and plants have full leaf cover of even-aged, undamaged leaves. Do not apply when mesquite plants are stressed from drought, frost, hail, wind or insects. Do not apply near susceptible crops.
	OR Reclaim 2/3 pt to 2/3 qt	OR Clopyralid 1/4 to 1/2 lb			
	OR Tank mix 2/3 pt to 1 pt Reclaim with 1/4 pt Remedy	OR Clopyralid 1/8 to 1/4 lb + Triclopyr 1/8 to 1/4 lb			
	OR Tank mix 1/3 to 2/3 pt Reclaim with 1/2 to 1 pt Tordon 22K	Clopyralid 1/8 to 1/4 lb + Picloram 1/8 to 1/4 lb			
	OR Remedy 3 pt	OR Triclopyr 1 1/2 lb per 100 gal water	Individual plant treatment.	Spring to early summer, 40 to 90 days after bud break.	Spray must cover all parts.
	OR Velpar L 4 to 6 ml per 3 ft of canopy diameter or height, or 2-4 ml per inch of stem diameter	OR Hexazinone	Individual plant treatment.	Anytime of year. Optimum is prior to rainy season.	Apply undiluted Velpar L to soil surface within 3 ft of stem base. Use exact delivery handgun applicator. Do not use on frozen or snow-covered ground.
Mesquite, mixed brush (catclaw, tarbush, whitehorn, creosote-bush, broom snake-weed, wolfberry)	Spike 20P 3 3/4 to 7 1/2 lb of pellets	Tebuthiuron 3/4 to 1 1/2 lb	Aerial broadcast.	Anytime of year. Optimum is prior to rainy season.	Low rate may be used on sand or loamy sand soils.
	OR Tank mix 1/2 to 1 pt Banvel with 1/2 to 1 pt Remedy	OR Dicamba 1/4 to 1/2 lb + Triclopyr 1/4 to 1/2 lb	2 to 4 gal oil-in-water emulsion as aerial spray (1 pt to 1 qt diesel fuel oil and water to make 2 to 4 gal/acre). 10 to 25 gal oil-on-water emulsion as ground broadcast (1/2 to 1 gal diesel fuel oil to make 20 to 25 gal/acre). Add surfactant as needed.	Spring to early summer, 40 to 90 days after bud break.	For best results, monthly precipitation should exceed the annual average from January to the spray season. Foliar sprays should be applied only where there are few associated weeds, such as broom snakeweed, shinnery oak, catclaw, etc. These nontarget species may dominate a stand after mesquite control and provide undesirable results.
Milkweed, showy and related species	Tordon 22K** 2 to 3 qt	Picloram 1 to 1 1/2 lb	10-25 gal for ground broadcast. 0.25% v/v nonionic surfactant	Bud to early bloom.	See label for grazing restrictions
	OR Banvel, Clarity 2 qt	OR Dicamba 2 lb		Emergence to bloom.	

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Plant controlled	Trade name and product rate/acre	Herbicide common name and active ingredient	Spray volume per acre or individual plant	Time of application	Remarks
Oxeye daisy	Remedy 1 1/3 pt	Triclopyr 2/3 lb	10-25 gal for ground broadcast.	Actively growing.	Retreatment may be necessary.
	OR Tordon 22K** 1 to 2 pt	OR Picloram 1/4 to 1/2 lb			
Perennial pepperweed	Ally, Escort 1 oz	Metsulfuron 3/5 oz	10-25 gal for ground broadcast. Add 0.25% v/v nonionic surfactant.	Late bud to early flower.	See label.
	OR Telar 1 oz	OR Chlorsulfuron 7/10 oz		Late bud to early flower.	
	OR Roundup 3 to 4 qt	Glyphosate 3 to 4 lb	25-40 gal for ground broadcast.	Mow plants when bolting bud stage spray resprouting plants	Wait until all resprouts emerge before applications
	OR 2,4-D* 2 qt	OR 2,4-D* 2 lb	25-40 gal for ground broadcast.	Late bud to early flower.	Retreatments may be necessary.
Poison ivy, poison oak	Roundup* 4 to 6 qt	Glyphosate 4 to 6 lb	10-25 gal for ground broadcast.	Actively growing to full bloom.	Add 0.25% v/v nonionic surfactant.
	OR Roundup 2 gal/100 gal water	OR Glyphosate 8 lb/100 gal water	2% v/v individual plant treatment.		
	OR Garlon 3 1 to 3 gal	OR Triclopyr 3 to 9 lb	10-25 gal for ground broadcast.		
	OR Garlon 4, Remedy 1 to 2 gal	OR Triclopyr 4 to 8 lb			
	OR Garlon 3 4 qt/100 gal water	OR Triclopyr 3 lb/100 gal water	Individual plant treatment.		
	OR Garlon 4, Remedy 3 qt/100 gal water	OR Triclopyr 3 lb/100 gal water	Individual plant treatment.		
Poverty sumpweed	Banvel, Clarity 1 to 2 qt	Dicamba 1 to 2 lb	10-25 gal for ground broadcast. Add 0.25% v/v nonionic surfactant.	Actively growing.	
	OR Tordon 22K** 2 pt	OR Picloram 1/2 lb			
	OR 2,4-D* 4 to 6 qt	OR 2,4-D 4 to 6 lb			
Rabbitbush	Velpar L 4-6 ml per 3 ft of canopy diameter	Hexazinone	Individual plant treatment.	Anytime of year. Optimum is prior to rainy season.	Apply undiluted Velpar L to soil surface within 3 ft of stem base. Do not use on clay soils. Do not apply to frozen or snow-covered ground.
Ragweed, common (western)	2,4-D* 2 qt	2,4-D 2 lb	10-25 gal for ground broadcast.	Actively growing.	
Rayless goldenrod	Spike 20P 5 lb of pellets	Tebuthiuron 1 lb	Aerial broadcast.	Anytime of year. Optimum is prior to rainy season.	Do not apply to frozen or snow-covered ground.

* Formulated as 4 lb active ingredient per gallon product
 ** Restricted use product

Table 1. Herbicides for controlling undesirable brush and weeds on range lands.

Plant controlled	Trade name and product rate/acre	Herbicide common name and active ingredient	Spray volume per acre or individual plant	Time of application	Remarks
Rayless goldenrod (continued)	OR Spike 20P oz 1/4 to 1/2 per 3 ft of canopy diameter	OR Tebuthiuron	Individual plant treatment.	Anytime of year. Optimum is prior to rainy season.	Distribute pellets uniformly under canopy. Do not apply to frozen or snow-covered ground.
	OR Tordon 22K** 1 qt	OR Picloram 1/2 lb	Aerial or ground broadcast.	Fall, after blooming and before frost.	Do not spray near susceptible crops.
	OR Ally, Escort 4/5 oz	OR Metsulfuron 1/2 oz			
Russian olive (see also saltcedar)	See saltcedar	See saltcedar	See saltcedar.	See saltcedar.	See saltcedar.
Sagebrush, big	Spike 20P 2 1/2 lb of pellets	Tebuthiuron 1/2 lb	Aerial broadcast.	Anytime of year. Optimum is prior to rainy season.	Select productive sites for treatment.
Sagebrush, fringed	2,4-D* 2 qt	2,4-D 2 lb	10-25 gal for ground broadcast. 2-4 gal for aerial broadcast.	Actively growing.	Retreat for 2 more years as necessary.
	OR Spike 20P 2 1/2 to 3 3/4 lb pellets	OR Tebuthiuron 1/2 to 3/4 lb		Anytime.	
Sagebrush, sand	2,4-D* low volatile ester 1 to 2 qt	2,4-D 1 to 2 lb	2-4 gal water solution for aerial spray. 10 to 25 gal water solution for ground broadcast application. Add surfactant as needed.	May 1 to June 15 with good growing conditions.	Do not spray when plants are defoliated by late frost, drought, or other unfavorable growing conditions. Do not spray near susceptible crops.
	OR Spike 20P 2 1/2 to 3 3/4 lb of pellets	OR Tebuthiuron 1/2 to 3/4 lb	Aerial or ground broadcast.	Anytime of year. Optimum is prior to rainy season.	
Saltcedar	Arsenal, Habitat 1 gal per 100 gal water	Imazapyr 2 lb per 100 gal water with 0.25% surfactant	Individual plant treatment or ground application.	August through September	Spray to wet, especially the terminal ends of all branches. Allow two full growing seasons before follow-up treatment.
	OR Tank mix 1/2 to 1 gal Arsenal, Habitat with 1/2 to 1 gal Roundup*	OR Imazapyr 1 to 2 lb + Glyphosate 2 to 4 lb per 100 gal water with 0.25% surfactant			
	OR Tank mix 1/2 to 1 gal Arsenal, Habitat with 1/2 to 1 gal Rodeo	OR Imazapyr 1 to 2 lb + Glyphosate 2 to 4 lb per 100 gal water with 0.25% surfactant	Individual plant treatment or ground application.		Spray to wet, especially the terminal ends of all branches. Allow two full growing seasons before follow-up treatment.
	OR Arsenal, Habitat 1/2 gal	OR Imazapyr 1 lb with 0.25% surfactant	Aerial broadcast.		10-15 gal per acre total solution. Allow two full growing seasons before follow-up treatment.

* Formulated as 4 lb active ingredient per gallon product
 ** Restricted use product

Table 1. Herbicides for controlling undesirable brush and weeds on range lands.

Plant controlled	Trade name and product rate/acre	Herbicide common name and active ingredient	Spray volume per acre or individual plant	Time of application	Remarks
Saltcedar (continued)	OR Tank mix 1 to 1 1/2 qt Arsenal, Habitat with 1 to 2 pt Roundup*	Imazapyr 1/2 to 3/4 lb + Glyphosate 1/2 to 1 lb with 0.25% surfactant			
	OR Tank mix 1 to 1 1/2 qt Arsenal, Habitat with 1 to 1 1/2 pt Rodeo	OR Imazapyr 1/2 to 3/4 lb + Glyphosate 1/2 to 1 lb with 0.25% surfactant			
Sand shinnery oak	Spike 20P 2 1/2 to 5 lb of pellets	Tebuthiuron 1/2 to 1 lb	Aerial broadcast.	Anytime of year. Optimum is prior to rainy season.	
	OR Velpar L 2-4 ml per 33 square ft of canopy diameter	OR Hexazinone	Individual plant treatment.	Anytime of year. Optimum is prior to rainy season.	Apply undiluted Velpar L to soil surface within 3 ft of stem base or in a grid pattern. Use exact delivery handgun applicator. Do not apply to frozen or snow-covered ground.
	OR Spike 20P 1/2 oz per 22 sq ft when treating a thicket or clump	OR Tebuthiuron	Individual plant treatment.	Anytime during year, Optimum is prior to rainy season.	Distribute uniformly under canopy. Do not apply to frozen or snow-covered ground.
Shrub oak (wavy leaf, gambel oak)	Spike 20P 3 3/4 to 7 1/2 lb of pellets	Tebuthiuron 3/4 to 1 1/2 lb	Aerial broadcast.	Anytime during year. Optimum is prior to rainy season.	Distribute uniformly under canopy. Do not apply to frozen or snow-covered ground.
	OR Velpar L 2-4 ml per 33 sq ft of canopy diameter	OR Hexazinone	Individual plant treatment. Anytime during year.	Optimum is prior to rainy season.	Apply undiluted Velpar L to soil surface within 3 ft of stem base. Use exact delivery handgun applicator. Do not apply to frozen or snow-covered ground. Do not use on clay soils.
	OR Spike 20P 1/4 oz per 22 sq ft when treating a clump or thicket	OR Tebuthiuron	Individual plant treatment. Anytime during year.	Optimum is prior to rainy season.	Distribute uniformly under canopy. Do not apply to frozen or snow-covered ground.
	OR Arsenal 1 gal per 100 gal water	OR Imazapyr 2 lb per 100 gal water with 0.25% surfactant	Individual plant treatment or ground application.	Anytime during growing season when growing conditions are good.	Spray to wet.
Skunkbrush sumac	Spike 20P 3 3/4 to 5 lb of pellets	Tebuthiuron 3/4 to 1 lb	Aerial or ground broadcast. Anytime during year.	Optimum is prior to rainy season.	Distribute uniformly under canopy. Do not apply to frozen or snow-covered ground.
	OR Spike 20P 1/4 to 1/2 oz per 3 ft of canopy diameter or height	OR Tebuthiuron	Individual plant treatment.	Anytime during year, Optimum is prior to rainy season.	Distribute uniformly under canopy. Do not apply to frozen or snow-covered ground.

* Formulated as 4 lb active ingredient per gallon product
 ** Restricted use product

Table 1. Herbicides for controlling undesirable brush and weeds on range lands.

Plant controlled	Trade name and product rate/acre	Herbicide common name and active ingredient	Spray volume per acre or individual plant	Time of application	Remarks	
Starthistle, yellow; malta; purple	Ally, Escort 1 oz	Metsulfuron 3/5 oz	10 to 25 gal for ground broadcast. Use surfactant as per label.	Seedling to early bud.		
	OR Remedy 3 pt	OR Triclopyr 1 1/2 lb				
	OR 2,4-D* 1 qt	OR 2,4-D 1 lb				
	OR Arsenal 1 pt	OR Imazapyr 1/4 lb				
	OR Tordon 22K** 1 pt	OR Picloram 1/4 lb				
	OR Banvel, Clarity 1 qt	OR Dicamba 1 lb				
	OR Reclaim 2/3 pt	OR Clopyralid 1/4 lb				
	OR Grazon P+D 2 qt	OR Picloram: 2,4-D (1:4 mixture) 1 1/4 lb				
Tarbush	Spike 20P 2 1/2 to 3 3/4 lb of pellets	Tebuthiuron 1/2 to 3/4 lb	Aerial broadcast.	Anytime during year. Optimum is prior to rainy season.		
	OR Tordon 22K** 2 to 4 ml per 3 ft of canopy diameter	OR Picloram	Individual plant treatment. Apply anytime during year.	Optimum is prior to rainy season.	Apply undiluted Tordon 22K to soil surface within 3 ft of stem base. Use exact delivery handgun applicator. Do not apply to frozen or snow-covered ground.	
	OR Spike 20P 1/3 to 1/2 oz per 3 ft of canopy diameter	OR Tebuthiuron	Individual plant treatment.	Anytime during year. Optimum is prior to rainy season.	Distribute uniformly under canopy. Do not apply to frozen or snow-covered ground.	
Thistle, musk; scotch; Canada; bull	Ally, Escort 1/2 to 1 oz	Metsulfuron 3/10 to 3/5 oz	10-25 for ground broadcast. Add 0.25% nonionic surfactant.	Rosette.		
	OR Telar 1/2 to 1 oz	OR Chlorsulfuron 3/8 to 3/4 oz				
	OR Tordon 22K** 1 to 2 pt	OR Picloram 1/4 to 1/2 lb				Before bolting.
	OR Curtail 1 to 2 qt	OR Clopyralid: 2,4-D (1:5 mixture) 3/5 to 1 1/5 lb				
	OR Tank mix 1 1/3 pt Remedy with 1 to 2 qt 2,4-D*	OR Triclopyr 2/3 lb + 2,4-D 1 to 2 lb				

* Formulated as 4 lb active ingredient per gallon product

** Restricted use product

Table 1. Herbicides for controlling undesirable brush and weeds on range lands.

Plant controlled	Trade name and product rate/acre	Herbicide common name and active ingredient	Spray volume per acre or individual plant	Time of application	Remarks
Threadlead groundsel, Riddel's groundsel Also: milkvetch, mustards, pingue, western bitterweed	2,4-D* 2 to 4 qt	2,4-D 2 to 4 lb	10-25 gal for ground broadcast. Add 0.25% v/v nonionic surfactant.	Actively growing, prior to bloom.	
	OR Weedmaster 1 to 2 qt	OR Dicamba: 2,4-D (1:3 mixture) 1 to 2 lb	2-4 gal for aerial broadcast.		
	OR Tank mix 1/2 to 1 pt Banvel with 1 1/2 to 3 pt 2,4-D*	OR Dicamba 1/4 to 1/2 lb + 2,4-D 3/4 to 1 1/2 lb			
	OR Banvel 1 pt	OR Dicamba 1/2 lb			
	OR Tank mix 1 to 2 pt Tordon 22K ** with 1 1/2 to 3 pt 2,4-D*	OR Picloram 1/4 to 1/2 lb + 2,4-D 3/4 to 1 1/2 lb			
	OR Grazon P+D 1 to 2 qt	OR Picloram: 2,4-D (1:4 mixture) 5/8 to 1 1/4 lb			
	OR Tordon 22K** 1 qt	OR Picloram 1/2 lb			
	OR Ally, Escort 5/8 to 4/5 oz	OR Metsulfuron 3/8 to 1/2 oz			
Water hemlock, western	2,4-D* 1 to 2 qt	2,4-D 1 to 2 lb	10 to 25 gal for ground broadcast.	Flower bud stage.	
Willows	2,4-D* 2 to 3 qt	2,4-D 2 to 3 lb	Individual plant treatment (2 to 3 lb per 100 gal of water solution).	Spring, when leaves are fully expanded. Good growing conditions.	Wet foliage thoroughly. Do not spray when plants are defoliated by late freeze, hail, insects, or other unfavorable conditions.
	OR Arsenal, Habitat 1 gal	OR Imazapyr 2 lb per 100 gal water with 0.25% surfactant	Individual plant treatment.	Anytime during growing season. Good growing conditions.	Spray to wet.
	OR Tank mix 1/2 to 1 gal Arsenal with 1/2 to 1 gal Roundup*	OR Imazapyr 1 to 2 lb + Glyphosate 2 1/2 to 5 lb per 100 gal water with 0.25% surfactant			
	OR Tank mix 1/2 to 1 gal Arsenal, Habitat with 1/2 to 1 gal Rodeo	OR Imazapyr 1 to 2 lb + Glyphosate 2 1/2 to 5 lb per 100 gal water with 0.25% surfactant	Individual plant treatment.	Anytime during growing season when good growing conditions exist.	Spray to wet.

* Formulated as 4 lb active ingredient per gallon product

** Restricted use product

Table 1. Herbicides for controlling undesirable brush and weeds on range lands.

Plant controlled	Trade name and product rate/acre	Herbicide common name and active ingredient	Spray volume per acre or individual plant	Time of application	Remarks
Willows (continued)	OR Velpar L 2-4 ml per 3 ft of canopy diameter or height, or 2-4 ml per inch of stem diameter	OR Hexazinone	Individual plant treatment.	Anytime during year. Optimum is prior to rainy season.	Apply undiluted Velpar L to soil surface within 3 ft of stem base. Use exact delivery applicator. Do not apply to frozen or snow-covered ground.
Yucca	Velpar L 4-6 ml per whorl.	Hexazinone	Individual plant treatment.	Anytime during year. Optimum is prior to rainy season.	Apply undiluted Velpar L directly to whorl.
	OR Remedy 3-4 ml per whorl	OR Triclopyr	Individual plant treatment.	Anytime during year.	Apply to every whorl. May be mixed with water or diesel.
	OR Arsenal 2-3 ml per whorl	OR Imazapyr	Individual plant treatment.	Anytime during year.	Apply to every whorl.

* Formulated as 4 lb active ingredient per gallon product
 ** Restricted use product

APPENDIX A

Common Chemical and Product Names of Herbicides
The herbicides are identified by the accepted Weed Science Society of America common name or other common designation, the correct chemical names as re-

quired on the label, and, where practical, one or more product names. Herbicides marketed under three or more labels have been designated “several manufacturers” rather than attempting to list all the trade formulations.

Table A1. Common Chemical and Product Names of Herbicides

Herbicide Common Name	Chemical Name	Trade Name	Active Ingredient or Acid Equivalent
2,4-D	(2,4-dichlorophenoxy) acetic acid	Several manufacturers	Amine salts and esters, 4 lb/gal
Atrazine	6-chloro-N-ethyl-N'-(1-methylethyl)-1,3,5-triazine-2,4-diamine	Several manufacturers	—
Chlorsulfuron	2-chloro-N-[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino] carbonyl] benzenesulfonamide	Telar	75%
Clopyralid	3,6-dichloro -2-pyridinecarboxylic acid	Reclaim, Stinger, Transline	3 lb/gal
Clopyralid: 2,4-D (1:5)	See Clopyralid and 2,4-D	Curtail	2 3/8 lb/gal
Dicamba	3,6-dichloro-2-methoxybenzoic acid	Banvel, Clarity, Overdrive	4 lb/gal
Dicamba: 2,4-D (1:3)	See dicamba and 2,4-D	Weedmaster	4 lb/gal
Diesel fuel oil	Refined petroleum fractions	Several manufacturers	—
Glyphosate	N-(phosphonomethyl) glycine	Rodeo	5 lb/gal
Glyphosate***	N-(phosphonomethyl) glycine	Several manufacturers	4 lb/gal
Glyphosate: 2,4-D (1:1 1/4)	See Glyphosate and 2,4-D	Landmaster	2 1/2 lb/gal
Hexazinone	3-cyclohexy-6-(dimethylamino)-1-methyl-1,3,5-triazine-2,4 (1H,3H)-dione	Velpar L	2 lb/gal
Imazapic	(±)-2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-5-methyl-3-pyridinecarboxylic acid	Plateau	2 lb/gal
Imazapyr	(±)-2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1H-imidazol-2-yl]-3-pyridinecarboxylic acid	Arsenal, Habitat	2 lb/gal
Metsulfuron	methyl 2-[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)-amino] carbonyl] amino] sulfonyl] benzoate	Ally, Escort, Cimarron Max	60%
Paraquat	1,1'-dimethyl-4,4' bipyridinium	Several manufacturers	—
Picloram	4-amino-3,5,6-trichloro-2-pyridinecarboxylic acid	Tordon 22K**	2 lb/gal
Picloram:2,4-D (1:4)	See picloram and 2,4-D	Grazon P+D	2 1/2 lb/gal
Quinclorac	3,7-dichloro-8-quinolinecarboxylic acid	Paramount	75%
Sulfometuron	methyl 2-[[[(4,6-dimethyl-2-pyrimidinyl) amino] carbonyl] amino] sulfonyl] benzoate]	Oust	75%
Tebuthiuron*	N-[5-(1,1-dimethylethyl)-1,3,4-triazazol-2-yl]-N',N'-dimethylurea	Spike 20P	20%
Triclopyr	[(3,5,6-trichloro-2-pyridinyl)oxy] acetic acid	Remedy, Garlon 4EC Garlon 3A	4 lb/gal 3 lb/gal

*Under supervision of U.S. government agencies, Spike 20P may be applied by aerial or ground equipment at lower than recommended rates if partial control is desired.

**Tordon 22K is a restricted use product.

***Glyphosate and 2,4-D are sold under several different trade names and formulations. Check the active ingredient rate on the label to determine the correct product application rate.

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