

Integrated Weed Management Plan
Foxtail Pines Owners Association

Prepared by Jude O'Connor
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Background:

The State of Colorado passed the Colorado Noxious Weed Act in 1990 and updated it in 2003. The intent of the act is to control noxious weeds that threaten native plant communities, wildlife habitat, agricultural lands, and property values.

The list of plants on the Noxious Weed list is prioritized by A, B, and C designation, as well as a watch list. Plants on the A list are species designated for eradication. Plants on the B list are species that require weed management plans designed to stop the continued spread of these plants. Plants on the C list are targeted for additional education, research, and biological control. The watch list monitors plants that may become a threat.

Facts and Findings:

There are three noxious weeds growing in Foxtail Pines; all three are listed on the B list (and thus require weed management plans). They are: Canada thistle (*Cirsium arvense*), Yellow toadflax (*Linaria vulgaris*), and Scentless chamomile (*Matricaria perforata*).

Additionally, there has recently been an invasion of Yellow sweet clover (*Melilotus officinalis*). This plant is not on the State Noxious Weed list but it is generally assumed by plant managers to be a threat to native vegetation. Unfortunately, it is still used in seed mixes used by both Park County and Colorado Department of Transportation. Professionals in the industry are voicing concern to these agencies regarding the addition of Yellow sweet clover in seed mix specifications.

The location of the aforementioned plants is significant as it defines who is responsible for management. There is an increasing population of both Canada thistle and Yellow toadflax at the pond, but both Scentless chamomile and Yellow sweet clover are primarily found along the county rights-of-way, and are the management responsibility of the county. However, the county has no budget for weed control. The best management practice for the noxious weeds growing along the rights-of-way is to notify the county of intent by owners to control these plants.

Management Strategies:

This weed management plan utilizes the Integrated Pest Management (IPM) approach. IPM is an ecosystem-based strategy that focuses on pest management through a combination of techniques. These include:

- Cultural control (i.e. establishing and maintaining healthy stands of vegetation)
- Mechanical control (i.e. mowing, hand picking, or grazing)
- Biological control (i.e. introducing predators, parasites, or pathogens)
- Chemical control (using the least toxic pesticide when appropriate)

Pesticides are used only when other strategies alone are not effective to control the target weed. Pesticides are selected and applied in a way that minimizes possible harm to people, non-target organisms, and the environment.

Additionally, Best Management Practices (BMP) from the Colorado Green Industry, based upon research and field trials, are offered.

Target Weeds:



Canada thistle is an aggressive perennial plant that generally takes hold in disturbed sites. If left unchecked, it will continue to spread and crowd out native vegetation. The best control methods are those that continually stress the plant and reduced stored energy in the root system. Sound control strategies will likely take between two and three years to be effective. After the population of thistle is dramatically reduced, it's essential to over-seed and re-establish desirable vegetation.

Although the State of Colorado Department of Agriculture is experimenting with biological controls (primarily weevils and rust) they are not proving to be very effective on Canada thistle and may not be suitable for high altitudes.

With appropriate timing and frequency, mowing is an effective first step in control. Mowing needs to begin with the first flush of growth, probably in May, and then continued every three to four weeks thru August. Research indicates that when this method is used in conjunction with a fall application of herbicide (to assure depletion of carbohydrates in the root system going into winter) control will occur sooner and more completely than control without a fall herbicide application.

Although research in Nevada and Idaho suggests goat grazing as an effective control (when used in conjunction with a fall herbicide application) Dr. George Beck (Weed Science Professor and Extension Specialist at Colorado State University) found that neither grazing nor burning was effective on Canada thistle control in his Colorado field trials. (See attachment.) Given this information, and the fact that it will likely be less expensive to mobilize a mowing operation than goats, mowing is the most appropriate mechanical control.

Control of thistle at the pond should begin with mowing every three to four weeks, beginning at plant emergence and continuing until August. In early September, an application of the herbicide Milestone should be applied. Although Milestone is a non-restricted chemical and can be purchased and applied by anyone, hiring someone with a State of Colorado Pesticide Applicators License would help ensure safe and proper application. It will likely take two to three years of this protocol to control the Canada thistle. Over-seeding should occur after control to re-establish desirable vegetation.

There may be debate regarding the desire to use an herbicide. There is no doubt about the efficacy of a fall herbicide application and it is used in most successful weed management programs, including Open Space in Summit and Jefferson counties. When the least toxic herbicide is used and properly applied, it provides no more of an environmental threat than a spreading patch of thistle. Should the choice be made to not use a fall chemical control in conjunction with mowing, it should be assumed that control methods will need to be implemented for a period of at least seven years and even then, eradication is unlikely.

There are approximately two thousand square feet of thistle at the pond. A random survey of outlots indicate no infestation there, but a more complete survey should be conducted. This size of the thistle population is very manageable and control should begin in the spring of 2017 to reduce further spread.



Yellow toadflax is an invasive plant that is starting to show up in Foxtail Pines. The only notable patch of Yellow toadflax is at the Pond. Again, like Canada thistle, Yellow toadflax takes hold in disturbed areas more easily. Surveys should be conducted to see if there are other patches of this plant.

The Yellow toadflax population at the Pond is still relatively small, approximately two hundred square feet. Research indicates that pulling can fairly effectively kill the plant by removing the root system, although it will likely need to be done a few times per season and for several years. In contrast, mowing or grazing will reduce flowering and seed production, but this 'surface treatment' does not control the roots. Toadflaxes contain glucosides that are poisonous to livestock. However, animals will typically avoid eating these species.

There are biological controls available for Yellow toadflax, but given the small population of the plant, it would be easier and quicker to manage with cultural control.

Just as in the case of Canada thistle, the population of this weed is still relatively small and control should begin in the spring of 2017 to reduce spread.



Scentless chamomile has been a problem in Alma for several years and is now infesting the area around U.S. 285 and Colorado 9. It is also starting to establish itself along the rights-of-way in Foxtail Pines. There are no biological controls currently available for controlling Scentless chamomile and, like Yellow toadflax, are plants that (because of their chemical composition) are not likely to be grazed by animals.

For the past several years, the Mosquito Range Heritage Initiative has been organizing community service days to hand pull Scentless chamomile and this seems to be an effective control method. It is important that plants be bagged and disposed securely off site.

Given that Scentless chamomile is growing either exclusively or primarily on private or county property, Foxtail Pines should provide an educational outreach program to owners (perhaps via the website and annual letters). Additionally, a community service day to pull and properly dispose of plants would be helpful.



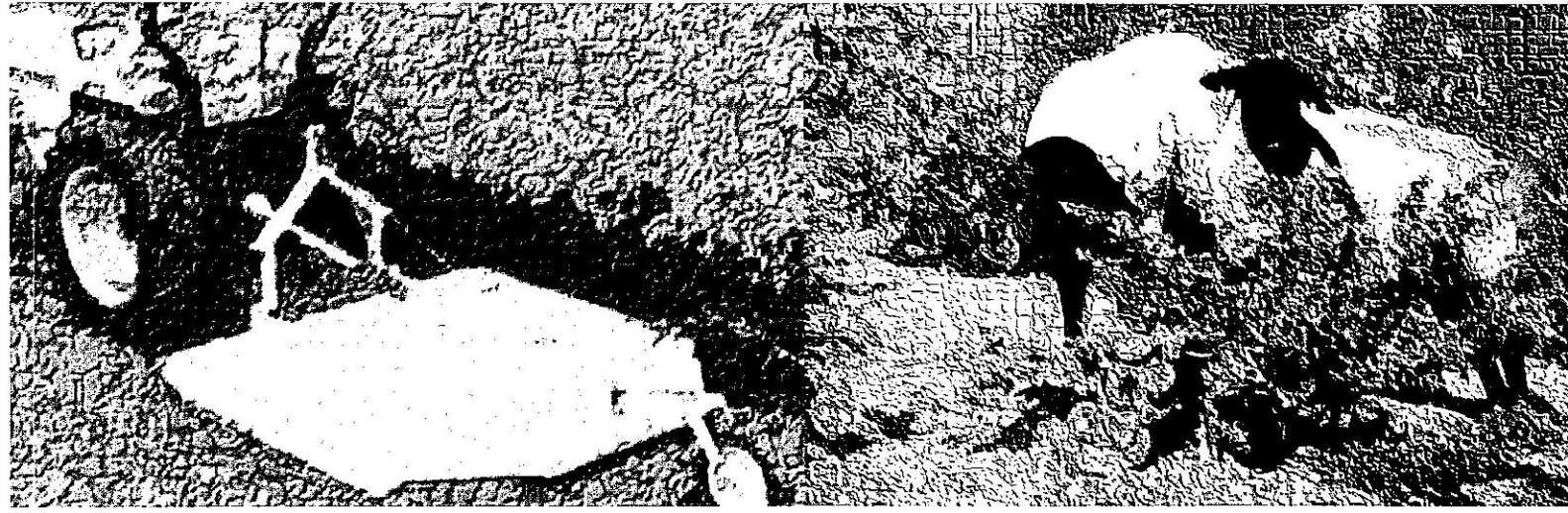
Yellow sweet clover started establishing itself in the Fairplay area and along rights-of-way in Foxtail Pines over the past few years. Although not on the Colorado Noxious Weed List, this plant nevertheless poses a threat to native vegetation. Aside from chemical control, the best management strategy is to pull the plant prior to seeding and bagging and disposing of plants off site. As the plant matures, it develops very woody qualities and should be pulled in its young stages. As with Scentless chamomile, an educational outreach program to owners and possibly a community service pulling day would be a prudent strategy.

Resources:

Deborah Lester (719-836-4296) is the Horticulture Agent for CSU Extension, Park County, and is located in Fairplay. She has experience with weed management in our area and is available to consult with the Board and/or provide a presentation at the Owners Annual Meeting. She knows of personnel available to implement the plan.

Park County does not have a Weed Manager, but shares a seasonal weed management specialist with Teller County. This position is currently vacant, but contact can be made in the spring thru Marisa Nuezil, Teller-Park Conservation District (719-472-3671). Marisa may also have references of qualified individuals available to implement the plan.

Weed Managers of both Summit and Jefferson Counties were very willing to share their experience. The Summit County coordinator is Ben Pleimann (970-668-4218) and the Jefferson County coordinator is Alicia Doran (303-271-5989).



Weed Control in Natural Areas in the Western United States

Weed Research & Information Center • University of California



Cirsium arvense (L.) Scop.

Canada thistle

Family: Asteraceae

Range: Found throughout much of the United States, including all western states.

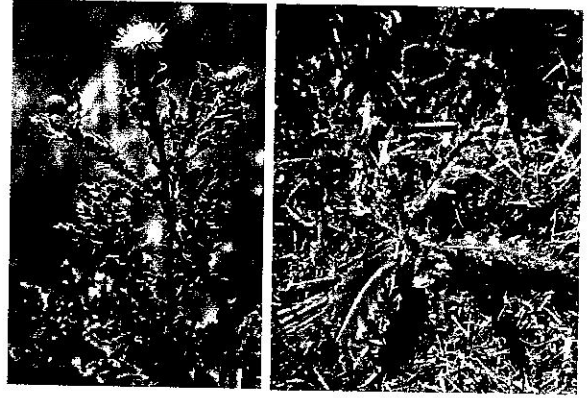
Habitat: Open, disturbed sites such as roadsides, gardens, pastures, hillsides, rangeland, stream banks, forest openings, and sometimes cropland such as alfalfa or grains. Prefers moist soils but will tolerate a wide range of soil types.

Origin: Native to southeastern Europe and the eastern Mediterranean area.

Impact: Competes aggressively with native plant species. It causes extensive yield loss in crops by competing for nutrients, light and water. It may also have an allelopathic effect. The productivity of pastures is significantly reduced because livestock avoid grazing Canada thistle and surrounding plants due to the spiny nature of the mature foliage. Canada thistle can also be economically damaging to ranchers by causing an increase in infections due to abrasions. Canada thistle is a host species for several agricultural insect and disease pests such as the sod-web worm, bean aphid, stalk borer, and cucumber mosaic virus.

Western states listed as a noxious weed: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, Wyoming

California Invasive Plant Council (Cal-IPC) Inventory: Moderate Invasiveness



Canada thistle is an erect perennial that grows up to 3 to 5 ft tall and forms patches or clumps that are usually of a single sex. Stems ordinarily die back over winter and new shoots are formed in spring from old stem bases or root buds when the soil moisture permits. Canada thistle has an extensive creeping root system that can reach depths of 6 to 15 ft making eradication difficult. The spiny lobed leaves are 6 to 8 inches long and 1 to 1.5 inches wide. The leaves are alternate, oblong or lance-shaped and the base leaves stalkless and clasping.

Plants are dioecious (separate male and female plants) and flower heads are white to purple, borne in clusters of 1 to 5 per branch. The purplish involucre is glabrous or has white wooly hairs. Plants develop from seed and from vegetative shoots that generate from adventitious root buds. Canada thistle can produce between 1,000 and 5,000 seeds per stem. Most seeds fall near the parent plants or disperse short distances with wind. Birds and small mammals can consume and disperse some seeds. The seeds have been known to survive in the soil for up to 20 years and longevity is favored by deep burial.

NON-CHEMICAL CONTROL

Mechanical (pulling, cutting, disking)	Mowing can be used to reduce the nutrient storage in the roots and suppress flower formation. However, for mowing to be effective it must be repeated at least every 3 to 4 weeks over several growing seasons or coupled with other control practices. Tillage or cultivation can actually increase Canada thistle because it breaks the root system into fragments, spreading the roots through the soil and stimulating development of new plants. Small root pieces have enough stored reserves to develop new plants. Small roots can survive at least 100 days without nutrient replenishment from photosynthesis. For cultivation to be effective it must be repeated at 21 day intervals throughout the growing season.
Cultural	Neither grazing nor prescribed burning have been shown to be effective for the management of Canada thistle.
Biological	Three insects have been released as biocontrol agents. None of these species have had a significant impact on Canada thistle. The larvae of the Canada thistle stem weevil (<i>Ceutorhynchus litura</i>) bore into the main leaf vein and then into the crown. It is considered the most effective of the current biocontrol agents, reducing plant vigor. When present in high enough densities it can kill the plant. Larvae of the bud weevil (<i>Larinus planus</i>) feed on the bud and can reduce the potential for sexual reproduction. Larvae of the thistle stem gall fly (<i>Urophora cardui</i>) bore into the apical meristem of shoots and form a gall. They can reduce plant vigor and can prevent flower

formation depending upon the location of the gall.
A pathogenic rust (*Puccinia punctiformis*) infects Canada thistle (mix sap from infected plant with water and spray uninfected plants to infect them), but it too has not had a significant effect on its control.

CHEMICAL CONTROL

The following specific use information is based on published papers and reports by researchers and land managers. Other trade names may be available, and other compounds also are labeled for this weed. Directions for use may vary between brands; see label before use. Herbicides are listed by mode of action and then alphabetically. The order of herbicide listing is not reflective of the order of efficacy or preference.

GROWTH REGULATORS

2,4-D

Several names

Rate: 2 qt product/acre (1.9 lb a.e./acre)

Timing: Postemergence in spring at the pre-bud to early bud stage.

Remarks: Control with 2,4-D alone is only temporary; therefore, it is commonly mixed with other growth regulator herbicides. Research from Colorado showed control from a spring 2,4-D application followed by fall application with different herbicides. 2,4-D is broadleaf-selective and has no soil activity. Do not apply ester formulation when outside temperatures exceed 80°F.

Aminocyclopyrachlor +
chlorsulfuron

Perspective

Rate: 4.75 to 8 oz product (*Perspective*)/acre

Timing: Postemergence to plants before they produce seed.

Remarks: *Perspective* provides broad-spectrum control of many broadleaf species. Although generally safe to grasses, it may suppress or injure certain annual and perennial grass species. Do not treat in the root zone of desirable trees and shrubs. May need retreatment for 1 to 2 additional years. Do not apply more than 11 oz product/acre per year. At this high rate, cool-season grasses will be damaged, including bluebunch wheatgrass. Not yet labeled for grazing lands. Add an adjuvant to the spray solution. This product is not approved for use in California and some counties of Colorado (San Luis Valley).

Aminopyralid

Milestone

Rate: 5 to 7 oz product/acre (1.25 to 1.75 oz a.e./acre)

Timing: Postemergence in spring after all plants have fully emerged (some may be budding) until the oldest plants are in full flower stage. Use the higher rate when applying to flowering plants. Applications are also effective in fall before a killing frost. Use higher rates for older/dense stands or for longer residual control.

Remarks: May need retreatment for 1 to 2 additional years. Aminopyralid is one of the most effective herbicides for the control of Canada thistle. It is safe on grasses, although preemergence application at high rates can greatly suppress invasive annual grasses, such as medusahead. Aminopyralid has a longer residual and higher activity than clopyralid. Other members of the Asteraceae and Fabaceae are very sensitive to aminopyralid.

Other premix formulations of aminopyralid can also be used for Canada thistle control. These include *Opensight* (aminopyralid + metsulfuron; 2.5 to 3 oz product/acre) and *Forefront HL* (aminopyralid + 2,4-D; 1.5 to 2.1 pt product/acre), both applied at the rosette to bolting stages. The formulation with metsulfuron is not registered for use in California.

Clopyralid

Transline

Rate: 0.67 to 1.33 pt product/acre (4 to 8 oz a.e./acre)

Timing: Postemergence before the bud stage when most of the basal leaves have emerged. Fall applications are also effective.

Remarks: One or more treatments per season may be needed for 1 to 3 consecutive years for complete control. Allow at least 20 days after application before disturbing treated areas. While clopyralid is very safe on grasses, it will injure many members of the Asteraceae, particularly thistles, and can also injure legumes, including clovers. Most other broadleaf species and all grasses are not injured. Also applied in a premix with triclopyr (*Redeem*, 2.5 to 4 pt product/acre) to rosette to bud stage Canada thistle.

Dicamba

Banvel

Rate: 4 pt product/acre (2 lb a.e./acre)

Timing: Postemergence to rosettes. Fall applications are also effective.

Remarks: Dicamba is a broadleaf-selective herbicide often combined with other active ingredients. It is not typically used alone to control Canada thistle because it is not as effective as other herbicides

Linaria vulgaris Miller

Yellow toadflax

Family: Scrophulariaceae

Range: Throughout North America and every state except Hawaii.

Habitat: Fields, pastures, riparian areas, rangeland and disturbed sites such as roadsides, forest clearings, and agricultural fields. Grows in most environments and can tolerate many soil types. Often inhabits moist, coarse soils, particularly gravelly or sandy soils. Although it often invades disturbed areas, it has been shown to move into relatively undisturbed prairies and riparian habitats. Tolerates sub-arctic conditions.

Origin: Native to Europe and the Mediterranean region and brought to North America as a garden ornamental in the mid-1600s.

Impacts: Yellow toadflax is highly competitive for soil moisture with winter annuals and shallow-rooted perennials. Large colonies that displace desirable vegetation can develop in natural areas. The plant decreases forage for domestic livestock and some big game species and decreases habitat for associated animal communities. Yellow toadflax contains quinazoline alkaloids that could possibly pose toxicity problems to livestock if ingested in sufficient quantity, but intoxications of livestock have not been reported. Goats and sheep have been known to graze the plants with little effect.

Western states listed as Noxious Weed: Idaho, Montana, Nevada, New Mexico, Oregon, South Dakota, Utah, Washington, Wyoming



Yellow toadflax is an herbaceous creeping rooted perennial that can reach a height of about 3 ft, but is generally about 1 ft tall. The stems are erect, glabrous to glandular-hairy near the top, but with a woody base. The leaves are pale green, 1 to 2 inches long, linear to narrow, alternate, and sessile.

The flowers are bilateral, resembling snapdragon flowers, and on dense racemes of 15 to 20 flowers in the axils of the upper portion of the stem. The flowers are about 1 inch long, yellow to pale yellow with an orange bearded throat and yellow spur in which nectar collects. The fruits are brown capsules, 0.25 to 0.5 inch long, ovate, and contain multiple flat, dark brown seeds that have a papery wing to aid dispersal. Reproduction is by seed and vegetatively from creeping lateral roots. Most seed falls near the parent plant. Seeds germinate in spring and fall when conditions become favorable. Seedlings compete poorly for soil moisture with established vegetation. Plants can rapidly colonize a site by vegetative reproduction from creeping roots. It is not known how long the seed survive in the soil, but because they are so small, it is likely that they do not survive for more than a couple of years. Yellow and Dalmatian toadflax readily cross to produce a very vigorous intermediate.

NON-CHEMICAL CONTROL

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| Mechanical
(pulling, cutting,
disking) | Hand pulling is only effective on seedlings before plants become established and the extensive creeping root system develops.
Mowing can prevent the plant from going to seed, but mowing also stimulates vegetative reproduction from the lateral roots and rhizomes.
Tilling on arable lands can be effective but tilling needs to be done every 7 to 10 days over the course of the season and repeated yearly for several years to eradicate resprouting root fragments. |
| Cultural | Grazing is not considered an effective control option. Overgrazing can reduce competition and increase site disturbance, creating an ideal environment for toadflax establishment. The plant is not preferred by grazing livestock and contains quinazoline alkaloids that are moderately toxic.
Fire is not effective because the underground root system is not damaged and will resprout.
Reseeding with competitive annual and perennial grasses reduces survival and helps prevent further spread. |
| Biological | Two insects active on yellow toadflax were accidentally introduced into the United States in the early 1900s. The toadflax flower feeding beetle (<i>Brachypterolus pulicarius</i>) and the toadflax capsule weevil (<i>Gymnetron antirrhini</i>) are well established in the Pacific Northwest. Both significantly reduce seed production, but do not have a significant impact on populations. However, the most promising biocontrol agent is the toadflax stem- |

mining weevil (*Mecinus janthinus*). It is too early to know how successful this insect will be.

CHEMICAL CONTROL

The following specific use information is based on published papers and reports by researchers and land managers. Other trade names may be available, and other compounds also are labeled for this weed. Directions for use may vary between brands; see label before use. Herbicides are listed by mode of action and then alphabetically. The order of herbicide listing is not reflective of the order of efficacy or preference.

GROWTH REGULATORS

- 2,4-D
Several names
Rate: 2 to 4 pt product/acre (0.95 to 1.9 lb a.e./acre)
Timing: Postemergence when plants are growing rapidly. Applications in spring provide best control.
Remarks: 2,4-D is a selective herbicide for broadleaf species. In areas where desirable grasses are growing around toadflax, 2,4-D can be used without non-target damage. Good coverage is necessary. Efficacy is improved when tank-mixed with picloram, chlorsulfuron, or metsulfuron.
- Aminocyclopyrachlor + chlorsulfuron
Perspective
Rate: 4 to 6 oz product/acre plus 0.25 to 0.5% v/v surfactant
Timing: Postemergence when plants are growing rapidly in the bud to bloom stage.
Remarks: *Perspective* provides broad-spectrum control of many broadleaf species. Although generally safe to grasses, it may suppress or injure certain annual and perennial grass species. Do not treat in the root zone of desirable trees and shrubs. Do not apply more than 11 oz product/acre per year. At this high rate, cool-season grasses will be damaged, including bluebunch wheatgrass. Not yet labeled for grazing lands. Add an adjuvant to the spray solution. This product is not approved for use in California and some counties of Colorado (San Luis Valley).
- Picloram
Tordon 22K
Rate: 2 qt product/acre (1 lb a.e./acre) plus 0.25 to 0.5% v/v surfactant
Timing: Postemergence when plants are growing rapidly in spring before full bloom, or in late summer to early fall.
Remarks: High levels of picloram can give long-term soil activity for broadleaves. Picloram at 2 pt product/acre plus 6 oz *Overdrive*/acre controlled yellow toadflax better (98% control) than picloram at 2 qt product/acre (70% control) 2 years after treatment. *Tordon 22K* is a federally restricted use pesticide. It is not registered for use in California.
- Picloram + 2,4-D
Tordon 101M
Rate: 2 qt product/acre plus 0.25 to 0.5% v/v surfactant
Timing: Postemergence when plants are growing rapidly in spring before full bloom.
Remarks: May require annual treatment for 2 to 3 years. High levels of picloram can give long-term soil activity for broadleaves. *Tordon 101M* is a federally restricted use pesticide. It is not registered for use in California.
- Picloram + chlorsulfuron
Tordon 22K + Telar
Rate: 1 qt product/acre *Tordon 22K* + 1.25 oz product/acre *Telar* plus 0.25 to 0.5% v/v surfactant
Timing: Postemergence when plants are growing rapidly from bloom through fall. Fall treatments give best control.
Remarks: High levels of picloram can give long-term soil activity for broadleaves. Retreatment may be necessary. *Tordon 22K* is a federally restricted use pesticide. It is not registered for use in California.

AROMATIC AMINO ACID INHIBITORS

- Glyphosate
Roundup, Accord XRT II,
and others
Rate: Broadcast treatment: 1 to 2 qt product (*Roundup ProMax*)/acre (1.1 to 2.25 lb a.e./acre). Spot treatment: 1.5 to 2% solution v/v *Roundup* (or other trade name) and water to thoroughly wet all leaves
Timing: Postemergence when plants are growing rapidly. Applications in early spring provide best control.
Remarks: Glyphosate is a nonselective systemic herbicide with no soil activity. Repeated applications may be necessary for complete control.

BRANCHED-CHAIN AMINO ACID INHIBITORS

- Chlorsulfuron
Telar
Rate: 2 to 2.6 oz product/acre (1.5 to 1.95 oz a.i./acre) plus 0.25 to 0.5% v/v surfactant
Timing: Postemergence when plants are growing rapidly in the bud to bloom stage.
Remarks: Chlorsulfuron is a selective herbicide effective for controlling broadleaves and grasses.