
APPENDIX 10

HERBICIDE USE GUIDELINES

An herbicide can be one of many useful tools considered for use in an integrated weed management program. However, unlike other weed management methods, herbicides have the potential to greatly impact the environment and harm the health of humans and other living things if they are not handled and applied properly. Although this section includes safety guidelines for persons who are planning to handle and use herbicides, the reader should be aware that these guidelines are very general. **It is extremely important to read the product label for the specific herbicide carefully prior to mixing and application. “The label IS the law.”**

HERBICIDE DOCUMENTATION

Herbicide labels should be included with any herbicide purchased. Labels include a wealth of information about the chemical, including: active ingredient(s), protective equipment required, hazards, directions for use, storage, mixing and application, species controlled by the product and more. Additional information about most chemicals is available in the form of a Material Safety Data Sheet (MSDS). Both of these publications are also available from the manufacturer, as well as via the Internet (see page 90 for further information on where to find herbicide labels and MSDS online).

PRE-SPRAYING CONSIDERATIONS:

Restricted Use Chemicals: Some herbicides are restricted-use-only chemicals. These chemicals are for sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator’s certification. For information on becoming a state certified pesticide applicator, contact the Colorado Department of Agriculture at the address given below.

Herbicide Selection: Determine which products are labeled for use on your particular weed species. If the product is a restricted use chemical and you are not certified to use such chemicals, you will need to hire a professional applicator. Other factors to consider when choosing an herbicide include proximity of the weed infestation to water, nearby trees or shrubs, soil composition, and propensity of the chemical to contaminate water supplies.

Herbicide labels: Prior to handling and use, read the product labels for any herbicides that you plan to use. It is a violation of Federal law to use any herbicide in a way that is inconsistent with its labeling.

Timing: Consider the growth stage of both target and non-target and species. Plan spraying for a time (of day and of year) when it is likely to have the greatest effect on target species.

Complement spraying with mechanical control methods in a logical sequence. The effectiveness of an herbicide can be enhanced by spraying a weed patch which has been mowed earlier in the season. The mowing depletes the plant's energy reserves and makes it more susceptible to the effects of the herbicide. Time herbicide application to minimize effects any desirable species in the area. This might mean waiting until desired plants have gone dormant before spraying weeds.

Weather: Rain can affect the function of an herbicide. It may be required for activity, or it may have the opposite effect, inactivating it or washing it away. Wind may result in unacceptable drift to non-target areas on or off the property. Drought conditions may preclude the use of certain chemicals. Pay close attention to weather conditions and follow directions on labels. If rain is predicted and a label says 24 hr of dry weather must follow herbicide application, do NOT spray. Wait until weather conditions are suitable. The alternative is wasted chemical, wasted labor costs, and possible environmental contamination and unintended damage to non-target vegetation.

Revegetation plans: Determine how soon after herbicide application revegetation can and should occur. This will vary tremendously depending upon which chemical is used. If revegetation occurs too soon, residual pesticide in the soil may kill or damage new plants and seedlings. Revegetation too late can result in the colonization of new weeds or the re-establishment of existing weed seeds in the absence of any competition. Prepare a revegetation plan and be ready to plant at the right time.

HERBICIDE APPLICATION METHODS:

Wick/Swiper: Provides very selective application of herbicides with no drift or drip. Uses a sponge wiping mechanism to wipe herbicide from sponge onto weeds. For use in sensitive areas and areas where weeds are mixed with desired vegetation.

Backpack/hand sprayer: Useful for accessing remote or sensitive areas where motorized vehicle use is not practical or advisable. Can be used in conjunction with pack animals as well. Allows for moderately selective application of herbicides. Some herbicide drift will occur when this method is used. It is important that sprayers are calibrated accurately, because the volume of spray delivered to a given area will be dependent on proper calibration.

Broadcast sprayers: Includes truck, ATV and lawn tractor mounted or tow-behind boom sprayers. Also includes aerial applications. For use in more easily accessible, less sensitive areas, along right of ways, and in areas where weeds outnumber desired vegetation. This is not a selective application method. All plants in a treated area will be sprayed, including non-target species, so special care must be taken to select an appropriate herbicide and in timing applications to minimize damage to non-target species. It is important that sprayers are calibrated accurately, because the volume of spray delivered to a given area will be dependent on proper calibration.

CONTRACTED HERBICIDE APPLICATION PRICING:

Herbicide application prices vary tremendously depending on the method of application, the number of acres sprayed and the specific chemical used. At the time of printing of this manual, some approximate herbicide application costs for contracted spraying services in the Denver Metro area are as follows:

Boom application of herbicide by ATV

1 to 5 acres: \$50/acre (labor) + chemical (cost/acre varies depending on the chemical)

6 to 10 acres: \$35/acre + chemical

11 to 20 acres: \$25/acre + chemical

Hand application of Chemicals

1 to 3,750 Sq. ft: \$0.01/sq ft (labor) + chemical (cost/quart varies depending on chemical)

Aerial spraying

The cost of aerial applications of herbicides varies tremendously. Call a professional applicator to get an idea of approximate costs associated with the site to be sprayed. The lowest prices can be obtained for agricultural land applications, starting at \$5-10/acre for labor only. Other types of applications are more expensive. Variables influencing the ultimate cost/acre include, but are not limited to, the cost of the chemical, the terrain, the target species, number of acres to be sprayed, and liability issues associated with the site.

UNDERSTANDING HERBICIDE APPLICATION RATES:

It is important to distinguish between concentrated herbicide and the diluted spray that is actually applied to vegetation. Often, the label will state the maximum rate of concentrated product that should be applied to an acre of treated land per year. For example, the 1999 label for Tordon 22K states that for non-cropland areas, the total use of Tordon 22K, including retreatments or spot treatments, must not exceed 2 quarts per acre per annual growing season. The 2 quarts per acre refers to concentrated herbicide. Sometimes, the maximum application rate is converted to pounds of active ingredient (a.i.) per treated acre per year. The label will then include the maximum application rate in that form as well.

The herbicide concentrate must be diluted in a solvent (carrier) prior to application. It is important to read the labels thoroughly to get an idea of what the total final volume of the spray should be. The actual spray will include the herbicide mixed in a carrier, usually water, oil or a mix of oil and water and any adjuvants (see below) that have been added.

Returning to the Tordon 22K example, the label says that for ground broadcast applications, a spray volume of 10 or more gallons per acre should be used. This spray volume refers to the diluted spray that actually gets applied to vegetation. The total volume used will vary depending on a variety of factors, including the density of vegetation to be sprayed, the height of the vegetation, the type of weeds and the type of equipment used. As mentioned above, broadcast sprayers must be calibrated properly to ensure that proper application rates are maintained.

Remember not to exceed the maximum application rate of any herbicide (in this case, 2 quarts/acre is the absolute maximum).

It is important to look for any special directions that may be present in herbicide labels for hand spraying and cut surface tree treatments, since these techniques will likely be used commonly in natural areas. Unfortunately, this information is not always easy to find, and most directions given are for use with broadcast sprayers. In many cases, it is necessary to use manufacturers' directions for broadcast spraying and come up with a reasonable conversion in terms of amount of acreage that will be covered by a hand sprayer. Ideally, the area of the patch that will be sprayed should be measured and a calibrated hand sprayer used. This will ensure that the maximum application rate is not exceeded. Remember, no matter what method of herbicide application is used, there will always be a maximum rate of active ingredient that should be applied to a treated acre in a given amount of time. Never exceed the maximum rate stated in the label.

HERBICIDE ADJUVANTS:

Adjuvants are substances added to a formulation to increase the effectiveness of the active ingredient. These substances may be labeled for use with certain herbicides and will be added during the mixing stage to the final dilute spray. Consult labels to ensure products are compatible.

Surfactants: Chemicals that break down the waxy layer found on most plant surfaces. When the layer is broken down, herbicides can be absorbed faster by the plant. This more efficient use of herbicides results in lower costs and reduced environmental impacts because less herbicide can be applied.

Dyes: Coloring agents added to herbicides. These dyes make it possible to see exactly what has been sprayed. Use of such dyes results in lower costs and reduced environmental impacts, because unintentional re-spraying of already sprayed areas is minimized. Care must be taken to avoid using incompatible dyes and herbicides. **Some dyes are listed as not compatible with certain herbicides. Read the labels.**

PERSONAL PROTECTION EQUIPMENT AND SAFETY RULES AND RECOMMENDATIONS

- Specific safety information is provided on each herbicide label. Protect the health of applicators and the environment by following all instructions for use of the chemical being used. *The label is the law.*
- Make a safety and contamination kit to be stored where herbicides are mixed and taken with applicators when they go to the field. This kit should contain eyewash solution, hand cleaner, a change of clothes, towels, a dust mask, safety glasses, and anything else that is recommended by the herbicide label.

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- Applicators and handlers should always wear a long-sleeved shirt, long pants, waterproof gloves, shoes plus socks, and protective eyewear. Always wash clothes thoroughly after they are used and dispose of clothes that become drenched or heavily saturated with herbicides. Wash these items separate from other laundry.
 - Remove clothing as soon as possible after application. Wash the outside of gloves before removing and rinse out the inside. As soon as possible, wash thoroughly and change into clean clothing.
 - Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.

MIXING HERBICIDES

- Establish a site that will be used exclusively for storage and mixing of herbicides. Keep the area and equipment clean. Make sure that the area and equipment are not accessible to children or animals.
- Do not mix herbicides within 50 feet of any well, sinkhole, or any open water source.
- Use color-coded jugs for mixing herbicides and to use to fill up tanks. Do not use these jugs for holding washing or drinking water.
- Avoid spilling herbicides, and wear safety glasses and gloves when handling herbicides or equipment.
- Rinse mixing cups and always triple rinse all containers and bottles.
- If herbicide is spilled, either dilute it with water, or shovel the exposed soil into a plastic bag and dispose of it properly.

Keep in mind that, according to Colorado's **Agricultural Chemicals and Groundwater Protection Act**, special rules and regulations relating to the storage, containment, mixing and loading of herbicides apply to the following:

- (a) all operating bulk pesticide storage facilities, commercial or private
- (b) all mixing and loading areas, commercial or private, where any of the following are handled in any one year period:
 - (1) five hundred (500) gallons or more, in the aggregate, of formulated product or combination of formulated products of liquid pesticides;
 - (2) three thousand (3,000) pounds or more, in the aggregate, of formulated product or combination of formulated products of dry pesticides: or
 - (3) one thousand five hundred (1,500) pounds or more, in the aggregate, of active ingredients of pesticides.

The full text of this and other related regulations is available at:
<http://www.ag.state.co.us/DPI/rules/rules.html>

HERBICIDE DISPOSAL

- Triple rinse and puncture empty containers before disposing.
- Rinse the backpacks with water and pump some clean water through the nozzle.
- If herbicide is spilled on clothing, either dispose of the clothing or soak it in a bucket of soapy water and rinse a few times before laundering.
- Unused herbicide constitutes hazardous waste and should not be disposed of in a municipal landfill. Call your county health or environment department to find out if a hazardous waste disposal program exists in your city or county. If you have no access to a hazardous waste disposal site, use up the remaining product in accordance with directions on its label, or give it to someone who will use it properly.
- **Colorado Waste Agricultural Pesticide Collection Program- Colorado ChemSweep: This program, organized by MSE Environmental, Inc., will dispose of unwanted, unused, or banned/outdated pesticides. The program services any agri-business or green industry business including farmers, ranchers, commercial applicators, golf courses, greenhouses or nurseries who apply or store pesticides in Colorado. Call 1-888-242-4362 for more information.**

BECOMING A STATE LICENSED HERBICIDE APPLICATOR

For information and to see the “Rules and Regulations Pertaining to the Administration and Enforcement of the Pesticide Applicator’s Act”,

Contact the Colorado Department of Agriculture, Division of Plant Industry:

700 Kipling Street, Suite 4000, Lakewood Colorado 80215

Phone: 303-239-4148

Fax: (303) 239-4125

<http://www.ag.state.co.us/DPI/home.html>

RESTRICTED USE PESTICIDES

Restricted use pesticides are for retail sale to and use only by certified applicators or persons under their direct supervision and only for those uses covered by the certified applicator’s certification. The official list of Federally Restricted Use Pesticides is constantly revised as new products are developed and others are removed from production. Contact the nearest EPA office for current lists.