

# WEED CONTROL IN GRASS PASTURES AND FEDERAL CONSERVATION RESERVE PROGRAM (CRP) ACRES

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## Impacts of Weeds and Cultural Practices

- GP1.** Considerable grass pasture acreage in Minnesota is infested with broadleaf weeds, many of which are on the noxious weed list and several are poisonous to livestock. These broadleaf weeds are generally less palatable, less nutritious, lower yielding, and are less dependable as a forage supply for livestock than the desirable grass or legume pasture species that they replace.
- GP2.** In established pastures, good management and controlled grazing are necessary to maintain a productive, weed-free stand. Protect new seedlings from grazing until they are well established and graze moderately thereafter. Allowing established pastures a recovery period after grazing by excluding cattle for 3 to 4 weeks, on a rotational basis, will reduce weeds and increase forage yields. If necessary, mow after each grazing period to control many pasture weeds and encourage new forage growth. Do not clip cool season forages closer than 3 to 4 inches, warm season forages 6 to 8 inches above the soil. In very weedy pastures where perennial forage grasses are thin, reseeding may be the best practice. To be successful, lime and fertilize according to soil test, destroy old sod and weeds by plowing or extensive surface tillage and seed an adapted mixture of legumes and grasses in a firm seedbed. If topography is not conducive to tillage, chemical control of existing vegetation and no-till interseeding desirable species may be an option. Mechanical control such as mowing, spading or hand rouging perennial weeds is most effective if not done until the late-bud to early-flower stage of growth when root carbohydrates are at their lowest. Repeating the mechanical control two times that season waiting until significant growth occurs will kill perennials in the shortest amount of time with the fewest inputs of labor.

## Herbicide Use in Pastures and Federal Conservation Reserve Program (CRP) Acres

- GP3.** Many years of research data and practical farmer use have shown that herbicides labeled for use in pastures are not harmful to livestock and other animals when applied on pasture grass and weeds at recommended usage rates and label restrictions are followed. However, because applied herbicides may make toxic weeds more palatable to livestock, **livestock should be excluded from the sprayed area for 7 to 10 days after treatment if poisonous plants are present.** Additionally, always **follow grazing restrictions (see table GP3)** and safety precautions as prescribed on the label for the specific herbicide applied. All broadleaf herbicides labeled for use in grass pastures will severely injure or kill legumes. Therefore, if legumes are present and desirable, only spot treatments should be used. Products listed in the CRP establishment section include specific exceptions and not all of them are labeled for use in pastures (see GP16). **All products labeled for pasture use also are labeled for use in CRP except for paraquat products (Firestorm, Gramoxone, Parazone), Rage-D, Overdrive, and Spike.**
- GP4.** Seedlings of annual, biennial, and perennial weeds are most effectively controlled with herbicides when seedlings have leafed out but while still small. Winter annuals, and biennial rosettes, e.g. musk, plumeless or bull thistle, may be effectively controlled with herbicides applied to seedlings and rosettes in late-summer, or early-fall, or in the spring before bolting (producing flower stalks). Annuals and biennials must continuously reestablish from seeds to survive. So if not using herbicides or other management techniques fail, preventing seed production should be a top priority. Mowing, pulling, hand cutting or spading go a long way to break the seedbank cycle and reduce infestations.

Shoots of established herbaceous perennial weeds arise from parent rootstocks or underground rhizomes. Established perennial weeds are best controlled with herbicides when the most complete translocation of herbicide will occur to these perennial roots and rhizomes. In Minnesota, sugars produced in perennial plant shoots start to move downward to rebuild depleted underground root and storage organ reserves after flowering has occurred. Herbicides simply go where the sugars go, and as such, the most efficacious and consistent perennial kill occurs when herbicides are applied in late-summer or early-fall, anytime before hard, killing frosts. If perennial weeds must be controlled with herbicides in the spring, wait until shoots reach at least 6- to 8-inches in height for most plant species before herbicide application to improve control (improve

\* or generic equivalent.

herbicide translocation). Milestone, ForeFront, Curtail, Curtail M, and Stinger can be applied in the spring through the bud stage for Canada thistle control.

- GP5.** The **endangered species act** impacts the use of certain herbicides on pasture, rangeland, or CRP in Minnesota to protect plants such as the prairie brush clover and the Minnesota trout lily. Herbicide restrictions may apply to only a few sites within Jackson, Cottonwood, Renville, Goodhue and Rice counties. Check with the Minnesota office of the U.S. Fisheries and Wildlife Service (612) 725-3276 before applying most pasture herbicides in counties listed if these protected species are in your area.
- GP6.** **Aminopyralid** is marketed as **Milestone 2 S (aminopyralid)** and package mixtures **ForeFront 3S (aminopyralid + 2,4-D)** and **Chaparral 62 DG (aminopyralid + metsulfuron methyl)**. Aminopyralid is a picolinic acid family herbicide. **Milestone** is an aminopyralid low-use rate product, does not have ground water restrictions, is not a restricted use product, and has less persistence compared to picloram (**Tordon**). Aminopyralid, the active ingredient in Milestone, like triclopyr and clopyralid, has moderate soil persistence which provides some root uptake in addition to postemergence foliar uptake, therefore improved control and some residual seedling control of susceptible broadleaf weeds. Milestone is an excellent replacement for picloram (**Tordon**), and is especially active on plants in the Asteraceae (Canada, musk and plumeless thistle) and Fabaceae (legumes) families. Plants in several other families may be tolerant to Milestone allowing targeted use. For more complete control in grass only pastures, use **ForeFront** or **Chaparral**. Apply in the spring before early bloom for annuals or biennials, during bud stage for perennials, or treat active growth or regrowth in the fall.

**Use instructions:**

- Apply 3 to 5 oz/A **Milestone** postemergence to control musk and plumeless thistle, 4 to 6 oz/A for tall buttercup, chicory, oxeye daisy, curly dock, orange and yellow hawkweed, or bitter sneezeweed, 5 to 7 oz/A to control Canada thistle, spotted knapweed or fireweed, and 6 to 7 oz/A to control absinth wormwood. Addition of 0.25 to 0.5% nonionic surfactant can improve consistency of control. Do not add surfactant if using Milestone when trying to gain tolerance in desirable forbs.
- Apply 1.5 to 2 pts/A **ForeFront** to control wild carrot, oxeye daisy, horsenettle, biennial thistles (bull, musk and plumeless), and absinth wormwood. Apply 2.0 to 2.6 pts/A for harder to control species such as burdock, chicory, curly and broadleaf docks, hawkweeds, and knapweeds. Addition of 0.25 to 0.5% nonionic surfactant can improve consistency of control.
- Apply 1 to 3.3 oz/A **Chaparral**. 3.3 oz of Chaparral equals 7 oz Milestone + 0.5 oz Escort XP, an aggressive rate of each herbicide. Apply 1.0 to 2.0 oz product/A for biennial thistles, 1.5 to 2.0 oz/A for dandelion and yarrow, 2.0 to 2.5 oz/A for hoary alyssum, burdock, tall buttercup, wild carrot, curly and smooth dock, 2.5 to 3.0 oz/A for wild parsnips and fireweed, 2.5 to 3.3 oz/A for bracken fern, absinth wormwood, tansy spotted knapweed, oxeye daisy, hawkweeds, mullein, houndstoungue, and Canada thistle. Metsulfuron methyl adds residual control (See Escort XP GP11 for precautions and additional information). Addition of 0.25 to 0.5% nonionic surfactant can improve consistency of control.

**Precautions:**

- There are no grazing or haying restrictions for Milestone. However, do not harvest hay treated with **ForeFront** for 7 days following application.
- Do Not Transfer grazing animals to pastures with sensitive broadleaf species without allowing 3 days grazing on untreated pastures or untreated forage before transfer.
- Do not apply manure, or use hay or straw from aminopyralid treated areas for mulch, compost, or apply treated plant residue to susceptible broadleaf crops.
- Follow guidelines on the label if rotating out of pasture to sensitive crops as aminopyralid can persist in the soil.

- GP7.** **Carfentrazone ethyl** is marketed as **Rage D-Tech**, a package mixture with **2,4-D ester**, for use on grass pastures. Controls many broadleaf weeds. Combines contact action of carfentrazone ethyl with systemic action of 2,4-D. Not widely tested in Minnesota. Would be expected to broaden the spectrum of control for 2,4-D esters used alone. **Restricted use herbicide**. Grazing restrictions apply, see Table GP3.

**Use instructions:**

- Apply 8 to 32 oz/A. Use lower rates for easy to control annual and biennial weeds. Apply higher rates for difficult to control weeds (assumed to be those listed on the label as partially controlled e.g. chickweed, fleabanes, or mareetail) or woody species.

\* or generic equivalent.

- Good coverage is essential for good weed control.
- Always add a nonionic surfactant at 0.25% v/v or crop oil concentrate at 1.5 to 2% v/v. Liquid nitrogen fertilizer at 2 to 4% v/v or ammonium sulfate at 2 to 4 lb/A may be added to improve weed control.

**Precautions:**

- May cause speckling or necrosis on forage grass leaves. Do not apply if leaves are wet with heavy dew, or within 6 to 8 hrs following rainfall or irrigation or severe necrosis on grasses may occur.
- Not labeled for use on CRP acres.

**GP8. Clopyralid and triclopyr** are available for pasture use as **Stinger (clopyralid amine), Curtail (clopyralid amine + 2,4-D amine), Curtail M (clopyralid free-acid + MCPA ester), Remedy (triclopyr ester), Crossbow (triclopyr ester + 2,4-D ester), and Redeem R&P (triclopyr amine + clopyralid amine)**. Clopyralid and triclopyr are picolinic acid family herbicides. These analogs of picloram are generally less persistent and have fewer environmental concerns compared to picloram. Yet, triclopyr and clopyralid have moderate soil persistence which provides some root uptake in addition to postemergence foliar uptake, therefore improved control and some residual seedling control of susceptible broadleaf weeds. Clopyralid in particular can persist and carryover injuring composites (Asteraceae) in renovations/forb seedings. Clopyralid adds aggressive control of composites and triclopyr adds aggressive control of herbaceous and woody plants. **Stinger**, is expensive at labeled use rates, but has no grazing or haying restrictions and is less damaging to nontarget dicot broadleaf species and as such, may be used in some cases where other products may not. The package mixtures containing clopyralid; **Curtail, Curtail M, and Redeem**, are an economical approach for Canada, musk and plumeless thistle, oxeye daisy, orange or yellow hawkweed, perennial sowthistle, and spotted knapweed control; control a broader spectrum of broadleaf weeds, and reduce leaching or surface runoff potential compared to Stinger or Tordon used alone. **Redeem R&P** (clopyralid + triclopyr) is a non-phenoxy option without the odor associated with phenoxy use. Clopyralid and triclopyr may be used under trees as long as label precautions for sensitive trees species are followed. The 2,4-D or MCPA component in the package mixtures generally causes few problems applied under trees. **Remedy Ultra** (triclopyr) is primarily for deciduous brush control as foliar, cut-stump or basal bark sprays. **PastureGuard and Surmount** are the picolinic acids, fluroxypyr, tank mixed with triclopyr or picloram, respectively, but the species controlled by the addition of fluroxypyr are not typically found in Minnesota. **Tordon** is still the best herbicide for use on leafy spurge (see GP15).

**Use Rates:**

- Apply 0.5 to 1.33 pts/A **Stinger**. Expensive, but no grazing or haying restrictions and less damaging to nontarget dicot broadleaf species. Very effective on musk, plumeless, bull, and Canada thistle at the ½ to 2/3 pt/A rate.
- Apply 2 to 4 qts/A **Curtail** or 4 to 5 pts/A **Curtail M** to control most broadleaf weeds. Particularly effective on the thistle complex and other composites. Addition of 2,4-D or MCPA adds control of many broadleaf weeds, but also increases damage to nontarget forbs compared to Stinger.
- Apply 2 to 8 pts **Remedy Ultra** per 100 gallons carrier with oil added as per label instructions for improved control of woody species. Controls ash, cherry, oak, locust, willow species, and more.
- **Redeem R&P** will suppress brush species, but primarily is for herbaceous broadleaf weed control, since less triclopyr is applied than when using Remedy. Apply 0.5 to 2 pts/A Redeem 3S for most broadleaf weeds including oxeye daisy, 2 to 3 pts/A for perennial sowthistle, and 4 pts/A for orange or yellow hawkweed control.
- Apply 2 qts/A or less **Crossbow** for most herbaceous broadleaf weeds as rates higher than 2 qts/A generally are for brush control.
- Apply 2 to 4 qts/A **Curtail** or 4 to 5 pts/A **Curtail M** to control most broadleaf weeds. Particularly effective on the thistle complex and other composites.

**Precautions:**

- Do not apply manure, or use hay or straw from clopyralid or triclopyr treated areas for mulch, compost, or apply treated plant residue to susceptible broadleaf crops.
- Clopyralid may leach to groundwater in sensitive areas, see groundwater precautions on the label of products containing clopyralid.
- **Grazing restrictions apply to the package mixtures** (see **Table GP3**). Follow guidelines on the label if rotating out of pasture to sensitive crops as clopyralid and triclopyr persist in the soil.

**GP9. Dicamba** herbicides for pasture are **Banvel/Clarity\* (dicamba), Overdrive (diflufenzopyr + dicamba), and Weedmaster\* (dicamba + 2,4-D)**. Dicamba alone (**Banvel/Clarity\***) controls most broadleaf weeds in grass pastures. For most annual broadleaf weeds, apply 0.5 to 1.0 pt/A of Banvel or Clarity (0.25 to 0.5 lb ai/A), or

\* or generic equivalent.

for hard to control perennial broadleaf weeds apply 1.0 to 4.0 pts/A. Rates of dicamba much higher than those discussed here can be used as a spot treatment to control brush or difficult to control perennial weeds. Tank mixing with 2,4-D, or using up to 4 pts/A of the package mixture **Weedmaster\*** is more economical, provides more consistent control of a broad spectrum of broadleaf weeds, and poses less environmental concerns than using higher rates of dicamba alone. **Overdrive** at 4 to 8 fl oz/A. (maximum 8 fl oz per season) offers improved control of perennial weeds compared to dicamba used alone via auxin inhibition by diflufenzopyr and unlike dicamba products, Overdrive has no grazing restrictions. The mode of action of diflufenzopyr is reported to improve the efficacy of other growth regulator herbicides when tank mixed with Overdrive. Overdrive must be applied with nonionic surfactant or methylated seed oil. Consider MSO for hard to control species or when weeds are stressed. See the Overdrive label for specific tank mixture rates of other growth regulator herbicides. **Grazing restrictions apply**, see **Table GP3**.

**Precautions:**

- Dicamba is persistent and soluble in water. **Do not** apply dicamba products on or near desirable trees or plants or in locations where it can leach to roots of desirable plants.
- Caution should be used when applying dicamba containing products in areas susceptible to contamination of surface and ground water.
- Overdrive is not labeled for use on CRP acres. The other dicamba products are.

**GP10. Glyphosate formulations**, marketed as **Roundup Ultra and many others**, can be applied as a spot treatment or applied with a wiper applicator for control of many annual and perennial weeds. No more than one-tenth of any given acre should be treated at one time. Spot treatments with glyphosate are particularly useful for localized patchy problems such as Canada thistle or brush control. Wiper applications are well suited for tall broadleaf weeds such as thistle, giant ragweed, goldenrod, hemp, etc. which may overstory legume mixtures such as birdsfoot trefoil or clover where broadcast broadleaf herbicide sprays are not an option. **Grazing restrictions apply**, see **Table GP3**.

**GP11. MCPA and 2,4-D** can be applied to control many annual and perennial broadleaf weeds and small brush. Repeated treatments for 2 or more years are usually necessary to control perennial weeds. Ester formulations are generally labeled at, and are effective at lower rates than amines, but ester formulations have more vapor movement at the time of application. These phenoxy herbicides are effective against numerous broadleaf weeds, are economical to use, weeds rarely develop resistance to them, and they pose little risk to the environment. MCPA and 2,4-D degrade rapidly once applied, rarely leach or move with surface runoff to water resources, and do not pose replanting concerns. **Grazing restrictions apply**, see **Table GP3**. Many formulations exist, so be sure to check individual labels for rates and precautions specific to the product used.

**GP12. Metsulfuron and chlorsulfuron** sulfonylurea herbicides for pasture use are **Escort XP (metsulfuron-methyl)**, **Cimarron Max (metsulfuron-methyl co-packaged with dicamba plus 2,4-D)**, **Cimarron Plus** and **Cimarron X-tra (metsulfuron-methyl + chlorsulfuron)**, and **Telar XP (chlorsulfuron)**. **Escort XP is labeled for use to establish, or on newly seeded grasses. The package mixtures are labeled for use on established pastures or in specific cases, after newly seed grasses have established and are perenniated.** There are **no grazing or haying restrictions** with any of these sulfonylurea herbicides.

**Escort XP** can be broadcast applied to established pasture grasses at 0.1 to 1.0 oz/A (0.004—0.0375 lb ai/A) or spot treated at 1 oz product per 100 gallons water to control broadleaf weeds. Use 0.1 to 0.2 oz/A to control buttercups, chickweed, mullein, wild carrot and curly dock. Use 0.2 to 0.75 oz/A for musk thistle, or 0.5 to 1.0 oz/A to control plumeless thistle, applied spring or early summer pre-flower. Use the spot treatment rate and application for control of Canada thistle in the spring when shoots are at least 6 to 10 inches tall but before flowering. Add nonionic surfactant (at least 80% active) at 1 to 2 pints per 100 gallons of water. For established pastures, bluegrass, bromegrass and orchardgrass must be established 6 months: timothy 12 months and fescue 24 months before using Escort XP.

**Escort XP** can also be applied preplant, preemergence or postemergence to suppress broadleaf weeds to aid in establishment of certain desirable perennial grasses (see label for tolerant species). Use only postemergence applications to establish orchardgrass or Russian wildrye. Do not apply more than 0.1 oz/A for grass establishment. Postemergence applications should be delayed until the majority of the grasses have reached the 3 to 4 leaf stage. Always add nonionic surfactant at 2 to 4 pt/100 gal spray solution for postemergence applications.

**Precautions:**

\* or generic equivalent.

- do not apply through irrigation equipment or exceed one application per year
- do not apply in liquid fertilizer or liquid N with a pH below 3.0 as rapid product degradation can occur. If applying in liquid N, do not add surfactant
- do not use more than 0.4 oz/A and 1 pint surfactant/100 gallons water on fescues
- do not use on ryegrasses, fine turf, or grasses grown for seed
- do not use on soils with pH greater than 7.9.

**Cimarron Max** is a two-part product of metsulfuron-methyl (60% dry flowable) and a package mixture of dicamba and 2,4-D (1 lb + 2.87 lb ai/gallon, respectively). Apply 0.25 to 1.0 oz metsulfuron-methyl component + 0.5 to 2.0 qts/A dicamba/2,4-D component. Because of the growth regulator herbicide components, this pre-package product has a 7 day grazing PHI for lactating dairy, no grazing restriction for non-lactating animals, a 37 day hay harvest PHI, and animals must be removed 30 days prior to slaughter.

**Cimarron Plus** is a 63% DG package mixture with 48% metsulfuron methyl and 15% chlorsulfuron, Apply 0.125 to 1.25 oz product/A postemergence when weeds / brush are 4 inches or less in height or diameter and actively growing. Broadleaf species may be injured, some severely. There are no grazing or harvest restrictions.

**Cimarron X-tra** is a 67.5% DG package mixture with 30% metsulfuron methyl and 37% chlorsulfuron, Apply 0.5 to 2.0 oz product/A postemergence when weeds / brush are 4 inches or less in height or diameter and actively growing. Broadleaf species may be injured, some severely. There are no grazing or harvest restrictions.

**Telar XP** is a 75% DG formulation of chlorsulfuron. Apply 0.25 to 1.33 oz product/A for broad-spectrum broadleaf weed control in established grass pastures. Rated up to 3 oz product can be used on noncrop sites, but can not be grazed if over 1.33 oz product applied. Very persistent product, especially as soil pH is > 7.5.

Crop rotation restrictions must be followed if rotating out of grass pasture as these sulfonylurea herbicides may remain in the soil for 34 months or more. Tank mixtures with most pasture herbicides are labeled to broaden spectrum of control and to reduce chances of weed resistance development. These products can be applied to establish or maintain numerous warm season and select cool season grasses in the **Conservation Reserve Program**. Apply preplant, preemergence, postemergence to new planting or postemergence to stands planted the previous season to prevent or reduce weed competition.

**GP13. Plateau 2L (imazapic)** can be applied at 2 to 12 fl oz product/A. Apply 2 to 6 fl oz product/A to control annual weeds to establish native grasses or grass/wildflower mixtures, or to renovate established stands. See Plateau 2L label for recommended rates, and tolerance to preemergence or postemergence applications. 2 to 4 fl oz product/A generally results in good annual weed control under Minnesota conditions. Add 1.5 to 2 pts/A methylated seed oil vegetable based COC or 0.25% v/v nonionic surfactant. May add 2 to 3 pts/A UAN or AMS nitrogen to improve burndown of annual weeds. Plateau 2L at 8 to 12 fl oz/A can be used for perennial weed control, but can be injurious to desirable species under Minnesota conditions, especially on stands that are not established. These rates can be used to reclaim established native grass stands infested with leafy spurge. Plateau is not recommended to establish pure stands of switchgrass as seedlings can be severely injured or killed by imazapic. Some introduced cool-season grass species have tolerance but will have greatly reduced yields, such as bromegrass or Kentucky bluegrass. Tall fescue may be killed at higher rates. May be used on Conservation Reserve Programs acres and may be grazed or hayed if program acres are released. 7 day PHI before cutting for hay.

**GP14. Spike 20P (tebuthiuron)** pellets applied at 3.75 to 20.0 lbs product/A (0.75 to 4.0 lbs ai/A) will control many woody species. Broadleaf forages and weeds will also be severely injured where treated. Dormant season applications are recommended to minimize desirable grass forage injury. Pasture use rates will control or suppress white or bur oak, sumacs, cottonwood, elms, some spruces and firs. Non-crop use rates, greater than 20 lbs product per acre, are generally required for pines, most maples, cherry species, dogwood, red or pin oaks, willows, and aspen. Control will be erratic on soils with more than 5% organic matter or 30% clay. If renovating, grass seed may be broadcast seeded without any soil disturbance the fall or spring following application. Reduced rates of Spike 80 DF at 0.5 to 1.0 lb product/A (0.4 to 0.8 lb ai/A) may be applied to dormant grasses to suppress cool season grasses in warm season grasses.

**Precautions:**

- do not reseed for at least two growing seasons following brush is removal

\* or generic equivalent.

- do not use where feeder roots of desirable trees may come in contact with this herbicide, or where soil or water movement from the application site is likely as very small amounts of tebuthiuron can cause severe injury to desirable trees and vegetation and is persistent, preventing the growth of some species for years
- do not use on heavy clay soils that crack extensively upon drying
- do not cut for hay for 1 year following applications. If the site will be hayed, do not exceed 20 lb/A of the pelleted 20P formulation annually where rainfall exceeds 20 inches per year, do not exceed 10 lb/A of the 20P where rainfall is 20 inches or less. Haying may be done after 1 year following band or individual plant treatments of less than 5 lbs/A of the 80 DF. See grazing restrictions, Table GP3.
- There are no grazing restrictions with 20P or 80 DF when used at labeled rates.
- do not exceed the maximum rate of 10 lbs/A 20 P if used on a site vulnerable to groundwater contamination with greater than 20 inches annual precipitation, 5 lbs/A maximum if less than 20 inches annual precipitation. Do not exceed 5 lb/A if using the 80 DF formulation regardless of rainfall.
- Not labeled for use on CRP acres.

**GP15. Tordon 22K (picloram potassium salt) and Grazon P + D (picloram amine + 2,4-D amine)** are herbicides containing picloram. Tordon is the most effective herbicide for broadleaf weed and deciduous brush control available. Tordon has long soil residual which improves control of perennial species and controls seedlings which germinate after application. This soil persistence poses some water resource and nontarget plant concerns, but using the lowest effective rate, proper application timing, and following label precautions will minimize these risks. Preferred application timing of key Minnesota Noxious weeds is in the early summer or in the fall for leafy spurge control, to Canada thistle regrowth in the fall, and to biennial thistles (musk, plumeless, bull) rosettes in the fall or before bolting in the spring. Broadcast apply Tordon at up to 2 qts/A to control noxious weeds, broadcast up to 1 qt/A for other weeds. Can spot treat up to a 2 qt/A equivalent rate to control any weed, but do not treat more than 50% of any given acre. Use low rates of Tordon (0.37 to 0.5 pts/A) tank mixed with 2,4-D (1 qt/A 4 lb/gal equivalent) or use Grazon P + D (package mixture of picloram + 2,4-D amine), to significantly lower costs, reduce potential damage to nontarget plants, and reduce leaching or surface runoff compared to higher rates of picloram used alone. Significantly improves control of most broadleaf weeds compared to use of 2,4-D or most other pasture herbicides alone. Lower Tordon rates also reduce injury to sensitive grass species. Tank mix 1.0 lb ae/A 2,4-D with 6 to 8 fl oz/A Tordon 22K for spring, or 8 fl oz/A Tordon 22K for fall control of biennial thistle rosettes, or with 16 fl oz/A Tordon 22K for wormwood or spotted knapweed control. Grazon can be tank mixed with Remedy (see GP14) for broad-spectrum brush control. **Grazing restrictions apply**, see **Table GP3. Restricted use herbicide**, however, a pre-diluted formulation for brush control, Tordon RTU, is not a restricted use product.

**Precautions:**

- Do not apply manure, or use hay or straw from picloram treated areas for mulch, compost, or land application to susceptible broadleaf crops.
- Picloram is not recommended where soils have rapid to very rapid permeability, such as on sands or loamy sands, and where the underlying aquifer is shallow.
- Not recommended for use where sinkholes overlay limestone bedrock, severely fractured surfaces, and substrates which allow direct introduction into aquifers exist.
- Assess surrounding area and topography for possible movement to non-target plants and desirable trees before use.

**GP16.** Pasture renovation to reestablish desirable species in improved pasture or to upgrade unimproved pasture with **glyphosate products** and paraquat products (**Gramoxone Inteon 2L** or **Firestorm 3L**, **Parazone 3L**) . Glyphosate may be applied as a broadcast treatment or in inter-seeded banding applications. There are no residue concerns with glyphosate, but the 8-week grazing restriction applies. The 14-day grazing restriction only applies to spot treatments with glyphosate. **Grazing restrictions apply**, see **Table GP3**. Apply paraquat before or at seeding or for established pastures, only as a broadcast application to grazed or mowed pastures not more than 3 inches in height. Apply paraquat to native pastures in the spring after 90% node formation in brome species but before full bloom to suppress cool season species. Apply paraquat at 0.25 to 0.5 lbs ai/A (2/3 to 1 1/3 pts/A3L or 1 to 2 pts/A2L formulation) or glyphosate at 2 to 4 lb ai/A (52 to 104 oz) depending on species. Paraquat has no grazing or harvest restrictions when used on pastures. Paraquat products are not labeled for use in CRP.

**Federal Conservation Reserve Program Lands (CRP) (CPR specific use products In addition to pasture products labeled for use on CRP listed in GP 6 through GP 16.)**

\* or generic equivalent.

**GP17.** Many of the products listed for use in pastures have CRP labeled uses. In addition, **Bromoxynil products, Plateau (imazapic), Pursuit (imazethapyr) and Escort XP (metsulfuron) and atrazine (Aatrex 4L only)** can be used to establish CRP grass-dominant vegetation. **Aatrex, Plateau and Pursuit** have tolerance on many native, warm season grasses, and less so on some cool season grasses. **Escort XP and bromoxynil** have tolerance on both, but still can cause injury. Note: Only Aatrex 4L is labeled to establish or renovate warm season grasses and only in CRP in Minnesota (24c label). Other formulations of **atrazine are no longer labeled** for CRP or warm season grass establishment in Minnesota although many are still labeled in some other states. **Pursuit** can be applied postemergence to seedling legumes after 3 fully-expanded trifoliolate leaves and to grasses at or after the 4-leaf stage of growth in CRP. Refer to the Pursuit label for labeled legume and grass species. Aatrex 4L or Pursuit treated forage may not be grazed or hayed if acreage is released for emergency forage. **See GP12 for details on Escort use, GP13 for details for Plateau use.**

**Buctril 2L\*, Buctril 4EC\* (bromoxynil)** controls most broadleaf weeds postemergence in CRP grass seedings. Apply 1 to 2.0 pt 2L or 0.5 to 1.0 pt/A 4EC after grass emergence. If alfalfa is planted with grasses, apply after the 4 trifoliolate leaf stage and do not exceed the 1.5 pt 2L or the 0.75 pt 4EC rate. Unacceptable injury may occur to alfalfa in the 2 trifoliolate stage or smaller with uneven stands, or under conditions favoring leaf-burn. Legumes other than alfalfa may be severely injured. Broadleaf weeds should not exceed 2 inches in height, the 4-leaf stage, or 1 inch in diameter, which ever comes first. Use the low rate on eastern black nightshade, cocklebur, lambsquarters, shepherdspurse, pennycress, smartweeds, and wild buckwheat. Use the high rate on redroot pigweed, velvetleaf, ragweeds, Kochia, and wild mustard. The low rate of bromoxynil can be tank mixed with 0.25 to 0.5 MCPA to improve Kochia and pigweed control.

**Do not:**

- add adjuvants or fluid fertilizers if seeded with alfalfa or other legumes
- graze treated areas
- use MCPA with bromoxynil if grasses are seeded with legumes

\* or generic equivalent.

**Table GP1.****Package mixtures labeled for use in Grass Pastures and CRP are as follows:**

<b>Trade Name</b>	<b>Formulation</b>	<b>Common Name</b>	<b>Active Ingredient / Acid Equivalent</b>
<b>Brash</b>	3.87 L	dicamba & 2,4-D	1 lb/gal & 2.87 lb/gal
<b>Chaparral</b>	61.95 DG	aminopyralid & metsulfuron-methyl	52.5% & 9.45%
<b>Cimarron Max</b>	60DF + 3.87L	metsulfuron-methyl + dicamba & 2,4-D	60% & 1 lb/gal & 2.87 lb/gal
<b>Cimarron Plus</b>	63 DG	metsulfuron-methyl & chlorsulfuron	48% & 15%
<b>Cimarron X-tra</b>	67.5 DG	metsulfuron-methyl & chlorsulfuron	30% & 37.5%
<b>Crossbow</b>	3 E	triclopyr & 2,4-D	2 lb/gal & 1 lb/gal
<b>Curtail</b>	2.38 L	clopyralid & 2,4-D	0.38 lb/gal & 2 lb/gal
<b>Curtail M</b>	2.77 E	clopyralid & MCPA	0.42 lb/gal & 2.35 lb/gal
<b>ForeFront R&amp;P</b>	3 L	aminopyralid & 2,4-D	0.33 lb/gal & 2.67 lb/gal
<b>Grazon P+D</b>	2.54 S	picloram & 2,4-D	0.54 lb/gal & 2 lb/gal
<b>Overdrive</b>	70 DF	diflufenzopyr & dicamba	20% & 50%
<b>Rage D-Tech</b>	4.06 EC	carfentrazone-ethyl & 2,4-D	0.13 lb/gal & 3.93 lb/gal
<b>Redeem R&amp;P</b>	3 S	triclopyr & clopyralid	2.25 lb/gal & 0.75 lb/gal
<b>Rifle-D</b>	3.87 L	dicamba & 2,4-D	1 lb/gal & 2.87 lb/gal
<b>Weedmaster</b>	3.87 L	dicamba & 2,4-D	1 lb/gal & 2.87 lb/gal

**Table GP2. Summary of herbicides for use in Grass Pastures and Conservation Reserve Program Acres**

<u>Application Type</u>			
Herbicide / Formulation	Rate Range	Grazing/Harvest Restrictions*	Remarks
<b><u>Preplant or Preemergence</u></b>			
<b>Escort XP 60 DF</b> (metsulfuron-methyl)	0.1 oz (0.004 lb ai/A)	No	Apply to new seedlings before or after planting but before grasses emerge. Refer to the label for tolerant grass species. Do not apply preplant or preemergence to orchardgrass or Russian wildrye grass as severe crop injury may occur.
<b><u>Surface applied</u></b>			
<b>Spike 20 P</b> (tebuthiuron)	3.75 to 20 lbs (0.75 to 4 lb ai/A)	Yes	For brush control in grass pastures. Do not use on CRP acres. Very persistent. Dormant season applications are recommended to minimize desirable grass forage injury. Pasture use rates will control or suppress white or bur oak, sumacs, cottonwood, elms, some spruces and firs.
<b><u>Postemergence</u></b>			
<b>2,4-D Amine 4 S</b>	1 to 4 pts	Yes	Use higher rates for perennial or biennial weeds and small brush. Affordable, broad spectrum control of broadleaf weeds and degrades rapidly in the environment.
<b>2,4-D Ester 4 E</b> (2,4-D)	0.5 to 2 qts (0.5 to 2 lb ai/A)		
<b>Banvel 4 S</b> (dicamba)	0.5 to 4 pts (0.25 to 2 lb ai/A)	Yes	Annual, biennial, and perennial broadleaf weed control. For most annual broadleaf weeds, apply 0.5 to 1.0 pt/A or for hard to control perennial broadleaf weeds apply 1.0 to 4.0 pts/A. Use higher rates only for spot application.
<b>Brash 3.87 L</b> (dicamba & 2,4-D)	0.5 to 4 pts (0.25 to 2.0 lb ai/A)	Yes	Annual, biennial, and perennial broadleaf weed control. Package mixture of 2,4-D and dicamba that provides more economical, more consistent control of a broad spectrum of broadleaf weeds, and poses less environmental concerns than using higher rates of dicamba alone.
<b>Chaparral 61.95 DG</b> (aminopyralid & metsulfuron-methyl)	1 to 3.3 oz (0.039 to 0.128 lb ai/A)	No	Apply 1.0 to 2.0 oz/A for biennial thistles, 1.5 to 2.0 oz/A for dandelion and yarrow, 2.0 to 2.5 oz/A for hoary alyssum, burdock, tall buttercup, wild carrot, curly and smooth dock, 2.5 to 3.0 oz/A for wild parsnips and fireweed, 2.5 to 3.3 oz/A for bracken fern, absinth wormwood, tansy spotted knapweed, oxeye daisy, hawkweeds, mullein, houndstoungue, and Canada thistle. Apply with a crop oil concentrate or nonionic surfactant. Use petroleum crop oil concentrate (COC) or methylated seed oil (MSO) at rate of 1% v/v (2% under arid conditions). MSO may be used at a rate of 0.5% v/v if indicated on the adjuvant label. Use NIS at a rate of 0.25% v/v (0.5% under arid conditions). Ammonium nitrogen fertilizer may also be included at rates of 2 to 4 qts/A UAN or 2 to 4 lbs AMS.
<b>Cimarron Max 60DF + 3.87L</b> (metsulfuron-methyl + dicamba & 2,4-D)	0.25 to 1 oz + 1 to 4 pts (0.009 to 0.037 + 0.48 to 1.94 lb ai/A)	Yes	Cimarron Max is a co-pack consisting of 5 ounces Part A (metsulfuron) and 2.5 gallons Part B (dicamba & 2,4-D). Always apply Parts A and B in ratios as outlined on the product label. Apply with a crop oil concentrate or nonionic surfactant. Use petroleum crop oil concentrate (COC) or methylated seed oil (MSO) at rate of 1% v/v (2% under arid conditions). MSO may be used at a rate of 0.5% v/v if indicated on the adjuvant label. Use NIS at a rate of 0.25% v/v (0.5% under arid conditions). Ammonium nitrogen fertilizer may also be included at rates of 2 to 4 qts/A UAN or 2 to 4 lbs AMS.
<b>Cimarron Plus 63 DG</b> (metsulfuron-methyl & chlorsulfuron)	0.125 to 1.25 oz (0.005 to 0.05 lb ai/A)	No	Apply to weeds less than 4 inches tall or in diameter and actively growing. Apply with a crop oil concentrate or nonionic surfactant. Use petroleum crop oil concentrate (COC) or methylated seed oil (MSO) at rate of 1% v/v (2% under arid conditions). Use NIS at a rate of 0.25% v/v (0.5% under arid conditions). Ammonium nitrogen fertilizer may also be included at rates up to 2% v/v/A UAN or up to 17 lbs/A AMS. Refer to the label for precautions on certain grass species.
<b>Cimarron X-tra 67.5 DG</b> (metsulfuron-methyl & chlorsulfuron)	0.5 to 2 oz (0.021 to 0.084 lb ai/A)	No	Apply to weeds less than 4 inches tall or in diameter and actively growing. Apply with a crop oil concentrate or nonionic surfactant. Use petroleum crop oil concentrate (COC) or methylated seed oil (MSO) at rate of 1% v/v (2% under arid conditions). Use NIS at a rate of 0.25% v/v (0.5% under arid conditions). Ammonium nitrogen fertilizer may also be included at rates up to 2% v/v/A UAN or up to 17 lbs/A AMS. Refer to the label for precautions on certain grass species.

\* Refer to Table GP3 Grazing Restrictions for Pasture Herbicides for 2009.

**Table GP2. Summary of herbicides for use in Grass Pastures and Conservation Reserve Program Acres**

<u>Application Type</u>			
Herbicide / Formulation	Rate Range	Grazing/Harvest Restrictions*	Remarks
<b>Postemergence</b>			
<b>Clarity 4 S</b> (dicamba)	0.5 to 4 pts (0.25 to 2.0 lb ai/A)	Yes	Annual, biennial, and perennial broadleaf weed control. For most annual broadleaf weeds, apply 0.5 to 1.0 pt/A, or for hard to control perennial broadleaf weeds apply 1.0 to 4.0 pts/A. Use higher rates only for spot application.
<b>Crossbow 3 E</b> (triclopyr & 2,4-D)	up to 4 qts (up to 3 lb ai/A)	Yes	Additional control of brush and some broadleaf weeds compared to 2,4-D alone. Use 2 qts/A or less for most broadleaf herbaceous weeds as rates up to 4 qts/A are generally for brush control.
<b>Curtail 2.38 L</b> (clopyralid & 2,4-D)	2 to 4 qts (1.19 to 2.38 lb ai/A)	Yes	Additional control of composites (Asteraceae), especially biennials and Canada thistle compared to 2,4-D alone. Apply 2 qts/A for susceptible annual, biennial, and perennial broadleaf weeds; 3 to 4 qts/A for moderately susceptible biennials and perennials; and 4 qts/s for difficult to control weeds.
<b>Curtail M 2.77 E</b> (clopyralid & MCPA)	4 to 5 pts (1.39 to 1.73 lb ai/A)	Yes	Additional control of composites (Asteraceae), especially biennials and Canada thistle compared to MCPA alone. Apply 4 pts/A to light to moderate infestations of susceptible annual, biennial, and perennial broadleaf weeds. Apply 5 pts/A for more dense infestations or under poor growing conditions such as drought.
<b>Escort XP 60 DF</b> (metsulfuron-methyl)	0.1 to 1.0 oz (0.004 to 0.0375 lb ai/A)	No	Postemergence to established grass pastures: Broadcast 0.1 to 0.2 oz product/A to control buttercups, chickweed, mullein, wild carrot and curly dock; 0.2 to 0.75 oz/A for musk thistle; or 0.5 to 1.0 oz/A to control plumeless thistle in spring or early summer pre-flower. Use spot treatment (1 oz. product per 100 gallons water) application for control of Canada thistle in the spring when shoots are at least 6 to 10 inches tall but before flowering. Add nonionic surfactant (at least 80% active) at 1 to 2 pints per 100 gallons of water. For established pastures, bluegrass, brome grass and orchardgrass must be established 6 months: timothy 12 months and fescue 24 months before using Escort XP.  Postemergence to newly established grasses: Broadcast 0.1 oz product/A after the majority of grass seedlings are in the 3 to 4 leaf stage. Always add nonionic surfactant at 2 to 4 pt/100 gal spray solution for postemergence applications. Refer to the label for tolerant species.
<b>Firestorm 3 S</b> (paraquat)	0.7 to 1.3 pts (0.26 to 0.49 lb ai/A)	No	For pasture renovation or interseeding, broadcast applications only. Do not use on CRP acres. Suppresses most species listed for pasture renovation. Apply as a broadcast application to grazed or mowed pastures not more than 3 inches in height. Restricted Use Herbicide.
<b>ForeFront R&amp;P 3 L</b> (aminopyralid & 2,4-D)	1.5 to 2.6 pts (0.56 to 0.98 lb ai/A)	Yes	Apply 1.5 to 2 pts/A to control wild carrot, oxeye daisy, horsenettle, biennial thistles (bull, musk and plumeless), and absinth wormwood. Apply 2.0 to 2.6 pts/A for harder to control species such as burdock, chicory, curly and broadleaf docks, hawkweeds, and knapweeds. Spot treatment at equivalent broadcast rates of up to 84 fl oz/A (5.2 pts) may be particularly effective against dense patches of perennial broadleaf plants (however do not treat more than 50% of an acre at this rate). The addition of a nonionic surfactant at 0.25 to 0.5% v/v (1-2 qts per 100 gallons of spray) is recommended under adverse conditions (high temperature, low relative humidity, drought, dusty plant surfaces) or when weeds are heavily pubescent or more mature.
<b>glyphosate, others</b> (glyphosate)	varies by product (1.5 to 3 lb ai/A)	Yes	Many formulations available including Roundup and Cornerstone. Spot treatment or wiper applications for control of many annual and perennial weeds. No more than one-tenth of any given acre should be treated at one time. Also for pasture renovation with broadcast applications, providing longer-term suppression. Stand loss may occur (activity may be unpredictable depending on use rates, plant growth, and environmental conditions). Check specific formulation label for rates and restrictions.
<b>Gramoxone Inteon 2 S</b> (paraquat)	1.0 to 2 pts (0.25 to 0.50 lb ai/A)	No	For pasture renovation or interseeding, broadcast applications only. Do not use on CRP acres. Suppresses most species listed for pasture renovation. Apply as a broadcast application to grazed or mowed pastures not more than 3 inches in height. Restricted Use Herbicide.

\* Refer to Table GP3 Grazing Restrictions for Pasture Herbicides for 2009.

2009 Cultural and Chemical Weed Control in Field Crops : <http://appliedweeds.cfans.umn.edu/pubsweedbull.html>

**Table GP2. Summary of herbicides for use in Grass Pastures and Conservation Reserve Program Acres**

<u>Application Type</u>			
Herbicide / Formulation	Rate Range	Grazing/Harvest Restrictions*	Remarks
<b>Postemergence</b>			
<b>Grazon P+D 2.54 S</b> (picloram & 2,4-D)	1 to 8 qts (0.64 to 5.08 lb ai/A)	Yes	Package mixture that allows use of lower rates of picloram than possible with Tordon used alone. May reduce non-target or environmental concerns. Use 1 to 4 qts/A to control broadleaf weeds and 1 to 2 gallons/A to control woody plants and vines.
<b>MCPA Amine 4 S</b> <b>MCPA Ester 4 E</b> (MCPA)	0.25 to 2 qts 0.25 to 2 qts (0.25 to 2 lb ai/A)	Yes	Use higher rates for perennial weeds. Use either ester or amine formulations. Affordable, broad spectrum control of broadleaf weeds and degrades rapidly in the environment.
<b>Milestone 2 L</b> (aminopyralid)	3 to 7 fl oz (0.047 to 0.11 lb ai/A)	No	Apply in the spring before early bloom for annuals or biennials, during bud stage for perennials, or treat active growth or regrowth in the fall. Addition of 0.25 to 0.5% nonionic surfactant to improve consistency of control. Do not add surfactant if using Milestone when trying to gain tolerance in desirable forbs. Excellent on musk, plumeless and Canada thistle. Apply 3 to 5 oz/A Milestone postemergence to control musk and plumeless thistle, 4 to 6 oz/A for tall buttercup, chicory, oxeye daisy, curly dock, orange and yellow hawkweed, or bitter sneezeweed, 5 to 7 oz/A to control Canada thistle, spotted knapweed or fireweed, and 6 to 7 oz/A to control absinth wormwood.
<b>Overdrive 70 DF</b> (diflufenzopyr & dicamba)	4 to 8 oz (0.18 to 0.36 lb ai/A)	No	Labeled for grass pastures only. Do not use on CRP acres. Includes an auxin transport inhibitor (diflufenzopyr) available only in a package mixture with dicamba. Improves performance of dicamba, but generally recommended to add reduced rates of other broadleaf weed herbicides for general overall performance (see label for details on tank mixtures and specific additive instructions). Overdrive must be applied with nonionic surfactant (1 qt/100 gal spray solution) or methylated seed oil (1.5 to 2 pts/A or 1% v/v if applied at >30 gpa). Consider MSO for hard to control species or when weeds are stressed.
<b>Parazone 3SL 3 S</b> (paraquat)	0.7 to 1.3 pts (0.26 to 0.49 lb ai/A)	No	For pasture renovation or interseeding, broadcast applications only. Do not use on CRP acres. Suppresses most species listed for pasture renovation. Apply as a broadcast application to grazed or mowed pastures not more than 3 inches in height. Restricted Use Herbicide.
<b>Plateau 2 L</b> (imazapic)	2 to 12 fl oz (0.032 to 0.189 lb ai/A)	Yes	Apply 2 to 6 fl oz/A to control annual weeds to establish native grasses or grass/wildflower mixtures, or to renovate established stands. Warm season grasses in general are more tolerant than cool season grasses. See label for recommended rates, and tolerance to preemergence or postemergence applications. 2 to 4 fl oz/A generally results in good annual weed control under Minnesota conditions. Add 1.5 to 2 pts/A methylated seed oil vegetable based COC or 0.25% v/v nonionic surfactant. May add 2 to 3 pts/A UAN or AMS nitrogen to improve burndown of annual weeds. Plateau 2L at 8 to 12 fl oz/A can be used for perennial weed control, but can be injurious to desirable species under Minnesota conditions, especially on stands that are not established.
<b>Rage D-Tech 4.06 EC</b> (carfentrazone-ethyl & 2,4-D)	8 to 32 oz (0.25 to 1 lb ai/A)	Yes	Labeled for grass pastures only. Do not use on CRP acres. Broadcast applications can be made to seedling grass from 5 leaf stage to boot stage. Applications to established grasses or pastures may be made up to boot stage. A nonionic surfactant (0.25% v/v) or crop oil concentrate (1.5 to 2% v/v) is required. May add 2 to 4% v/v pts UAN or 2 to 4 lbs/S AMS nitrogen/A to improve burndown of annual weeds. Apply to 4-6 inch weeds.
<b>Redeem R&amp;P 3 S</b> (triclopyr & clopyralid)	1 to 4 pts (0.375 to 1.5 lb ai/A)	Yes	Apply 0.5 to 2 pts/A for most broadleaf weeds including oxeye daisy, 2 to 3 pts/A for perennial sowthistle, and 4 pts/A for orange or yellow hawkweed control. An economical approach for Canada, musk and plumeless thistle, oxeye daisy, orange or yellow hawkweed, perennial sowthistle, and spotted knapweed control; control a broader spectrum of broadleaf weeds, and reduce leaching or surface runoff potential compared to Stinger alone. The addition of a nonionic surfactant at the manufacturer's recommended rate is required.

\* Refer to Table GP3 Grazing Restrictions for Pasture Herbicides for 2009.

**Table GP2. Summary of herbicides for use in Grass Pastures and Conservation Reserve Program Acres**

<u>Application Type</u>			
Herbicide / Formulation	Rate Range	Grazing/Harvest Restrictions*	Remarks
<b>Postemergence</b>			
<b>Remedy Ultra 4 E</b> (triclopyr)	1 to 4 qts (1 to 4 lb ai/A)	Yes	Primarily for deciduous brush control as foliar, cut-stump, or basal bark sprays. Add oil to carrier per Remedy Ultra label instructions for improved control. Controls ash, cherry, oak, locust, willow species and more.
<b>Rifle 4 S</b> (dicamba)	0.5 to 4 pts (0.25 to 2 lb ai/A)	Yes	Annual, biennial, and perennial broadleaf weed control. For most annual broadleaf weeds, apply 0.5 to 1.0 pt/A, or for hard to control perennial broadleaf weeds apply 1.0 to 4.0 pts/A. Use higher rates only for spot application.
<b>Rifle-D 3.87 L</b> (dicamba & 2,4-D)	0.25 to 2 qts (0.25 to 2 lb ai/A)	Yes	Annual, biennial, and perennial broadleaf weed control. Package mixture of 2,4-D and dicamba that provides more economical, more consistent control of a broad spectrum of broadleaf weeds, and poses less environmental concerns than using higher rates of dicamba alone.
<b>Sterling Blue 4 S</b> (dicamba)	0.5 to 4 pts (0.25 to 2 lb ai/A)	Yes	Annual, biennial, and perennial broadleaf weed control. For most annual broadleaf weeds, apply 0.5 to 1.0 pt/A, or for hard to control perennial broadleaf weeds apply 1.0 to 4.0 pts/A. Use higher rates only for spot application.
<b>Stinger 3 S</b> (clopyralid)	0.5 to 1.33 pts (0.19 to 0.5 lb ai/A)	No	Clopyralid provides aggressive control of composite (Asteraceae) species. Apply 0.5 to 1.33 pts/A Stinger. Expensive, but no grazing or haying restrictions and less damaging to nontarget dicot broadleaf species. Very effective on musk, plumeless, bull, and Canada thistle at the 1/2 to 2/3 pt/A rate.
<b>Telar XP 75 DF</b> (chlorsulfuron)	0.25 to 1.33 oz (0.012 to 0.062 lb ai/A)	No	See label for rate breakdown by grass species. Broad-spectrum broadleaf weed control in established grass pastures. Rates up to 3 oz product can be used on noncrop sites, but can not be grazed if over 1.33 oz product applied. Very persistent product, especially where soil pH is > 7.5.
<b>Tordon 22K 2 S</b> (picloram)	up to 2 qts (up to 1.0 lb ai/A)	Yes	Annual and perennial broadleaf weed control. Tordon has long soil residual which improves control of perennial species and controls seedlings which germinate after application. Use up to 2 qts/A for noxious weeds, up to 1 qt/A for others. Spot treat at a rate equivalent to 2 qts/A to control any weed, but do not treat more than 50% of a given acre. Restricted Use Product.
<b>Weedmaster 3.87 L</b> (dicamba & 2,4-D)	0.5 to 4 pts (0.25 to 2.0 lb ai/A)	Yes	Annual, biennial, and perennial broadleaf weed control. Package mixture of 2,4-D and dicamba that provides more economical, more consistent control of a broad spectrum of broadleaf weeds, and poses less environmental concerns than using higher rates of dicamba alone.
<b>Conservation Reserve Program (CRP) Specific Usage</b>			
<b>Aatrex 4 L</b> (atrazine)	2 to 4 qts (2 to 4 lb ai/A)	Yes	For CRP only. Only Aatrex 4L formulation labeled 24(c) for establishment or renovation of certain warm season grass species and cool season western wheatgrass. Apply preplant incorporated or preemergence at the time of seeding prior to weed emergence or broadcast to existing stands prior to weed emergence for renovation. See label for rates, labeled grass species, and weeds controlled.
<b>Broclean 2 E</b> (bromoxynil)	1 to 2 pts (0.25 to 0.5 lb ai/A)	No	For CRP only. Controls annual broadleaf weeds in grass seedlings. Use the low rate on eastern black nightshade, cocklebur, lambsquarters, shepherdspurse, pennycress, smartweeds, and wild buckwheat. Use the high rate on redroot pigweed, velvetleaf, ragweeds, Kochia, and wild mustard. Use lower rates when seeded with alfalfa.
<b>Buctril 2 E</b> <b>Buctril 4 E</b> (bromoxynil)	1 to 2 pts 0.5 to 1 pt (0.25 to 0.5 lb ai/A)	No	For CRP only. Controls annual broadleaf weeds in grass seedlings. Use the low rate on eastern black nightshade, cocklebur, lambsquarters, shepherdspurse, pennycress, smartweeds, and wild buckwheat. Use the high rate on redroot pigweed, velvetleaf, ragweeds, Kochia, and wild mustard. Use lower rates when seeded with alfalfa.

\* Refer to Table GP3 Grazing Restrictions for Pasture Herbicides for 2009.

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**Table GP2. Summary of herbicides for use in Grass Pastures and Conservation Reserve Program Acres**

<u>ApplicationType</u>		Grazing/Harvest	
Herbicide / Formulation	Rate Range	Restrictions*	Remarks
<b>Conservation Reserve Program (CRP) Specific Usage</b>			
Pursuit 2 S	3 to 6 fl oz	Yes	For CRP only. Controls many annual broadleaf and grass weeds, and suppresses some perennial weeds. Pursuit has tolerance on many native, warm season grasses, and less so on some cool season grasses (see label for species tolerance details). Apply postemergence to seedling legumes after 3 fully-expanded trifoliolate leaves and to grasses at or after the 4-leaf stage of growth in CRP. Can not be grazed if released for emergency forage.
Pursuit 70 DG (imazethapyr)	1.08 to 2.16 oz (0.47 to 0.94 lb ai/A)		

\* Refer to Table GP3 Grazing Restrictions for Pasture Herbicides for 2009.

**Table GP 3. Grazing Restrictions for Pasture Herbicides for 2009.**

Herbicide		Rates		Lactating Dairy Animals		Beef Cattle, Non-Lactating Dairy, and Other Animals		Removal Before Slaughter
				Before Grazing	Before Hay Harvest	Before Grazing	Before Hay Harvest	
Common Name	Product Name	Product/A	lb ai or ae/A					
<i>aminopyralid</i>	<b>Milestone 2S</b> <sup>a, b</sup>	3 to 7 oz	0.047 to 0.109 ae	0	0	0	0	0
<i>aminopyralid</i> + 2,4-D	<b>Forefront 3S</b> <sup>a, b</sup>	1.5 to 2.6 pt	0.56 to 0.97 ae	0	7	0	7	0
<i>aminopyralid</i> + <i>metsulfuron methyl</i>	<b>Chaparral 62DG</b> <sup>a, b</sup>	1.0 to 3.3 oz	0.038 to 0.128 ai	0	0	0	0	0
<i>carfentrazone</i> + 2,4-D	<b>Rage D-Tech 6EC</b>	8 to 32 oz	0.51 to 1.5 lb ai	7	7	0	7	3
<i>chlorsulfuron</i>	<b>Telar XP</b>	0.25 to 1.33 oz	0.187 to 1.0 ai	0	0	0	0	0
<i>clopyralid</i>	<b>Stinger 3E</b> <sup>a, b</sup>	0.33 to 1.33 pt	0.12 to 0.5 ae	0	0	0	0	0
<i>clopyralid</i> + 2,4-D	<b>Curtail 2.38S</b> <sup>a, b</sup>	2 to 3 qts	1.19 to 1.78 ae	14 days	7 days	0	7 days	7 days <sup>c</sup>
<i>clopyralid</i> + MCPA	<b>Curtail M 2.77S</b> <sup>a, b</sup>	2 to 3 qts	1.38 to 2.0 ae	7 days	7 days	0	0	7 days <sup>c</sup>
<i>dicamba</i>	<b>Banvel 4S</b>	Up to 1 pt Up to 2 pt Up to 4 pt	0.5 ae 1.0 ae 2.0 ae	7 days 21 days 40 days	37 days 51 days 70 days	0 0 0	37 days 37 days 37 days	30 days 30 days 30 days
<i>dicamba</i> + 2,4-D	<b>Weedmaster</b>	0.5 to 4 pts	0.25 to 2.0 ae	7 days	37 days	0	37 days	30 days
<i>dicamba</i> + <i>diflufenzopyr</i>	<b>Overdrive</b>	4 to 8 oz	0.18 to 0.36 ae	0	0	0	0	0
<i>glyphosate</i>	<b>Roundup UltraMax 4S, others</b>							
	Spot or Wiper <sup>e</sup>	labeled rate varies	- - -	14 days	14 days	14 days	14 days	0
	Broadcast	labeled rate varies	- - -	8 weeks	8 weeks	8 weeks	8 weeks	0
<i>imazapic</i>	<b>Plateau 2L</b>	2 to 12 fl oz	0.032 to 0.189 ai	0	7 days	0	7 days	0
<i>metsulfuron methyl</i>	<b>Escort XP 60 DF</b>	0.1 to 0.4 oz	0.004 to 0.015 ai	0	0	0	0	0
<i>metsulfuron-methyl</i> + <i>dicamba</i> & 2,4-D	<b>Cimarron Max</b>	0.25 to 1 oz + 1 to 4 pts	0.012 to 0.047 ai + 0.48 to 1.94 ae	7 days	37 days	0	37 days	30 days
<i>metsulfuron-methyl</i> + <i>chlorsulfuron</i>	<b>Cimarron Plus 63 DG</b>	0.125 to 1.25 oz	0.005 to 0.049 ai	0	0	0	0	0
	<b>Cimarron X-tra 67.5 DG</b>	0.5 to 2.0 oz	0.021 to 0.084 ai	0	0	0	0	0
<i>paraquat</i>	<b>Firestorm or Parazone 3L</b> <sup>f</sup>	0.8 to 1.5 pts	0.25 to 0.47 ai	0	0	0	0	0
	<b>Gramoxone Inteon 2L</b> <sup>f</sup>	1.0 to 2.0 pts	0.25 to 0.5 ai	0	0	0	0	0
<i>picloram</i>	<b>Tordon 22K</b> <sup>a, b</sup>	1 to 2 qts	0.5 to 1.0 ae	14 days	14 days	0	0/14 days <sup>f</sup>	3 days <sup>c</sup>
<i>picloram</i> + 2,4-D	<b>Grazon P+D</b> <sup>a, b</sup>	1 to 4 pts	0.31 to 1.25 ae	7 days	30 days	0	30 days	3 days <sup>c</sup>
<i>tebuthiuron</i>	<b>Spike 20P</b> <sup>g</sup>	3.75 to 20.0 lbs	0.75 to 4.0 ai	0	1 year	0	1 year	0
	<b>Spike 80 DF</b> <sup>g</sup>	0.5 to 1.0 lb.	0.4 to 0.8 ai	0	1 year	0	1 year	0
<i>triclopyr</i>	<b>Remedy 4 S</b> <sup>h</sup>	0.5 to 4 qts.	0.5 to 4.0 ae	Next season	14 days	0 days	14 days	3 days <sup>d</sup>
<i>triclopyr</i> + <i>clopyralid</i>	<b>Redeem R &amp; P 3S</b> <sup>a, b</sup>	1.5 to 4.0 pts	0.56 to 1.5 ae	Next season	Next season <sup>i</sup>	0	14 days	3 days <sup>d</sup>
<i>triclopyr</i> + 2, 4-D	<b>Crossbow 3S</b> <sup>h</sup>	1 to 4 qts	0.75 to 3.0 ae	Next season	14 days	0	0	3 days <sup>d</sup>
<b>2,4-D / MCPA</b>	Numerous Products <sup>j</sup>	0.25 to 2 qts	0.25 to 2.0	7-14 days	30 days	0-7 days	30 days	0 to 3 days

<sup>a</sup> See label for restrictions on use of treated plant material or manure from animals grazing treated areas for mulch or compost on sensitive plants.

<sup>b</sup> Move livestock to untreated grass pasture or feed untreated forage for 7 days for Stinger, Curtail, Curtail M, Redeem, Grazon, and Tordon; for 3 days for Milestone, ForeFront, and Chaparral before transferring livestock to broadleaf crop or pasture areas.

<sup>c</sup> Removal before slaughter is not needed if the restricted grazing interval has expired since application. For Curtail, removal is not needed if 2 weeks or more have elapsed following application.

<sup>d</sup> Applies to grazing or hay harvested during the season of treatment.

<sup>e</sup> Do not treat more than one-tenth of any given acre at one time with spot or wiper applications. Remove livestock before application.

<sup>f</sup> 40 day hay harvest interval only on Bermuda grass, no interval required on other grasses.

<sup>g</sup> Restrictions apply to application rates listed. No grazing restrictions but do not exceed 20 lbs 20 P product per acre where rainfall exceeds 20 inches per year, 10 lbs per acre where rainfall is less than 20 inches per year. Do not exceed 5 lbs 80 DF product regardless of rainfall. With either formulation, do not harvest for hay for 1 year following any application.

<sup>h</sup> Grazed areas of non-cropland and forestry sites may be grazed if no more than 10% of the total grazable area is spot treated.

<sup>i</sup> Includes both harvesting green forage and dried hay.

<sup>j</sup> Be sure to check individual product labels for restrictions and use rates due to the large number of formulations available.

NOTE: Buctril (bromoxynil products) and Pursuit (imazethapyr) do not have clearance for grazing when used in CRP acres.

**Table GP4. Effectiveness of herbicides on major weeds in Grass Pastures and CRP Acres.**

Herbicides	Annual			Biennial				Perennials																			
	Hemp	Burdock	Knapweed, Spotted	Mullein	Thistle, Bull	Thistle, Musk	Thistle, Plumelless	Alyssum, Hoary	Aster spp.	Bracken Fern	Buttercup spp.	Daisy, Oxeye	Dandelion, Common	Dock, Curly	Goldenrod spp.	Hawkweeds	Nettle, Stinging	Snakeroot, White	Sowthistle, Perennial	Spurge, Leary	Tansy	Thistle, Canada	Toadflax, Yellow	Waterhenlock spp.	Wormwood, Absinth		
<b>Postemergence</b>																											
2,4-D, generic (2,4-D)	G	G	G	P	G	G	G	F/G	F/G	P	F	F	G	F	F/G	F	G	F	F	P/F	F	F	P	G	F/G		
Banvel (dicamba)	G	G	G	F	G	G	G	F	G	F	P	F	G	G	F/G	F	F	G	F	P	F	G	P	F	G		
Brash (dicamba & 2,4-D)	G	G	G	F	G	G	G	F/G	F/G	P/F	P/F	F	G	G	F/G	F	F/G	F/G	F/G	P/F	F	F/G	P	F/G	G		
Chaparral (aminopyralid & metsulfuron-methyl)	G	G	G	F/G	G	G	G	-	F/G	-	G	G	F/G	G	F/G	G	F	F/G	G	P/F	F/G	G	P/F	F/G	G		
Cimarron Max (metsulfuron-methyl + dicamba & 2,4-D)	G	G	G	F	G	G	G	F/G	F/G	P/F	F/G	F/G	G	F/G	F/G	F	F/G	F/G	F/G	P/F	F/G	F/G	P/F	F/G	F/G		
Cimarron Plus (metsulfuron-methyl & chlorsulfuron)	-	F/G	F	F	G	G	G	-	F/G	-	F/G	F	F/G	F	F	P	-	-	F/G	P/F	F/G	F	P/F	-	N		
Cimarron X-tra (metsulfuron-methyl & chlorsulfuron)	-	F/G	F	F	G	G	G	-	F/G	-	F/G	F	F/G	F	F	P	-	-	F/G	P/F	F/G	F	P/F	-	N		
Clarity (dicamba)	G	G	G	F	G	G	G	F	G	F	P	F	G	G	F/G	F	F	G	F	P	F	G	P	F	G		
Crossbow (triclopyr & 2,4-D)	G	G	G	P	G	G	G	F	F	P	G	F	G	G	F/G	F	G	F	F	F	F	F	P	G	F		
Curtail (clopyralid & 2,4-D)	G	G	G	P	G	G	G	F/G	G	P	F	G	G	G	F/G	G	G	G	F	P/F	F	G	P	G	G		
Curtail M (clopyralid & MCPA)	G	G	G	P	G	G	G	F/G	G	P	F	G	G	G	F/G	G	F/G	G	F	P/F	F	G	P	G	G		
Escort XP (metsulfuron-methyl)	-	F/G	F	F	G	F/G	F/G	-	F/G	-	F/G	F/G	F/G	F	F/G	P	-	-	F/G	P	F/G	F	P/F	-	N		
ForeFront R&P (aminopyralid & 2,4-D)	G	G	G	F/G	G	G	G	F/G	G	P	G	G	G	G	F	G	F/G	F	G	P/F	F	G	N	G	G		
glyphosate, generic (glyphosate)	G	G	G	G	G	G	G	G	G	F	G	G	G	G	G	G	G	G	G	F	G	G	G	G	G		
Grazon P+D (picloram & 2,4-D)	G	G	G	G	G	G	G	F	G	F	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		
MCPA, generic (MCPA)	G	G	G	P	G	F	F	F	F	P	G	F	G	F	F	P	F	F	F	N	N	F	P	F	P		
Milestone (aminopyralid)	G	G	G	F/G	G	G	G	N	G	N	G	G	P	G	P	G	F	N	G	P	F	G	P	N	G		
Overdrive (diflufenzopyr & dicamba)	F/G	G	G	F/G	G	G	G	-	F/G	-	F/G	F/G	G	G	F	F	F	F/G	F	P	F/G	F/G	P	F	F/G		
Plateau (imazapic)	-	-	F/G	-	F/G	F/G	F/G	F/G	P	-	-	N	F	F/G	-	-	-	-	-	F/G	-	F	F	-	-		
Rage D-Tech (carfentrazone-ethyl & 2,4-D)	G	G	G	P	G	G	G	F/G	F/G	P/F	F	F/G	G	F	F/G	F	G	F	F	P/F	F	F	P/F	G	F/G		
Redeem R&P (triclopyr & clopyralid)	G	G	G	P	G	G	G	F	G	P	F	G	G	G	P	G	-	G	F	N	-	G	P	-	F		
Remedy Ultra (triclopyr)	G	-	-	-	-	-	-	F	-	-	F	-	F	G	-	-	-	-	-	-	-	-	-	-	-		
Rifle (dicamba)	G	G	G	F	G	G	G	F	G	F	P	F	G	G	F/G	F	F	G	F	P	F	G	P	F	G		
Rifle-D (dicamba & 2,4-D)	G	G	G	F	G	G	G	F/G	F/G	P/F	P/F	F	G	G	F/G	F	F/G	F/G	F/G	P/F	F	F/G	P	F/G	G		
Sterling Blue (dicamba)	G	G	G	F	G	G	G	F	G	F	P	F	G	G	F/G	F	F	G	F	P	F	G	P	F	G		
Stinger (clopyralid)	-	G	G	P	G	G	G	-	G	P	F	G	G	-	P	G	-	G	F	N	-	G	P	-	F		
Telar XP (chlorsulfuron)	-	-	F	F	G	G	G	-	F/G	-	F/G	-	F/G	F	F	P	-	-	F/G	P/F	-	F	P/F	-	N		
Tordon 22K (picloram)	G	G	G	G	G	G	G	G	G	F	G	G	G	G	G	G	G	G	G	G	G	G	G	G	G		
Weedmaster (dicamba & 2,4-D)	G	G	G	F	G	G	G	F/G	F/G	P/F	P/F	F	G	G	F/G	F	F/G	F/G	F/G	P/F	F	F/G	P	F/G	G		

NOTE: G = Good; F= Fair; P = Poor; N = No control, - = no Minnesota or other applicable data available to determine a reliable control rating. Effectiveness ratings apply if herbicide is used according to label recommendations as to rate, time of application, etc., and favorable temperature and moisture conditions prevail.