

**Weed Management Reference Guide**  
**Small Acreage Landowners – Boulder County, Colorado**

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The purpose of this guide is to provide weed management information helpful to small acreage landowners in Boulder County. The information provided is concise but hardly complete. More extensive information can be obtained from:

Colorado Weed Management Association – [www.cwma.org](http://www.cwma.org)  
Center for Invasive Plant Management - [www.weedcenter.org](http://www.weedcenter.org)  
Colorado State University - [www.ext.colostate.edu/pubs/natres/pubnatr.html](http://www.ext.colostate.edu/pubs/natres/pubnatr.html)

Weed law:

The Colorado Weed Management Act - <http://www.ag.state.co.us/CSD/Weeds/statutes/weedlaw.PDF>  
The Boulder County Weed Management Plan -  
[www.co.boulder.co.us/openspace/management\\_plans/mgmtplans\\_pdfs/weed\\_mgmt\\_plan2004.pdf](http://www.co.boulder.co.us/openspace/management_plans/mgmtplans_pdfs/weed_mgmt_plan2004.pdf)

Pesticide labels and safety information - [www.cdms.net](http://www.cdms.net)  
[www.colostate.edu/Depts/SoilCrop/extension/CEPEP](http://www.colostate.edu/Depts/SoilCrop/extension/CEPEP)

- Information on pesticide toxicity, environmental fate, or mode of action – 1-800-858-7378
- Boulder County weed management daily herbicide application line – 303-441-3940

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Pg19-30– Herbicide reference guide.

Pg 31 – Single nozzle calibration guide.

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## State Weed Law

The Boulder County Noxious Weed Management Plan was revised July 20, 2004 to conform to the new Colorado State Noxious Weed Law, which went into effect May 3, 2004. The basic change that occurred in the state weed law was categorizing noxious weed species into 3 lists: A, B, and C.

- List A species are not well established in Colorado, and require mandatory eradication by local governing agencies.
- List B species are common enough in parts of the state that eradication is not feasible, though the species are still recommended for eradication, suppression, or containment depending on distribution and densities around the state.
- List C species are widespread and well established. Control of List B and C species is recommended but not required by the state, although local governing bodies may require management.

Of the 18 List A species, only 9 are known to currently exist in Colorado, and 7 of those 9 are known to exist in Boulder County. Those species are:

Cypress spurge (*Euphorbia cyparissias*)  
Dyer's woad (*Isatis tinctoria*)  
Mediterranean sage (*Salvia aethiopsis*)  
Myrtle spurge (*Euphorbia myrsinites*)  
Orange hawkweed (*Hieracium aurantiacum*)  
Purple loosestrife (*Lythrum salicaria*)  
Yellow starthistle (*Centaurea solstitialis*)

The required management objective for List A species is eradication, meaning prevention of production of seed or other reproductive propagules. Prescribed techniques for management of List A species are hand pulling, digging, or herbicide application. Mowing, grazing, and insect bio-control are not acceptable forms of management for these species.

- Dyer's woad is found on one small location within the city limits of Boulder. Naturalists there are monitoring and working towards eradication of the weed.
- Yellow starthistle is found on a very restricted site within the boundaries of the Town of Superior. Aggressive control should result in eradication within a few years. The remaining 5 species are more widespread and difficult to detect and eradicate.
- Mediterranean sage, found primarily in the east central portions of Boulder County, has been on the county weed list for over ten years, but still persists as a troublesome weed on public and private lands.
- Orange hawkweed, two small infestations of are known to exist in western Boulder County, one near Nederland, the other near Jamestown. These patches are being treated with an herbicide and monitored closely.
- Cypress spurge and myrtle spurge were very recently sold and cultivated as ornamental plants. Many county residents are not aware these species are noxious weeds, let alone listed for eradication. Both species can be found in urban and suburban areas, hopefully education and outreach efforts will result in eradication from the county in the near future.
- Purple loosestrife has been aggressively controlled wherever found, and is not common in Boulder County

Enforcement on List B and C species can only occur if the species is listed on the weed plan of a local agency (county or city). Weed species listed on the Boulder County Weed Management Plan are:

Canada thistle (*Cirsium arvense*)  
Musk thistle (*Carduus nutans*)  
Bull thistle (*Cirsium vulgare*)  
Scotch thistle (*Onopordum acanthium*, *Onopordum tauricum*)  
Diffuse knapweed (*Centaurea diffusa*)  
Russian knapweed (*Acroptilon repens*)  
Spotted knapweed (*Centaurea maculosa*)  
Dalmatian toadflax (*Linaria dalmatica*, *Linaria genistifolia*)  
Yellow toadflax (*Linaria vulgaris*)  
Leafy spurge (*Euphorbia esula*)  
Houndstongue (*Cynoglossum officinale*)  
Common teasel (*Dipsacus fullonum*)  
Tamarisk or saltcedar (*Tamarix ramosissima*)

The required management objective for these species is containment and suppression, meaning prevention of dispersal of seed or other plant propagules (reproductive vegetative parts). In most cases this is accomplished by mowing, though hand pulling, mechanical tillage, grazing, or herbicide application can also be effective.

Enforcement of the Boulder County Weed Management Plan is conducted through the County Land Use Department's Zoning Inspector – (720) 564-2621.

**The following tables contain a short summarization of the most troublesome weed species in the Boulder County area, and management options.  
All the weed species listed are non-native and invasive.**

Description	<ul style="list-style-type: none"> <li>- Weeds are typically opportunistic and readily invade disturbed sites.</li> <li>- Cultural control, the establishment of desired vegetation, prevents or slows down invasion by non-native species and is recommended for management of all weed species.</li> <li>- Prevention of new infestations through identification and on-the-spot eradication saves substantial time and expense.</li> </ul>
Legal Designation	<ul style="list-style-type: none"> <li>- Weed species designated as 'List A', are mandated for eradication everywhere in Colorado by the Colorado State Noxious Weed Act (prevention of seed or vegetative propagule production).</li> <li>- List B species are common enough in parts of the state that eradication is not feasible, though the species are still recommended for eradication, suppression, or containment depending on distribution and densities around the state.</li> <li>- List C species are widespread and well established. Control of List B and C species is recommended but not required by the state, although local governing bodies may require management.</li> <li>- The Boulder County Noxious Weed Management Plan requires eradication of all List A species, as mandated by the state, and containment and suppression measures for 13 of the List B species identified as significantly troublesome in Boulder County.</li> </ul>
Chemical Control	<ul style="list-style-type: none"> <li>- Most common selective herbicides utilized for control of each species are listed.</li> <li>- Spot-spray applications of non-selective glyphosate (Roundup and others) should generally be effective for controlling any of the weeds listed.</li> <li>- Always consult the product label for specific rates and uses (pasture, non-cropland, riparian, etc.)</li> </ul>
Biological Control	<ul style="list-style-type: none"> <li>- Insects are available through Colorado Dept of Agriculture Toll Free 866-324-2963.</li> <li>- Insect bio-control is best used on large weed infestations and/or in areas of rugged terrain.</li> <li>- Eradication of a weed species will not be attained strictly through insect bio-control.</li> <li>- Expect 3-5 years following release for establishment and impact on target weed.</li> </ul>
Mechanical Control	<ul style="list-style-type: none"> <li>- When digging or hand pulling any annual or biennial species, always sever the root at least 2-4 inches below soil surface or re-growth may occur.</li> </ul>

## List A Species – Found in Boulder County

### **Cypress Spurge (*Euphorbia cyparissias*)**

Description	This ornamental is a simple perennial that reproduces only by seed. Flowering occurs in April and May. The latex sap is irritating to the skin and can cause permanent eye damage. Seed longevity is estimated to be 8 years in the soil.
Legal Designation	Colorado State Noxious Weed Act List A species Listed on Boulder County Weed Management Plan
Chemical Control	Most effective herbicide has been <b>2,4-D</b> .
Biological Control	Not palatable to livestock. No insect agents are currently available.
Mechanical Control	Hand pulling or digging is very effective. Always wear leather gloves, avoid any contact with skin or eyes.

### **Dyer's woad (*Isatis tinctoria*)**

Description	A winter annual or short-lived perennial of the mustard family with blue-green leaves and numerous bright yellow flowers. Cultivated as a dye crop, has escaped to become a major problem weed in several western states.
Legal Designation	Colorado State Noxious Weed Act List A species Listed on Boulder County Weed Management Plan
Chemical Control	<b>Escort</b> and <b>Telar</b> provide very effective control.
Biological Control	Not palatable to livestock. No insect agents are currently available.
Mechanical Control	Hand pulling or digging is very effective.

**Mediterranean Sage (*Salvia aethiopis*)**

Description	Biennial member of the mint family that reproduces only from seed. Mediterranean sage germinates in spring/summer/fall, over-winters as a rosette, bolts and flowers in spring, sets seed in mid-summer, and becomes a tumbleweed in the fall. No data available on seed longevity in the soil, but appears to be 10 years or more.
Legal Designation	Colorado State Noxious Weed Act List A species Listed on Boulder County Weed Management Plan
Chemical Control	<b>Tordon, Telar, Escort/2,4-D</b> tank mix, <b>Plateau</b> (fall applied).
Biological Control	Not palatable to livestock. A Mediterranean sage weevil is available, but has not proven to be effective.
Mechanical Control	Mowing is not effective as the plants readily grow back and produce seed. Hand pulling or digging, where feasible, is very effective.

**Myrtle Spurge (*Euphorbia myrsinites*)**

Description	Also known as donkey tail spurge, this ornamental is a simple perennial that reproduces only by seed. Flowering occurs in April and May. The latex sap is irritating to the skin and can cause permanent eye damage. Seed longevity is estimated to be 8 years in the soil.
Legal Designation	Colorado State Noxious Weed Act List A species Listed on Boulder County Weed Management Plan
Chemical Control	<b>2,4-D</b> applied in the fall is most effective.
Biological Control	Not palatable to livestock. No insect agents are currently available.
Mechanical Control	Hand pulling or digging is very effective. Always wear leather gloves, avoid any contact with skin or eyes.

**Orange hawkweed (*Hieracium aurantiacum*)**

Description	A perennial forb that grows to 12 inches tall. A very showy flower appears mid-June through August. Leaves occur primarily at the base, plants contain a milky juice. Seed longevity is unknown.
Legal Designation	Colorado State Noxious Weed Act List A species Listed on Boulder County Weed Management Plan
Chemical Control	<b>Milestone, Transline, Tordon, or 2,4-D.</b> Apply prior to seed production.
Biological Control	Not palatable to livestock. No insect agents are currently available.
Mechanical Control	Hand pulling or digging can reduce seed production and stress plants, but this perennial will readily grow back.

**Purple Loosestrife (*Lythrum salicaria*)**

Description	A rhizomatous perennial that reproduces by rootstalks and seed. Purple loosestrife is an escaped ornamental plant that readily invades riparian sites. Seed longevity is unknown but at least 10 years.
Legal Designation	Colorado State Noxious Weed Act List A species Listed on Boulder County Weed Management Plan
Chemical Control	Due to this plants proximity to water, the number of herbicides is limited to those that have an aquatic label. <b>Rodeo</b> (glyphosate), <b>Garlon A</b> (triclopyr), <b>Habitat</b> (imazapyr) and several formulations of <b>2,4-D</b> effectively control purple loosestrife and are registered for use in and around water.
Biological Control	Insect agents are available, though marginally effective.
Mechanical Control	Hand pulling or digging is only effective if all the rootstalk is removed. A common practice of removal is to cut and bag seed heads and spot-spray the remaining portion of the plant with an herbicide.

**Yellow starthistle (*Centaurea solstitialis*)**

Description	An annual or winter annual forb with yellow flowers and laterally extending thorns below. Could potentially become Colorado's worst weed problem.
Legal Designation	Colorado State Noxious Weed Act List A species Listed on Boulder County Weed Management Plan
Chemical Control	<b>Milestone, Transline, Tordon, or 2,4-D.</b> Apply prior to seed production.
Biological Control	Not palatable to livestock, causes 'chewing disease' in horses. Insect bio-control agents are available but not recommended for management on Colorado's limited infestations.
Mechanical Control	Hand pulling or digging, where feasible, is very effective.

## List B Species on Boulder County Weed Management Plan

### Biennial Thistles

**Bull Thistle (*Cirsium vulgare*) Musk Thistle (*Carduus nutans*)**

**Scotch Thistle (*Onopordum acanthium*)**

Description	Tap rooted biennials that reproduce only by seed. Plants typically germinate in late summer or early fall, over-winter as a rosette, bolt and flower in the spring or early summer, disperse seed in mid-summer. Seed longevity is variable but can last up to 10 years.
Legal Designation	List B – State weed list Listed on Boulder County Weed Management Plan
Chemical Control	<b>Tordon, Transline, Milestone, Curtail, Redeem, Telar, dicamba, 2,4-D</b>
Biological Control	A seed head weevil, <i>Rhinocyllus conicus</i> , is well dispersed throughout Colorado for control of musk thistle. The impact from this weevil has been cyclic, some years very effective, other years not. Other insect predators are available, but have only been marginally effective.
Mechanical Control	Mowing and grazing can suppress populations, but plants will still flower and set seed from a reduced height. Hand pulling and digging, when feasible, is very effective.

### Canada Thistle (*Cirsium arvense*)

Description	A deep-rooted perennial that reproduces by seed or underground rootstalks. Seed can remain viable in soil for up to 20 years. The most common weed problem in the western US.
Legal Designation	List B – State weed list Listed on Boulder County Weed Management Plan
Chemical Control	<b>Tordon, Transline, Milestone, Curtail, Redeem, Telar, dicamba, 2,4-D</b>
Biological Control	Insect agents are available but have not been effective. Livestock grazing effectively suppresses Canada thistle through the early summer.
Mechanical Control	Shallow tillage (disk, sweep) has shown to be counter-productive, creating a denser, more uniform stand. Deeper tillage such as moldboard plowing can provide 1-2 years control. Mowing effectively suppresses Canada thistle, and in combination with a fall-applied herbicide application provides very good control.

**Common Teasel (*Dipsacus fullonum*)**

Description	Tap-rooted biennial that reproduces only by seed. Plants typically germinate in late summer or early fall, over-winter as a rosette, bolt and flower in the spring or early summer, disperse seed in late summer. Found in moist sites, teasel is a threat to wetlands. No data available on seed longevity in the soil.
Legal Designation	List B – State weed list Listed on Boulder County Weed Management Plan
Chemical Control	<b>Tordon, Transline, Milestone, Curtail, Redeem, 2,4-D, dicamba, Escort, Telar, Plateau.</b>
Biological Control	No insect agents are currently available.
Mechanical Control	Hand pulling or digging is very effective. Mowing can reduce seed production but plants generally re-flower and set seed from a reduced height.

**Dalmatian Toadflax (*Linaria genistifolia*), Yellow Toadflax (*Linaria vulgaris*)**

Description	Perennial species that originated as ornamentals, escaped and have become problems in rangeland and natural areas. Reproduce from seed and vegetative root buds. Seeds can remain viable in the soil for at least 10 years.
Legal Designation	List B – State weed list Listed on Boulder County Weed Management Plan
Chemical Control	<b>Tordon, Telar, Tordon/Telar tank mix, Plateau</b> (fall applied).
Biological Control	The most effective insect for control of dalmatian toadflax is <i>Mecinus janthinus</i> , a stem-boring weevil (not effective on yellow toadflax). Other toadflax feeding insects are available, though marginally effective.
Mechanical Control	Mowing, hand pulling, or digging can reduce seed production and stress plants, but this perennial will readily grow back.

**Diffuse Knapweed (*Centaurea diffusa*), Spotted Knapweed (*Centaurea maculosa*)**

Description	Diffuse knapweed is primarily a biennial that germinates in summer/fall, over-winters as a rosette, bolts and flowers in spring/summer, sets seed in the fall, and becomes a tumbleweed in winter. Spotted knapweed is primarily a perennial that follows the same life cycle but stays in place and does not become a tumbleweed. Both species reproduce only by seed. Seeds can remain viable in the soil for at least 15 years.
Legal Designation	List B – State weed list Listed on Boulder County Weed Management Plan
Chemical Control	<b>Tordon, Transline, Milestone, Curtail, Redeem.</b>
Biological Control	Numerous insects are available and have shown fair to good results. Most effective have been a seed head weevil <i>Larinus minutus</i> and root weevils <i>Cyphocleonus achates</i> and <i>Sphenoptera jugoslavica</i> .
Mechanical Control	Mowing and grazing can suppress populations, but plants will still flower and set seed from a reduced height. Hand pulling and digging, when feasible, is very effective.

**Houndstongue (*Cynoglossum officinale*)**

Description	A tap-rooted biennial that reproduces by seed only. Houndstongue germinates in summer/fall, over-winters as a rosette, bolts and flowers in spring/summer, sets seed in the fall. Seeds are velcro-like, attaching to clothing and animals. There is no data available on seed longevity in the soil Houndstongue is toxic to livestock.
Legal Designation	List B – State weed list Listed on Boulder County Weed Management Plan
Chemical Control	Herbicides used - <b>dicamba, Escort, 2,4-D, Plateau, Telar, Tordon.</b>
Biological Control	No insect agents are currently available.
Mechanical Control	Hand pulling or digging is very effective.

**Leafy Spurge (*Euphorbia esula*)**

Description	A deep-rooted perennial that reproduces by rootstalks and seed. Leafy spurge emerges in early spring, flowers in April/May. The entire plant contains a milky latex that can be toxic to livestock and irritating to humans. Seeds can remain viable for 8 years.
Legal Designation	List B – State weed list Listed on Boulder County Weed Management Plan
Chemical Control	<b>Tordon, Tordon/2,4-D</b> tank mix, <b>dicamba, Plateau</b> (fall applied).
Biological Control	Sheep and goats can be trained to browse leafy spurge. Several species of flea beetle ( <i>Apthona spp.</i> ) have been effective in significantly reducing stands of leafy spurge.
Mechanical Control	Mowing and grazing are effective in depleting root reserves. Hand pulling or digging can reduce seed production and stress plants, but this perennial will readily grow back.

**Russian Knapweed (*Acroptilon repens*)**

Description	A perennial that reproduces from seed and vegetative root buds. Russian knapweed emerges in the spring, bolts in early summer, and flowers mid-summer. This weed is allelopathic (inhibits the growth of other plants), and toxic to horses. Seeds remain viable for 2-3 years.
Legal Designation	List B – State weed list Listed on Boulder County Weed Management Plan
Chemical Control	<b>Tordon, Transline, Milestone, Curtail, Redeem, Telar, Plateau, dicamba.</b>
Biological Control	There are currently no insect agents available.
Mechanical Control	Mowing reduces seed production and stresses the plant. Hand pulling and digging are marginally effective.

**Tamarisk/Saltcedar (*Tamarix ramosissima*)**

Description	A deciduous shrub or small tree introduced into this country for erosion control, windbreaks and as an ornamental. Tamarisk is an invasive plant in riparian sites that exudes salts through its leaves creating a saline environment that excludes other vegetation. Tamarisk reproduces by seed, is a prolific seed producer, but seed longevity is just a few months.
Legal Designation	List B – State weed list Listed on Boulder County Weed Management Plan
Chemical Control	Due to this plants proximity to water, the number of herbicides is limited to those that have an aquatic label. <b>Arsenal</b> is the most commonly used herbicide for foliar application, if overspray has potential to go into water use <b>Habitat</b> – same active ingredient with an aquatic label.
Biological Control	A defoliating insect, <i>Diorhabda elongata</i> , was released in Colorado in 2005, with promising results. Should be readily available by 2008.
Mechanical Control	Mechanical treatments such as cutting, bulldozing, and fire are temporarily effective, though an herbicide application is necessary to prevent subsequent sprouting.

**Troublesome Weeds not on Boulder County Weed Management Plan**

**Cheatgrass**

**Downy Brome (*Bromus tectorum*), Japanese Brome (*Bromus japonicus*)**

Description	‘Cheatgrass’ is generally considered a collective term for winter annual brome species. These grasses typically germinate in late summer, are semi-dormant through winter, resume growth in early spring, and set seed by June. At maturity the dry grass and abundant seed heads become a nuisance and a fire hazard. Seed survival – 2-3 years.
Legal Designation	List C – State weed list Not listed on Boulder County Weed Management Plan
Chemical Control	<b>Plateau</b> applied in the fall, pre-emergent or early post-emergent (prior to tiller stage). Low rates of <b>glyphosate</b> (Roundup and others) applied in winter or early spring can provide selective control.
Biological Control	Grazing prior to seed set can suppress cheatgrass. No insect agents are available.
Mechanical Control	Hand pulling or tillage (where feasible) prior to seed set. Mowing is marginally effective, as timing is critical. Fire in the late fall or early spring can be effective if enough fuel is available to burn hot enough to kill the emerged cheatgrass.

**Kochia (*Kochia scoparia*)**

Description	An annual of the goosefoot family. Kochia typically germinates in March, and flowers from July to October. Readily invades disturbed sites and areas of high soil nitrates. In fall/winter the plant breaks loose and becomes a tumbleweed. Seed remains viable 2-3 years.
Legal Designation	Not listed on State weed list Not listed on Boulder County Weed Management Plan
Chemical Control	<b>Dicamba, Vista/Starane</b>
Biological Control	Utilized by livestock up to maturity. No insect agents available.
Mechanical Control	Tillage or hand pulling is effective on this annual. Mowing is only a temporary solution as kochia will quickly re-sprout, often in a stand more dense and uniform than prior to mowing.

**Field Bindweed (*Convolvulus arvensis*)**

Description	A deep-rooted perennial that reproduces by seed or underground rootstalks. Seeds can remain viable in the soil for 50+ years.
Legal Designation	List C – State weed list Not listed on Boulder County Weed Management Plan
Chemical Control	<b>Tordon, Arsenal, Plateau, Paramount, dicamba, 2,4-D</b>
Biological Control	The gall mite <i>Aceria malherbae</i> , and to a lesser extent a defoliating moth, <i>Tyta luctuosa</i> are becoming well established in Colorado and having a significant effect on bindweed infestations.
Mechanical Control	Shallow tillage (disk, sweep) can be counter-productive, creating a denser, more uniform stand. Deeper tillage such as moldboard plowing can provide 1-2 years control.

**Common Mullein (*Verbascum thapsus*)**

Description	A biennial commonly found in Boulder County east of the Peak-to-Peak Highway. Mullein seldom appears to have invasive characteristics except on disturbed sites such as heavily grazed pastures or prairie dog colonies.
Legal Designation	List C – State weed list Not listed on Boulder County Weed Management Plan
Chemical Control	<b>Escort or Telar</b>
Biological Control	No insect bio-control agents available.
Mechanical Control	Hand pulling or digging is very effective

**Sulfur cinquefoil (*Potentilla recta*)**

Description	A perennial of the rose family. Scattered infestations of sulfur cinquefoil are becoming more common in Boulder County, particularly west of Highways 36 and 93.
Legal Designation	List B – State weed list Not listed on Boulder County Weed Management Plan
Chemical Control	<b>Milestone, Tordon, Escort , Telar</b>
Biological Control	No insect bio-control agents available.
Mechanical Control	Hand pulling marginally effective

**Moth Mullein (*Verbascum blattaria*)**

Description	A tap-rooted biennial
Legal Designation	List B – State weed list Not listed on Boulder County Weed Management Plan
Chemical Control	<b>Milestone, Tordon, Escort , Telar</b>
Biological Control	No insect bio-control agents available.
Mechanical Control	Hand pulling is very effective

**Russian olive (*Elaeagnus angustifolia*)**

Description	A deciduous shrub or small tree introduced into this country for erosion control, windbreaks and as an ornamental. Russian olive is an invasive plant in riparian sites that is readily spread by seed-feeding birds.
Legal Designation	List B – State weed list Listed on Boulder County Weed Management Plan
Chemical Control	Due to this plants proximity to water, the number of herbicides is limited to those that have an aquatic label. Arsenal is the most commonly used herbicide for foliar application, if overspray has potential to go into water use Habitat – same active ingredient with an aquatic label. The Boulder County POS Weed Group and Plant Ecologists actively work to remove Russian olives as part of riparian restoration. The most common management practice is a cut-stump treatment, which consists of cutting the tree down near the base and applying a herbicide on the stump to prevent re-growth. The cut portion of the tree is typically put through a mechanical chipper. Smaller trees are pulled out of the ground with a weed wrench. Herbicides used – <b>Garlon 4</b> and <b>Arsenal</b> .
Biological Control	No insect bio-control agents available.
Mechanical Control	Mechanical treatments such as cutting, bulldozing, and fire are temporarily effective, though an herbicide application is necessary to prevent subsequent sprouting.

## Escaped Ornamental Weeds Not On the Boulder County Weed Management Plan

Listed below are ornamental species formerly available for purchase at nurseries, now on the state's prohibited sales list. These species have escaped to natural areas throughout Colorado and have demonstrated noxious weed characteristics. Other escaped ornamental species already listed in this text under the A List or B List species on the County Management Plan are: cypress spurge, dalmatian toadflax, dyer's woad, Mediterranean sage, myrtle spurge, purple loosestrife, tamarisk, teasel, and yellow toadflax.

### **Chicory (*Cichorium intybus*)**

Description	A tap-rooted, simple perennial that reproduces by seed. Found along roadsides and riparian areas. Chicory is particularly a problem along Left Hand Canyon and some meadows at Heil Valley Ranch, otherwise not considered invasive.
Legal Designation	List C – State weed list Not listed on Boulder County Weed Management Plan
Chemical Control	<b>Escort or Telar</b>
Biological Control	No insect bio-control agents available.
Mechanical Control	Hand pulling or digging is very effective

### **Oxeye daisy (*Chrysanthemum leucanthemum*)**

Description	A simple perennial that reproduces by seed. Found in mountain meadows and pastures.
Legal Designation	List B – State weed list Not listed on Boulder County Weed Management Plan
Chemical Control	<b>Escort or Telar</b>
Biological Control	No insect bio-control agents available.
Mechanical Control	Hand pulling or digging is very effective

**Scentless chamomile (*Matricaria perforate*)**

Description	Annual that reproduces only by seed. Found in mountain meadows and pastures. Similar in appearance to oxeye daisy, distinguished by finely divided leaves.
Legal Designation	List B – State weed list Not listed on Boulder County Weed Management Plan
Chemical Control	<b>Escort or Telar</b>
Biological Control	No insect bio-control agents available.
Mechanical Control	Hand pulling or digging is very effective

**Bouncingbet (*Saponaria officinalis*)**

Description	A rapidly spreading perennial with greatest infestations along Boulder Canyon and Left Hand Canyon. Bouncingbet is found in eastern Boulder County as well, though much more prevalent west of Hwy's 36 & 93.
Legal Designation	List B – State weed list Not listed on Boulder County Weed Management Plan
Chemical Control	<b>Escort or Telar</b>
Biological Control	No insect bio-control agents available.
Mechanical Control	Hand pulling or digging can be effective

**Dames rocket (*Hesperis matronalis*)**

Description	A biennial of the mustard family, dames rocket is found primarily in the western half of Boulder County. This plant has become a major problem in the Poudre Canyon in Larimer County, and has potential to become a problem here.
Legal Designation	List B – State weed list Not listed on Boulder County Weed Management Plan
Chemical Control	<b>Escort or Telar</b>
Biological Control	No insect bio-control agents available.
Mechanical Control	Hand pulling or digging can be effective

## Organic Weed Controls for Small Acreage Landowners

When considering whether organic weed control is suitable for your situation, consider weed life cycle, extent of infestation, applicability of organic controls, and resources available. Organic controls include: mechanical (harrowing, disking, plowing, hoeing, hand pulling, and mowing), cultural (don't overgraze and maintain a vigorous grass cover for competition with weeds), biological (some species of insects have impact on targeted weeds, but eradication is not likely, also include grazing, which mimics mowing), and chemical (acetic acid, clove oil, etc. based desiccant sprays, these are non-selective and will damage desirable vegetation).

Correct weed identification will then provide you with weed life cycle. Annual weeds are best controlled early in their growth, less than 6" tall. Annual weeds are indicative of lack of cultural control (overgrazing, etc.). Pastures less than 30% grass cover are candidates for reseeding. If this is the case, disking is likely the best organic choice to control annual weed species. Mowing is a last resort to diminish total seed deposition. Chemical controls are also applicable when weeds are immature. There are biological (insects) control for puncture vine. Annuals reproduce by seed only, so prevent seed deposition.

Biennial species are most vulnerable as seedlings. Once the weed has established a taproot, this taproot will need to be undercut to 6" deep to kill the plant. A few biennials in a pasture can be controlled in this way with a shovel. Mowing is a last resort to diminish total seed deposition. Biennials are also suppressed by grass cover, but are more tolerant of grass cover than annuals. Chemical timing is the same as with annuals. Once the biennial has established a taproot, the weed will regrow new vegetation after burn down from desiccant sprays. In this scenario, spray any vegetative growth every other week to exhaust root carbohydrates. There are insects that will target: musk/bull/scotch thistle and diffuse knapweed but will require 3-5 years to show impact, often not eradicating the weed. Biennials reproduce by seed only, so prevent seed deposition.

Control for simple, tap rooted, perennials is similar to control for biennials, with one exception: if established for several years, undercutting to 6" may not kill the weed and another undercutting after regrowth may be necessary. With both biennials and perennials, if less than 30% grass cover, tillage may be the best choice for mechanical control. No insect control is current showing impact on simple perennials. Perennials reproduce by seed only, so prevent seed deposition.

Rhizomatous (complex) perennial control is the same as for biennials when still seedlings. Once established, they pose the greatest challenge with organic weed control via propagation from roots. A two-year research project with non-tillage organic controls for Canada thistle showed biomass reduction only when above ground vegetative growth was removed (hoeing, hand pulling, flame weeding, 6 desiccant sprays) every other week. After two years C. thistle was not eradicated. Disking and rotary tillage tend to propagate complex perennials via root cuttings. Deep plowing in the fall helps to exhaust root carbs. Bindweed mites are showing impact on field bindweed at 3-5 years, along with insects for leafy spurge and Russian thistle, but insects available for C. thistle are not slowing plant propagation.

## **Herbicide Reference Guide for Small Acreage Landowners**

This guide is to provide information helpful in deciding which herbicide may be most appropriate for a small acreage landowner. There is no intended endorsement of the products listed, nor is discrimination intended towards any product that may have been omitted. This guide is not intended to substitute for a product label. Always read the label and keep in mind “the label is the law”. The user of any pesticide is liable for all aspects of handling the product, including but not limited to mixing, loading, application, spill control, and disposal of a pesticide or its container.

It is a violation of federal law to use any pesticide in a manner inconsistent with its labeling, with the following 4 exemptions:

- Application at a rate or frequency less than specified on the label.
- Application on a target species not specified on the label as long as application is to the site or use specified on the label, unless the label specifically prohibits use on that specific pest.
- Employing any method of application not prohibited on the label.
- Mixing with a fertilizer, as long as such a mixture is not prohibited on the labeling.

### **Acronyms and Definitions**

**Adjuvants** – Additives to an herbicide tank mix to enhance plant uptake.

- AMS - ammonium sulfate
- COC – crop oil concentrate
- MSO – methylated seed oil
- NIS – nonionic surfactant
- UAN – urea-ammonium nitrate

**GUP** – General use pesticide. Products available to the general public.

**MSDS** – Material Safety Data Sheet. A technical bulletin that supplements information found on the product label. This bulletin provides detailed descriptions of a product’s physical properties and toxicity, and provides users and emergency personnel with the proper procedures for handling and working with that substance. Info can be obtained online at: [www.cdms.net](http://www.cdms.net)

**Pesticide Label** – a legal document located on the pesticide container that provides information concerning the safe and effective use of the pesticide. It is a violation of federal pesticide laws to use any pesticide in a manner inconsistent with its labeling.

**PPE** – Personal Protective Equipment. The required PPE for a specific compound is listed under the “Hazards to Humans” section on the label. Always use protective equipment specified on the label. The most serious risk of exposure from chemicals is during handling and mixing operations with the concentrated product.

**RUP** – Restricted Use Pesticide. The "Restricted Use" classification restricts the purchase of a product, and its uses, to a certificated pesticide applicator, or usage to anyone under the direct supervision of a certified applicator.

**Signal Words** – Indicate the toxicity and/or hazards associated with the use of the pesticide.

- **Caution** – least toxic, Category 3 or 4. 1 ounce to 1 pint swallowed lethal to an adult.
- **Warning** – Category 2. 1 –3 teaspoons swallowed lethal to an adult.
- **Danger/Poison** – most toxic, Category 1. 1-3 drops swallowed lethal to an adult.

**Toxicity** – measured by LD<sub>50</sub> (lethal dose, 50%), describes the dose of a pesticide that will kill ½ of a group of test animals from a single dose. A pesticide with a lower LD<sub>50</sub> is more toxic than one with a higher number because it takes less of the pesticide to kill half of the test animals.

## Arsenal, Habitat

Imazapyr – General Use Product

← Restriction (days) →

Signal word (toxicity)	Cost	Use rates (product per acre)	Re-entry interval	Hay harvest	Grazing interval	Lactating dairy animal	Slaughter
Caution	\$235/gal	2-6 pts	NA	NA	NA	NA	NA

**Labeled Uses (sites):**

**Arsenal** – grass pasture, rangeland, non-crop areas such as industrial sites, right-of-ways, and fence rows.

**Habitat** – for control of undesirable emergent and floating aquatic vegetation in and around standing and flowing water. Applications may be made to control undesirable wetland, riparian, and terrestrial vegetation growing in and around surface water.

**Environmental characteristics** – non-selective herbicide (controls grasses and broadleaf plants). Persistent in soil, breaks down rapidly in water, uptake in plants through foliage and roots. Arsenal can be applied up to water's edge. Habitat has an aquatic label – can be used in and around water. Not for use on irrigation ditchbanks.

**Primary target species** – Often used for total vegetative control (parking lots, industrial sites, etc.). This herbicide is very effective in controlling tamarisk and other woody species.

**Pre-mixes** – + diuron = Sahara, Topsite.

Chopper – ready to use pre-mix with adjuvants for cut-stump or basal bark treatments.

## Banvel, Clarity, Sterling, Vanquish

Dicamba – General Use Product

← Restriction (days) →

Signal word (toxicity)	Cost	Use rates (product per acre)	Re-entry interval	Hay harvest	Grazing interval	Lactating dairy animal	Slaughter
Caution	\$60/gal	0.25-4 pts	24 hours	37-70*	0	7-40*	30

**Labeled Uses (sites):**

**Banvel, Clarity, Sterling** – For use in crops, pasture, and rangeland.

**Vanquish** – non-cropland – turf, right-of-ways including areas that run through rangeland, and fence rows.

**Environmental characteristics** – water soluble, should not be applied near water. Active on target plants primarily through foliar uptake, with root uptake to a lesser degree. Do not apply near desirable trees and shrubs. Dicamba is a volatile product that can damage off-target vegetation through vapor drift. Do not use when temperatures are expected to exceed 85 degrees Fahrenheit within 24 hours of application.

**Primary target species** – kochia and many other annual broadleaf species. At higher rates can be effective on Canada thistle, bindweed, and biennial thistles. Not effective for controlling grass species.

**Pre-mixes** – + 2,4-D = Outlaw, Rangestar, Veteran 720, Weedmaster  
+ glyphosate = Fallowmaster

\*Restriction dependant on rate of application

## Ally, Cimarron, Escort

Metsulfuron Methyl – General Use Product

				← Restriction (days) →			
Signal word (toxicity)	Cost	Use rates (product per acre)	Re-entry interval	Hay harvest	Grazing interval	Lactating dairy animal	Slaughter
Caution	\$14/oz	0.33-4.0 oz	4 hours	0-3*	0-3*	0-3*	0
<p><b>Labeled Uses (sites):</b>  <b>Ally</b> – wheat, barley, and fallow.  <b>Cimarron</b> – pasture and range.  <b>Escort</b> – right-of-ways, industrial sites, and non-crop areas.</p>							
<p><b>Environmental characteristics</b> – can be applied to water’s edge, do not apply directly to water. Short soil residual activity and is primarily taken into a plant by foliar uptake.</p>							
<p><b>Primary target species</b> – plants of the mustard family, houndstongue, common mullein, common teasel, and assorted annual broadleaf species. At higher rates has activity on biennial thistles. Not effective for controlling grass species, kochia, knapweed species, or most perennial species.</p>							
<p><b>Pre-mixes</b> – + dicamba + 2,4-D = Cimarron Max; + chlorsulfuron (Telar) = Cimarron X-tra.</p>							

\*Restriction dependant on rate of application

## Garlon

triclopyr – General Use Product

(Garlon 4, Garlon 3A, Weed B Gon, Pathfinder II, and others – triclopyr products with varying formulations and additives)

				← Restriction (days) →			
Signal word (toxicity)	Cost	Use rates (product per acre)	Re-entry interval	Hay harvest	Grazing interval	Lactating dairy animal	Slaughter
Caution – Danger*	\$90/gal	variable	12 hours	7	0	14	3
<p><b>Labeled Uses (sites):</b>  <b>Garlon 4</b> – for use in forests and grazed areas.  <b>Garlon 3A</b> – non-cropland, right-of-ways, grazed areas, in and around water.  <b>Weed B Gon</b> – turf and ornamental applications.</p>							
<p><b>Environmental characteristics</b> – ester formulation can be volatile, and is best used when temperature is not expected to exceed 85 degrees. Triclopyr has some soil activity but is primarily taken up by plants through foliage and/or vascular tissue (cut-stump or basal bark treatment). Restrictions near water vary with formulation – Garlon 4 – up to water’s edge, Garlon 3A has an aquatic label, can be used to control target vegetation in and around standing water. Not for use on irrigation ditchbanks.</p>							
<p><b>Primary target species</b> – used for controlling broadleaf weeds and woody vegetation. Has little or no effect on grasses. Often used as a cut-stump or basal bark treatment for controlling Russian olives, tamarisk, and other woody species.</p>							
<p><b>Pre-mixes</b> – + Transline = Redeem. + 2,4-D = Crossbow. Many other pre-mix products. Pathfinder II – ready to use pre-mix with adjuvants necessary for effective cut-stump or basal bark treatments.</p>							

\*Signal word varies with differing triclopyr formulations

## Glyphosate

General Use Product

Originally Roundup from Monsanto, patent expired in 2000, current brand names too numerous to list

Signal word (toxicity)	Cost	Use rates (product per acre)	Re-entry interval	Hay harvest	Grazing interval	Lactating dairy animal	Slaughter
Caution	\$25-\$45/gal	0.5 - 2 pts	4 hours	NA	NA	NA	NA
<div style="display: flex; justify-content: center; align-items: center;"> <span style="font-size: 2em;">←</span> <span style="margin: 0 10px;">Restriction (days)</span> <span style="font-size: 2em;">→</span> </div>							
<p><b>Labeled Uses (sites):</b> Crop, non-crop, fallow.</p>							
<p><b>Environmental characteristics</b> – non-selective herbicide (active on grasses and broadleaf plants) that controls most annuals and perennials. Active through foliar uptake, has no soil activity. Labeled for use up to water’s edge. At least one formulation, Rodeo, labeled for use in and around water.</p>							
<p><b>Primary target species</b> – effective for control of most grasses and broadleaf species.</p>							
<p><b>Pre-mixes</b> – too numerous to list.</p>							

## Milestone

### Aminopyralid – General Use Product

← Restriction (days) →							
Signal word (toxicity)	Cost	Use rates (product per acre)	Re-entry interval	Hay harvest	Grazing interval	Lactating dairy animal	Slaughter
Caution	\$100/qt	3 – 7 oz	12 hours	0	0	0	0
<p><b>Labeled Uses (sites):</b> Rangeland, permanent grass pastures, non-cropland sites such as right-of-ways, campgrounds, trailheads, and trailsides.</p>							
<p><b>Environmental characteristics</b> – Can be applied to water’s edge. Milestone can be safely applied near trees and shrubs. Active on target plants through foliar and root uptake. Not for use on irrigation ditchbanks.</p>							
<p><b>Primary target species</b> – Canada thistle, biennial thistles, knapweeds, common teasel, oxeye daisy, sunflowers, cinquefoil, absinth wormwood, hawkweeds. (plants of composite, legume, and polygonum families). Not effective for controlling grass species, kochia, bindweed, leafy spurge, toadflax, houndstongue, or most mustard species.</p>							

## Plateau

### Imazapic – General Use Product

← Restriction (days) →							
Signal word (toxicity)	Cost	Use rates (product per acre)	Re-entry interval	Hay harvest	Grazing interval	Lactating dairy animal	Slaughter
Caution	\$275/gal*	2 – 12 oz	12 hours	7	0	0	0
<p><b>Labeled Uses (sites):</b> Pasture, rangeland, right-of-ways.</p>							
<p><b>Environmental characteristics</b> – has soil residual activity, uptake in plants through foliage and roots. This product has runoff potential and should not be used on hillsides sloping towards water. Do not apply to water, or inside irrigation ditches. Application timing, use rate and choice of surfactant can be critical, read the label carefully.</p>							
<p><b>Primary target species</b> – leafy spurge, cheatgrass, mustard species, dalmatian toadflax, bindweed, teasel, houndstongue, Russian knapweed, suppression of thistle species at higher rates. Not effective on kochia or biennial knapweed species.</p>							
<p><b>Other Product Names</b> – Cadre – labeled for use in peanuts. <b>Pre-mixes</b> – + glyphosate = Journey. + 2,4-D = Oasis</p>							

\*sold only to pre-approved government agencies

## Telar

Chlorsulfuron – General Use Product

← Restriction (days) →							
Signal word (toxicity)	Cost	Use rates (product per acre)	Re-entry interval	Hay harvest	Grazing interval	Lactating dairy animal	Slaughter
Caution	\$17/oz	0.25-3.0 oz	4 hours	0*	0*	0*	0*
<b>Labeled Uses (sites):</b> Non-crop and industrial sites.							
<b>Environmental characteristics</b> – can be applied to water’s edge, do not apply directly to water. Telar has soil residual activity and is active on weeds through foliar and root uptake.							
<b>Primary target species</b> – plants of the mustard family, biennial thistles, houndstongue, common mullein, common teasel, puncturevine, Canada thistle, and assorted annual broadleaf species. Fair to good activity on dalmatian and yellow toadflax. Not effective for controlling most grass species, kochia, knapweed species, or bindweed.							
<b>Other Product Names</b> – Glean							
<b>Pre-mixes</b> – + metsulfuron (Escort) = Cimarron X-tra.							

\*Restriction dependant on rate of application

## Tordon

Picloram – \*Restricted Use Product

← Restriction (days) →							
Signal word (toxicity)	Cost	Use rates (product per acre)	Re-entry interval	Hay harvest	Grazing interval	Lactating dairy animal	Slaughter
Caution	\$85/gal	1.5 oz – 2 qts	12 hours	14	0	14	3
<b>Labeled Uses (sites):</b> Grass pastures, fallow cropland, and non-cropland areas.							
<b>Environmental characteristics</b> – this product is soluble in water and persistent in soil. Do not apply on ditchbanks or bottoms, near water, or under desirable trees and shrubs. Tordon is residually active in the soil, and taken into a plant through foliar absorption and/or root uptake.							
<b>Primary target species</b> – bindweed, Canada thistle, biennial thistles, knapweeds, toadflax, leafy spurge, houndstongue, woody species. Not effective for controlling kochia or most mustard species. Not effective for grass control, though will suppress certain established pasture grasses such as smooth brome.							
<b>Pre-mixes</b> – + 2,4-D = Grazon, Pathway							

\* Restricted Use Products for retail sale to and use only by Certified Applicators or persons under their direct supervision

## Transline

Clopyralid – General Use Product

Signal word (toxicity)	Cost	Use rates (product per acre)	Re-entry interval	Hay harvest	Grazing interval	Lactating dairy animal	Slaughter
Caution	\$320/gal	0.3-1.3 pts	12 hours	0	0	0	0
<p style="text-align: center;">← Restriction (days) →</p> <p><b>Labeled Uses (sites):</b>  <b>Transline</b> - Rangeland, grass pastures, forest land, and right-of-ways.  <b>Stinger</b> – Cropland use.  <b>Lontrel</b> – turf and landscaping.</p> <p><b>Environmental characteristics</b> – water soluble, should not be applied near water. Transline is similar to Tordon, though less persistent in the soil. Transline can be safely applied near trees and shrubs. Active on target plants primarily through foliar uptake, with root uptake to a lesser degree.</p> <p><b>Primary target species</b> – Canada thistle, biennial thistles, knapweeds, common teasel, oxeye daisy, sunflowers.                      Not effective for controlling grass species, kochia, bindweed, leafy spurge, toadflax, houndstongue, or most mustard species.</p> <p><b>Pre-mixes</b> – + 2,4-D = Curtail. + triclopyr = Redeem, Confront</p>							

## Vista

Fluroxypyr – General Use Product

Signal word (toxicity)	Cost	Use rates (product per acre)	Re-entry interval	Hay harvest	Grazing interval	Lactating dairy animal	Slaughter
Warning	\$85/gal	0.66-1.33 pts	12 hours	7	0	0	2
<p style="text-align: center;">← Restriction (days) →</p> <p><b>Labeled Uses (sites):</b>  <b>Vista</b> – non-cropland sites.  <b>Starane</b> – small grain crops.</p> <p><b>Environmental characteristics</b> – Active on target plants through foliar uptake. Not for use on irrigation ditchbanks.</p> <p><b>Primary target species</b> – kochia, prickly lettuce, puncturevine, sunflower                      Not effective for controlling grass species, Canada thistle, or bindweed.</p>							

## 2,4-D

General use product sold under many brand names, some but not all – Amine 4, Formula 40, Hi-Dep, Saber, Salvo, Savage, Weedar, Weedone, Hardball

Signal word (toxicity)	Cost	Use rates (product per acre)	Re-entry interval	← Restriction (days) →			
				Hay harvest	Grazing interval	Lactating dairy animal	Slaughter
Danger – Caution*	\$15/gal	4 - 64 oz	48 hours	30	0	7	3

**Labeled Uses (sites):**

For use over a wide range of applications including rangeland, pasture, crops, and non-cropland.

**Environmental characteristics** – 2,4-D is the active ingredient in many compounds, and is available in ester and amine formulations. Ester formulations are volatile and may injure non-target plants through vapor drift. Low volatility (LV) esters are less susceptible to vapor drift, but may still volatilize at temperatures above 85 degrees. Amine formulations typically do not volatilize, and should be used during warmer weather. Ester formulations penetrate foliage more readily, and are usually used at lower rates than amine formulations.

2,4-D has little to no soil activity, uptake in plants is through foliage. Do not apply to water.

**Primary target species** – used for control of most broadleaf weeds with little or no effect on grass. Higher rates for control or suppression of perennials. Not effective for control of kochia or knapweed species.

**Pre-mixes** – too numerous to list.

\*Signal word varies with differing 2,4-D formulations

# Curtail

Clopyralid & 2, 4- D - General Use Product

Signal Word (toxicity)	Cost	Use rates (product per acre)	Re-entry interval	Hay harvest	Grazing interval	Lactating dairy animal	Slaughter
Danger	\$40/gal.	2pt.-4qt.	12 hours	30 days	0 days	14 days	7 days

**Labeled Uses (sites)**

For use on wide range of sites including wheat, barley, rangeland and non-cropland sites.

**Environmental characteristics**

Do not apply directly to water or to areas where surface water is present.

Many forbs are susceptible to Curtail. Do not use on newly seeded areas until grass is well established.

**Primary target species**

Canada thistle, biennial thistles, knapweeds and selected mustards.

Some control of kochia at the 2-4-leaf stage.

## Single Nozzle Sprayer Calibration

It is critical to know the output of a sprayer in order to be accurate in adding an herbicide to the tank. A quick and easy method:

1. Measure a calibration plot that is exactly 18.5 ft X 18.5 ft (128<sup>th</sup> of an acre).
2. Spray the plot uniformly with water, keeping the sprayer pressure constant. Note the number of seconds required.
3. Spray into a bucket for the same number of seconds, again keeping the sprayer pressure constant.
4. Measure the number of ounces of water in the bucket.
5. Number of ounces of water measured from the bucket is equal to the number of gallons per acre (gpa) the sprayer is delivering.

Spray volume (gpa)	Amount of Herbicide to Add to Each Gallon of Water				
	Recommended Herbicide Rate/Acre				
	1 Pint	1 Quart	2 Quarts	3 Quarts	4 Quarts
15	1 fl oz	2 fl oz	4 fl oz	6 ¼ fl oz	8 ½ fl oz
20	0.83 fl oz	1.67 fl oz	3 ¼ fl oz	4 ¾ fl oz	6 1/3 fl oz
30	0.5 fl oz	1 fl oz	2 fl oz	3 ¼ fl oz	4 ¼ fl oz
40	0.42 fl oz	0.83 fl oz	1 2/3 fl oz	2 1/3 fl oz	3 ¼ fl oz
50	0.33 fl oz	0.63 fl oz	1 ¼ fl oz	2 fl oz	2 ½ fl oz
60	0.28 fl oz	0.55 fl oz	1.1 fl oz	1 2/3 fl oz	2 fl oz
70	0.22 fl oz	0.44 fl oz	0.88 fl oz	1 1/3 fl oz	1 ¾ fl oz
80	*1 ¼ tsp	2 1/3 tsp	4 ¾ tsp	7 ¼ tsp	9 ½ tsp
90	1 tsp	2 tsp	4 ¼ tsp	6 1/3 tsp	8 ½ tsp

\* 6 tsp = 1.0 oz