Volunteer Herbicide Applicator Training
Outline

- WEEDS
- HERBICIDES
- LABELS
- HUMAN PESTICIDE PROTECTION
- ENVIRONMENTAL PROTECTION
- PRACTICAL KNOWLEDGE
Weed Biology

- Native – vs – Non Native
- Invasiveness
What is a weed?

Plants are considered weeds if they:

- compete with desirable vegetation for moisture, nutrients, light, and growing space;
- negatively affect the desired appearance of a site;
- provide a source of weed seeds for nearby areas;
- harbor insects or diseases that affect desirable plants;
- pose a fire hazard;
- are legally declared noxious;
- or cause hay fever, skin rash, or other allergic or toxic reactions.
Weed Biology

- Broadleaf vs. narrowleaf plants
  - Broadleaf plants have netted veins.
  - Narrowleaf plants, or grasses, have long, thin leaves with parallel veins.
• Germinate, grow, set seed, and die in the same year and are relatively easy to control.
  • Treatments should be made as early as possible.
  • Herbicides should be applied to annual weeds before they flower and produce seeds.
Biennials

- Require two years to complete their life cycle. In the first season, the seed germinates, and the plant assumes a compact or rosette growth habit. The plant overwinters, and in the second growing season the stems elongate, flower, set seed, and die. Biennials are broadleaf plants not grasses.
  - Most susceptible to herbiciding in the rosette stage or early in the 2nd year.
Perennials

- Live for two or more years and may be either herbaceous (die to the ground each winter) or woody (have persistent stems). Perennials are the most difficult weeds to control.
  - Treating with a translocated, systemic herbicide may be the most efficient method of control.
HERBICIDES
Basic Terminology

- Pesticide
- Herbicide
- Active ingredient
- Inert ingredient
Formulations

- Dry formulations – powders, dry flowables, granules, pellets, and dusts
  - Not as common as wet formulations
  - Can present an inhalation hazard
- Wet formulations – emulsifiable concentrates, microencapsulated, flowables, solutions.
  - Must keep from freezing
Adjuvants

- Drift reduction additives
- Surfactants
- Stickers
- Penetrants
- Buffering agents
Herbicide Classification

- Selective vs. Nonselective
- Systemic vs. Contact
- Persistent
- Preemergent vs. Postemergent
- Growth hormone
  - 2,4-D, Transline, Garlon
- Meristematic inhibitor
  - Roundup, Krenite, Poast, Escort
Information on a Product Label:

- A pesticide’s impact on wildlife?
- Personal protective equipment required when handling a pesticide?
- How long to wait before entering a treated area?
Brand Name

- Trademark name used by the manufacturer

Be careful, some products with:
- similar brand names may have different ingredients
- different brand names may have the same ingredients
What type of pests will the product will control?
Type of Pesticide

General Use Pesticide
- do not need certification to apply

Restricted Use Pesticide (RUP)
- only a certified pesticide applicator may apply or supervise the use of a RUP.

–A RUP could cause great harm to people or the environment if not used properly.
Signal Words

Danger
Warning
Caution

Highly Toxic
Moderately Toxic
Slightly Toxic
Practically Non-Toxic
Emergency response and first aid

Read the label BEFORE using the product so you know the correct emergency procedures.
Material Safety Data Sheets (MSDS)

- Hazardous chemical components
- Physical data
- Fire and explosion dangers
- Potential threat of safety of handler
- First aid
- Product reactivity
- Spill or leak procedures
- Other special precautions

Keep on file and readily available.
Hazardous Materials Identification System

Scale of 0 to 4
0 = minimal hazard
4 = severe hazard
Specimen labels

- Roundup
- Rodeo
Trade Name (Refers to this specific formulation of herbicide)

Chemical Name (Shows what active ingredients are in the formulation)

Active Ingredient Concentration (Important to know this to determine rates and solutions for application)

EPA Registration Number (kind of like a social security number for herbicides. Each specific formulation must be registered with the EPA)
PPE Requirements
(You must follow these requirements when applying this particular herbicide)

Description of Herbicide Use
(Tells you what type of species and what locations it is legal to apply this herbicide)

Hazard Statement
(Volunteers can only apply herbicides labeled as ‘Caution’)

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Contact information for Manufacturer
(In case of health of environment emergency)

General Information
(Basic information on how the herbicide works, how long it takes to see visible signs of effects, and conditions to treat)

Directions for Use
It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Read all Directions for Use carefully before applying.

This is an end-use product. Dow AgroSciences does not intend and has not registered it for reformulation. See individual container label for repackaging limitations.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or tribe, consult the agency responsible for pesticide regulation.

General Information
(How this product works)
This product is a water-soluble liquid, which mixes readily with water and nonionic surfactant to be applied as a foliar spray for the control or destruction of many herbaceous and woody plants. This product is intended for control of annual and perennial weeds and woody plants in forests, pine straw plantations, non-crop sites such as utility rights-of-way and in and around aquatic sites; also for use in wildlife habitat areas, for perennial grass release, and grass growth suppression and grazed areas on these sites.

The active ingredient in this product moves through the plant from the point of foliage contact to and into the root system. Visible effects on most annual weeds occur within 2 to 4 days. 7 days or more on most perennial weeds, and 30 days or more on most woody plants. Extremely cool or cloudy weather following treatment may slow the activity of this product and delay visual effects of control. Visible effects include gradual wilting and yellowing of the plant which advances to complete browning of above-ground growth and deterioration of underground plant parts.

Unless otherwise directed on this label, delay application until vegetation has emerged and reached the stages described for control of such vegetation under the “Weeds Controlled” section of this label.

Unmerged plants arising from unattached underground rhizomes or root stocks of perennials or brush will not be affected by the spray and will continue to grow. For this reason best control of perennial weeds or brush is obtained when treatment is made at late growth stages approaching maturity.

Always use the higher rate of this product and surfactant within the recommended range when vegetation is heavy or dense, when treating dense multi-canopied sites or woody vegetation or difficult-to-control herbaceous or woody plants.

Do not treat weeds, brush or trees under poor growing conditions such as drought stress, disease or insect damage, as reduced control may result. Reduced control of target vegetation may also occur if foliage is heavily covered with dust at the time of treatment.

Reduced control may result when applications are made to woody plants or weeds following site disturbance or plant top growth removal from grazing, mowing, logging or mechanical brush control. For best results, delay treatment of such areas until resprouting and foliar growth has reached the target vegetation to the recommended stage of growth for optimum herbicide exposure and control.

Rainfall or irrigation occurring within 6 hours after application may reduce effectiveness. Heavy rainfall or irrigation within 24 hours after application may delay control.

Agricultural Use Requirements
Use this product only in accordance with its labeling and with the Worker Protection Standards, 40 CFR part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It also contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), and restricted entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted entry interval (REI) of 4 hours.

PPE required for entry to treated areas that is permitted under the Worker Protection Standards and that involves contact with anything that has been treated, such as plants, soil, or water, is:
• Coveralls
• Chemical-resistant gloves made of any waterproof material
• Shoes plus socks

Storage and Disposal
Do not contaminate water, food, feed or seed by storage or disposal.
Pesticide Storage: Store above 10°F (-12°C) to keep product from crystallizing. Crystals will settle to the bottom. If allowed to crystalize, place in a warm room 68°F (20°C) for several days to redissolve and roll or shake container or recirculate in mini-bulk containers to mix well before using.
Cautionary statements
(To avoid unintended injury to desirable plants)

Note: The maximum rates stated throughout this product’s labeling apply to this product combined with the use of all other herbicides containing glyphosate or sulfosate as the active ingredient, whether applied as mixtures or separately. Calculate the application rates and ensure that the total use of this and other glyphosate or sulfosate containing products does not exceed the maximum use rates.

Grazing Restrictions: This product may be used to treat undesirable vegetation in utility rights-of-way that pass through pastures, rangeland, and forestry sites that are being grazed. For tank mix applications, comply with all restrictions appearing on the tank mix product label.

Except for lactating dairy animals there are no grazing restrictions following the labeled applications of this product:
- For lactating dairy animals there are no grazing restrictions for the following labeled applications of this product:
  - Where the spray can be directed onto undesirable woody brush and trees, such as in handgun spray-to-wet or low volume directed spray treatments.
  - For tree injection of tall applications and for cut stump treatments.
  - For broadcast applications, observe the following restrictions for lactating dairy animals:
    - For application rates of greater than 4.5 but not to exceed 7.5 quarts per acre, no more than 15 percent of the available grazing area may be treated.
    - For application rates that do not exceed 4.5 quarts per acre, no more than 25 percent of the available grazing area may be treated.
    - These restrictions do not apply to pastures, rangeland or forestry sites outside of utility rights-of-way.

NOTE: Use of this product in any manner not consistent with this label may result in injury to persons, animals, or crops, or other unintended consequences. When in doubt, keep container in use, prevent spills and contamination.

Buyer and all users are responsible for all loss or damage in connection with the use or handling of this product. Do not apply this product or other materials that are not expressly recommended in this label. Mixing this product with herbicides or other materials not recommended in this label may result in reduced performance.

ATTENTION: Avoid drift. Extreme care must be used when applying this product to prevent injury to desirable plants and crops.

Do not allow the herbicide solution to mist, drip, drift or splash onto desirable vegetation since minute quantities of this product can cause severe damage or death to the crop or other areas on which treatment was not intended. The likelihood of plant or crop injury occurring from the use of this product is greatest when winds are gusty or in excess of 5 miles per hour or when other conditions, including lesser wind velocities, will allow spray to drift. When spraying, avoid combinations of pressure and nozzle type that will result in splatter or fine particles (mist) which are likely to drift. Avoid applying at excessive speed or pressure.

Spray Drift Management

Avoiding spray drift at the application site is the responsibility of the applicator. The interaction of many equipment-and-weather-related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions. The following drift management requirements must be followed to avoid off-target movement from aerial applications to agricultural field crops. These requirements do not apply to forestry applications, public health uses or to applications using dry formulations.

1. The distance of the outer most nozzles on the boom must not exceed 3/4 the length of the wingspan or rotor.
2. Nozzles must always point backward parallel with the air stream and never be pointed downward more than 45 degrees. Where states have more stringent regulations they should be observed.

The applicator should be familiar with and take into account the information covered in the following Aerial Drift Reduction Advisory Information:

Importance of Droplet Size: The most effective way to reduce drift potential is to apply large droplets. The best drift management strategy is to apply the largest droplets that provide sufficient coverage and control. Applying larger droplets reduces drift potential, but will not prevent drift if applications are made improperly, consider unfavorable weather conditions (see Wind, Temperature and Humidity, and Temperature Inversion section of this label).

Controlling Droplet Size: Volume-Use high flow rate nozzles to apply the highest practical spray volume. Nozzles with higher rated flows product larger droplets.

Pressure-Use the lower spray pressures recommended for the nozzle. Higher pressure reduces droplet size and does not improve canopy penetration. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.

Number of nozzles-Use the minimum number of nozzles that provide uniform coverage.

Nozzle Orientation-Optimal nozzle orientation so that the spray is released backwards, parallel to the airstream will produce larger droplets than other orientations. Significant deflection from the horizontal will reduce droplet size and increase drift potential.

Nozzle Type-Use nozzle type that is designed for the intended application. For most nozzle types, narrower spray angles produce larger droplets. Consider using low-drip nozzle. Solid stream nozzle oriented straight back produce larger droplets than other nozzle types.

Boom Length-For some use patterns, reducing the effective boom length to less than 3/4 of the wingspan or rotor length may further reduce drift without reducing swath width.

Application-Applications should not be made at a height greater than 10 feet above the top of the largest plants unless a greater height is required for aircraft safety. Making applications at the lowest height that is safe reduces exposure of droplets to evaporation and wind.
### Spray Solution Chart

(Used by mixer to determine amount needed for different solution strengths)

<table>
<thead>
<tr>
<th>Desired Volume</th>
<th>3/4%</th>
<th>1%</th>
<th>1 1/4%</th>
<th>1 1/2%</th>
<th>2%</th>
<th>5%</th>
<th>8%</th>
<th>10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 gal</td>
<td>1 fl oz</td>
<td>1 1/3 fl oz</td>
<td>1 2/3 fl oz</td>
<td>2 fl oz</td>
<td>2 2/3 fl oz</td>
<td>6 1/4 fl oz</td>
<td>10 1/4 fl oz</td>
<td>12 3/4 fl oz</td>
</tr>
<tr>
<td>25 gal</td>
<td>1 1/2 qt</td>
<td>1 qt</td>
<td>1 1/4 qt</td>
<td>1 1/2 qt</td>
<td>2 qt</td>
<td>5 qt</td>
<td>2 gal</td>
<td>2 1/2 gal</td>
</tr>
<tr>
<td>100 gal</td>
<td>3 gal</td>
<td>1 gal</td>
<td>1 1/4 gal</td>
<td>1 1/2 gal</td>
<td>2 gal</td>
<td>5 gal</td>
<td>8 gal</td>
<td>10 gal</td>
</tr>
</tbody>
</table>

When applied as directed, this product plus a surfactant such as a non-ionic surfactant containing 80% or greater active ingredient will control the following annual weeds:

### Selective Equipment

This product may be applied through shielded sprayers or wiper application equipment. This equipment may be used to selectively control undesirable vegetation without harming desirable vegetation.

Shielded sprayers direct the herbicide solution onto weeds while shielding desirable vegetation from the spray solution. Any recommended rate or tank mixture of this product may be used employing this equipment.

Wiper applicators physically wipe product directly onto undesirable vegetation. Care should be taken to avoid wiping desirable vegetation. Use a 33 to 100 percent solution of this product, diluted in water for wiper applications. Use a 33 percent solution for wick or gravity feed systems. Higher concentrations may be used in pressurized systems that are capable of handling higher solutions. Addition of a nonionic surfactant at a rate of 10 percent by volume of total herbicide solution is recommended.

### Weeds Controlled

#### Annual Weeds

Apply to actively growing annual grasses and broadleaf weeds.

Allow at least 3 days after application before disturbing treated vegetation. After this period the weeds may be mowed, tilled or burned. See “Directions for Use,” “General Information” and “Mixing and Application Instructions” for labeled uses and specific application instructions.

**Broadcast Application Rates:** For weeds less than 6 inches tall, use 1 1/2 pints of this product per acre plus a surfactant such as a non-ionic surfactant containing 80% or greater active ingredient. If weeds are greater than 6 inches tall, use 2 1/2 pints of this product per acre plus a non-ionic surfactant containing 80% or greater active ingredient.

**Hand-Held, High-Volume Application Rates:** Use a 3/4 percent solution of this product in water plus a surfactant such as a non-ionic surfactant containing 80% or greater active ingredient. Apply to foliage of vegetation to be controlled.
<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sowthistle, annual</td>
<td>Sonchus oleraceus</td>
</tr>
<tr>
<td>Spanishneedles</td>
<td>Bidens bipinnata</td>
</tr>
<tr>
<td>Stinkgrass</td>
<td>Erigeron annuus</td>
</tr>
<tr>
<td>Sunflower</td>
<td>Helianthus annuus</td>
</tr>
<tr>
<td>Thistle, Russian</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Spurry, umbrelia</td>
<td>Holosteum umbellatum</td>
</tr>
<tr>
<td>Velvetleaf</td>
<td>Abutilon theophrasti</td>
</tr>
<tr>
<td>Wheat</td>
<td>Trifolium aestivum</td>
</tr>
<tr>
<td>Witchgrass</td>
<td>Paniceae pungens</td>
</tr>
<tr>
<td>Cordgrass</td>
<td>Cenchrus ciliaris</td>
</tr>
<tr>
<td>Gutgrass, giant</td>
<td>Dallisgrass (31)</td>
</tr>
<tr>
<td>Dandelion</td>
<td>Doronicum orientale</td>
</tr>
<tr>
<td>Dock, curly</td>
<td>Rosmarinus officinalis</td>
</tr>
<tr>
<td>Dogbane, hemp</td>
<td>Galium aparine</td>
</tr>
<tr>
<td>Fescue</td>
<td>Festuca arundinacea</td>
</tr>
<tr>
<td>Fescue, tall</td>
<td>Paspalum dilatatum</td>
</tr>
<tr>
<td>Guineagrass</td>
<td>Poa pratensis</td>
</tr>
<tr>
<td>Helium cock</td>
<td>Potentilla reptans</td>
</tr>
<tr>
<td>Hemlock, poison</td>
<td>Primula veris</td>
</tr>
<tr>
<td>Horsetail</td>
<td>Pulmonaria officinalis</td>
</tr>
<tr>
<td>Horseradish</td>
<td>Quercus rubra</td>
</tr>
<tr>
<td>Ice Plant</td>
<td>Rhamnus cathartica</td>
</tr>
<tr>
<td>Johnsongrass</td>
<td>Ranunculus acris</td>
</tr>
<tr>
<td>Kikuyagrass</td>
<td>Ranunculus asiaticus</td>
</tr>
<tr>
<td>Knaweed</td>
<td>Rubus fruticosus</td>
</tr>
<tr>
<td>Lantana</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Leopodanthus, common</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Leopodanthus, searuea</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Loosestrife, purple</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Lotus, American</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Maidencane</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Milkwed</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Muhy, wriestem</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Mullein, common</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Napiergrass</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Nightshade, silverleaf</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Nutseed, purple</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Nutseed, yellow</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Orchardgrass</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Pampasgrass</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Paragrass</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Parijata</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Quackgrass</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Redtop</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Ryegrass, perennial</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Sheepfoot swamp</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Spotted dock</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Star, yellow</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Sweat potato, wild</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Thistle, artichoke</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Thistle, Canada</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Timothy</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Torpedograss</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Tules, common</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Vaseygrass</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Velvetygrass</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Waterhyacinth</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Waterwetland</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Waterprimrose</td>
<td>Salvia officinalis</td>
</tr>
<tr>
<td>Whoaggrass, western</td>
<td>Salvia officinalis</td>
</tr>
</tbody>
</table>

**Specific Perennial Weed Control Recommendations:**

1. **Alligatorweed**
   
   Apply 6 pts of this product per acre as a broadcast spray or as a 1 1/4 percent solution with hand-held equipment to provide partial control of alligatorweed. Apply when most of the target plants are in bloom. Repeat applications will be required to maintain such control.
Noncrop Sites
This product may be used to control the listed weeds in and around aquatic sites and on noncrop sites such as:
- Airports
- Golf Courses
- Habitat Restoration & Management Areas
- Highways & Roadside
- Industrial Plant Sites
- Lumberyards
- Parking Areas
- Parks
- Petroleum Tank Farms
- Pipelines, Power, Telephone & Utility Rights-of-Way
- Pumping Installations
- Railroads
- Schools
- Storage Areas
- Similar Sites

Aquatic Sites
This product may be applied to emerged weeds in all bodies of fresh and brackish water which may be flowing, nonflowing or transient. This includes lakes, rivers, streams, ponds, estuaries, rice fields, seeps, irrigation and drainage ditches, canals, reservoirs, wastewater treatment facilities, wildlife habitat restoration and management areas and similar sites.

If aquatic sites are present in the noncrop area and are part of the intended treatment, read and observe the following directions:
- This product does not control plants which are completely submerged or have a majority of their foliage under water.
- There is no restriction on the use of treated water for irrigation, recreation or domestic purposes.
- Consult local state fish and game agency and water control authority before applying this product to public water. Permits may be required to treat such water.
- NOTE: Do not apply this product directly to water within 1/2 mile up-stream of an active potable water intake in flowing water (i.e., river, stream, etc.) or within 1/2 mile of an active potable water intake in a standing body of water such as lake, pond or reservoir. To make aquatic applications around and within 1/2 mile of active potable water intakes, the water intake must be turned off for a minimum period of 48 hours after the application. The water intake may be turned on prior to 48 hours if the glyphosate level in the intake water is below 0.7 parts per million as determined by laboratory analysis. These aquatic applications may be made only in those cases where there are alternative water sources or holding ponds which would permit the turning off of an active potable water intake for a minimum period of 48 hours after the applications. This restriction does not apply to intermittent inadvertent overspray of water in terrestrial use sites.
- For treatments after drawdown of water or in dry ditches, allow 7 or more days after treatment before reintroduction of water to achieve maximum weed control. Apply this product within 1 day after drawdown to ensure application to actively growing weeds.

Wetland/aquatic information
(If you herbicides in or near water, it is crucial that you use a product labeled for use in aquatic areas. This section gives specific information about this type of application)

Forestry Sites and Utility Rights-of-Way
In forest and utility sites, this product is recommended for the control or partial control of woody brush, trees, and annual and perennial herbaceous weeds. This product is also recommended for use in preparing or establishing wildlife openings within these sites, in pine straw plantations for maintaining logging roads, and for side trimming along utility rights-of-way.

In forestry sites, this product is recommended for use in site preparation prior to planting any tree species, including Christmas trees and silvicultural nursery sites.

In utility sites, this product is recommended for use alongside electrical power, pipeline, and telephone rights-of-way, and in other utility sites associated with these rights-of-way, such as substations.

Application Rates:

<table>
<thead>
<tr>
<th>Method of Application</th>
<th>Application Rate</th>
<th>Spray Volume (gal/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadcast (Aerial)</td>
<td>1.5 to 7.5 qt/acre</td>
<td>5 to 100</td>
</tr>
<tr>
<td>Broadcast (Ground)</td>
<td>1.5 to 7.5 qt/acre</td>
<td>5 to 100</td>
</tr>
<tr>
<td>Spray-to-Wet Handgun, Backpack Mistblower</td>
<td>0.75 to 2% by volume</td>
<td>spray-to-wet</td>
</tr>
<tr>
<td>Low Volume Directed Spray Handgun, Backpack Mistblower</td>
<td>5% to 10% by volume</td>
<td>partial coverage</td>
</tr>
</tbody>
</table>

1 Where repeat applications are necessary, do not exceed 8 quarts per acre per year.

2 For low volume directed spray applications, coverage should be uniform with at least 50% of the foliage contacted. For best results, coverage of the top one-half of the plant is important.

In forestry site preparation and utility rights-of-way applications, this product requires use with a surfactant such as a non-ionic surfactant containing greater than 80% active ingredient. Use of this product without surfactant will result in reduced herbicide performance. Refer to the “Mixing and Application Instructions” section of this label and the surfactant manufacturer label for more information.

Sites specific control recommendations chart
(Label gives specific control recommendations for certain sites)
Tank Mixtures

This product may be used in tank mix combination with other herbicide products to broaden the spectrum of vegetation controlled. When tank mixing, read and observe applicable use directions, precautions and limitations on the respective product labels. Use according to the most restrictive precautionary statements for each product on the mixture. Any recommended rate of this product may be used in a tank mix.

Note: For forestry site preparation, make sure the tank mix product is approved for use prior to planting the desired species. Observe planting interval restrictions. For side trimming treatments in utility rights-of-way, tank mixtures with Arsenal 2WSL herbicide are not recommended. For side trimming treatments, it is recommended that this product be used alone as recommended, or as a tank mix with Garlon.

<table>
<thead>
<tr>
<th>Product</th>
<th>Broadcast Rate</th>
<th>Use Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenal Applicators Concentrate</td>
<td>2 to 16 fl oz/acre</td>
<td>Forestry site preparation</td>
</tr>
<tr>
<td>Oust</td>
<td>1 to 4 fl oz/acre</td>
<td>Forestry site preparation, utility sites</td>
</tr>
<tr>
<td>Garlon 3A</td>
<td>1 to 8 fl oz/acre</td>
<td>Forestry site preparation, utility sites</td>
</tr>
<tr>
<td>Garlon 4</td>
<td>1 to 4 qt/acre</td>
<td>Forestry site preparation, utility sites</td>
</tr>
<tr>
<td>Arsenal 2WSL</td>
<td>2 to 32 fl oz/acre</td>
<td>Utility sites</td>
</tr>
</tbody>
</table>

Spray-to-Wet Rates

<table>
<thead>
<tr>
<th>Product</th>
<th>Rate by volume</th>
<th>Use Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenal Applicators Concentrate</td>
<td>1/32% to 1/2%</td>
<td>Forestry site preparation</td>
</tr>
<tr>
<td>Arsenal 2WSL</td>
<td>1/32% to 1/2% by volume</td>
<td>Utility sites</td>
</tr>
</tbody>
</table>

Low Volume Directed Spray Rates

<table>
<thead>
<tr>
<th>Product</th>
<th>Rate by volume</th>
<th>Use Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenal Applicators Concentrate</td>
<td>1/8% to 1/2%</td>
<td>Forestry site preparation</td>
</tr>
<tr>
<td>Arsenal 2WSL</td>
<td>1/6% to 1/2% by volume</td>
<td>Utility sites</td>
</tr>
</tbody>
</table>

Mixing Information

(Important information on which other herbicides are compatible with this specific herbicide and what rates to use and how to mix them correctly)

RODEO – Page 12
Wetland/aquatic information
(If you herbicides in or near water, it is crucial that you use a product labeled for use in aquatic areas. This section gives specific information about this type of application)

Information on cut stump treatments
(Specific information on the rates and methods used for this application type)
HUMAN PESTICIDE PROTECTION
**Exposure**

- **Hazard** = Exposure \( \times \) Toxicity
  - **Exposure** - how pesticides enter the body
  - **Toxicity** - how poisonous the pesticide is

- **Routes of exposure**
  - Dermal (skin)
  - Oral (mouth)
  - Inhalation (lungs)
  - Eyes
Dermal exposure

- rinse with water
- remove contaminated clothing
- wash with plenty of soap and water

Exposure
Dermal exposure

• Parts of the body absorb pesticides at different rates.

• The head is 4 times more absorbent than the hand.

• The genital area is 11 times more absorbent.
**Exposure**

- **Oral exposure**
  - rinse mouth with water
  - Do not induce vomiting if
    - victim is unconscious
    - having convulsions
    - petroleum based product
    - corrosive pesticide
    - label specifies NOT to induce vomiting
Oral exposure

- Pesticides removed from their original containers are the highest cause of pesticide poisonings in adults and children.
Exposure

- Inhalation exposure
  - remove to fresh air
  - loosen tight clothing
  - keep air passages clear
  - perform artificial respiration if necessary
Exposure

- Eye exposure
  - wash eye with a gentle stream of clean water for 15+ minutes
  - get medical attention if there is pain or reddening of the eye
**Exposure**

- **First Aid**
  - Act immediately!
  - Stop exposure
  - Rinse with clean water
  - Read and follow label directions!
  - See a doctor and bring the pesticide label.
Toxicity

- The pesticide’s ability to cause damage
  - The pesticide label gives a quick indication of how poisonous the pesticide is - the signal word.
Personal Protective Equipment

Read the pesticide label for PPE requirements.
For Effective PPE Barrier

- Choose the right equipment.
- Clean and maintain it correctly.
- Use it correctly!
Wear PPE to Protect:

- Skin
- Eyes
- Breathing system
...especially when handling concentrate.

- Goggles
- Face shield
- Safety glasses
Other PPE to wear

- Long pants
- Chemical resistant gloves
- Work shoes
- Optional:
  - Long sleeve shirt
  - Rubber boots
  - Hat
Wash contaminated work clothing and PPE by themselves

...use hot water with a heavy-duty liquid detergent and rinse thoroughly (unless PPE manufacturer specifies otherwise).
Remove PPE carefully...try not contact any pesticides.
Wash hands and face using soap and hot water before:
- eating
- drinking, or
- smoking.

Shower and change clothes when possible.
Safe Pesticide Handling
Risk of Pesticide Exposure

- handling
- applying
- mixing
- loading
Decontamination Materials

- clean water
- soap
- paper towels
- extra coveralls
- eyewash
- first aid kit
Cleaning and Disposing of Pesticide Containers

Return all empty containers to the District for disposal.
Pesticide Storage

- Lock your pesticide storage.
- Store pesticides in original containers with label intact.
- Do NOT store pesticides in soft drink bottles or other food containers.
ENVIRONMENTAL PROTECTION
All applicators need to consider how the use of pesticides can affect the environment.
Pesticides can move off target by:

Air

Water

On or in objects, plants or animals
Drift: pesticide movement away from the target by air.
Factors that make a pesticide MORE likely to drift include:

- small droplet size
- wind or air currents
- large distance from the target
Volatilization

solid or liquid turns to gas
Vapor drift

movement of invisible pesticide vapors
Surface Runoff
Leaching into Groundwater
Runoff is more likely when:

- Pesticide over-applied
- Sloping site or saturated soils
- Compacted or paved surface
- Spills not cleaned up
Leaching is more likely when:

- Pesticide over-applied
- Applied to sandy soil
- Pesticide properties
- Applied before heavy rain or irrigation
- Spills not cleaned up
• Check weather forecasts and delay applications if heavy rain is predicted.
Movement of pesticides on objects
PRACTICAL KNOWLEDGE

- Species
- Preferred methods of control
- Timing
- Concentrations
- Sprayer use, maintenance, and troubleshooting
Autumn olive (*Eleagnus umbellata*))
Black locust (*Robinia pseudoacacia*)
Buckthorn (*Rhamnus spp.*)
Burning bush (*Euonymus alatus*)
Canada thistle (*Cirsium arvense*)
Chervil (*Anthriscus sylvestris*)
Crown vetch (Coronilla varia)
Garlic mustard (Alliaria petiolata)
Honeysuckle (Lonicera spp.)
Multiflora rose (*Rosa multiflora*)
Oriental bittersweet (*Celastrus orbiculatus*)
Privet (*Ligustrum spp.*)
Purple loosestrife (*Lythrum salicaria*)
Reed canary grass (*Phalaris arundinacea*)
Teasel (*Dipsacus spp.*)
Tree of Heaven (Ailanthus altissima)