Volunteer Herbicide Training

Crab Orchard NWR
2011
Training agenda

• Requirements for apply herbicides as a volunteer
• Herbicides
  – Safety
  – Herbicides used in volunteer program at CONWR
  – Reading and understanding herbicide labels
• Control methods
• Invasive Species
  – Species to be controlled on CONWR
  – Sites for volunteer applications
  – Specific herbicide rates/methods to be used by volunteers
Requirements of Illinois Pesticide Act

- Volunteers wishing to apply herbicides to control invasive species must attend a training session that reviews the methods, locations, and herbicides to be used.
- Training is good for calendar year in which it is conducted.
- Volunteers must be at least 18 years of age.
Requirements of Illinois Pesticide Act

- Volunteers can only treat invasive species with the specific herbicides, methods, and sites including in training
- Volunteers can only apply herbicides labeled as “Caution”
- Volunteers cannot mix or load herbicides
- Volunteers must wear all appropriate PPE listed on herbicide label
Herbicide Safety

• Safety of volunteers and others involved in applications is of the utmost importance
  – Wear PPE (Personal Protective Equipment)
  – Limit or quickly contain spills
  – Reduce exposure to herbicide as much as possible
Herbicide Safety

• PPE
  – Legal requirement found in any herbicide label
  – Usually consists of long sleeved shirt and long pants, chemical-resistant gloves, shoes plus socks
  – Some herbicides also include eye protection
  – Wash and launder PPE equipment separately from other clothing
What’s wrong with this picture?
Herbicide Safety

• Spills
  – Limit spills by handling herbicide containers carefully
  – If spill does occur try to contain it as much as possible and prevent further spilling
    • Avoid direct skin contact when working with herbicide spills
  – Contact applicator if spill is excessive
Herbicide Safety

• Reduce exposure
  – Check all equipment to make sure no leaks exist before using.
    • This is particularly important for backpack sprayers
    • Check for signs of degradation in equipment
    • Do not use faulty equipment, instead report them to applicator
  – Be careful of any hoses or other parts of the equipment that might get caught and tear
  – Always wear PPE when using herbicides or handling spray equipment filled with herbicide
  – Carry a change of clothes in case herbicide contaminated clothing
Herbicide Safety

• Reduce Exposure
  – Don’t make applications upwind of where you are standing
  – Don’t walk through a recently treated area (especially true with foliar applications)
  – Consider using herbicide dye to more easily recognize exposure
  – Don’t spray herbicide over your head
Safety

• Take care not to overheat on hot days
• Be careful of typical hazards when working in the field
  – Poison ivy
  – Dehydration
  – Ticks/chiggers
  – Snakes
  – Loose rocks, old wells, etc.
• Be careful when working with other people, particularly with power tools
Wait until power tool operator is clear of the area
Herbicides

• Label information
  – All volunteers must read and follow label information
  – The label is a legal document that gives limits on what, where, and how much you can spray each herbicide
  – It indicates the PPE required for application, the health and environment risks involved with applying the herbicide, and give rates and method recommendations for many species
Herbicides

• Labels are included with every container of herbicide purchased
• Also available online at cdms.net
• Volunteers should have a copy of the label for the specific herbicide being used whenever applying
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)

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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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In case of emergency endangering health or the environment involving this product, call 1-800-992-5994. If you wish to obtain additional product information, visit our website at www.dowagro.com.

Agricultural Chemical: Do not ship or store with food, feeds, drugs or clothing.

**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 visible 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.

Unemerged 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 most 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-croped sites or woody vegetation 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 2 hours after application
Cautionary statements
(To avoid unintended injury to desirable plants)

Cautionary statements are provided to ensure the safe and effective use of the product. It is important to read and follow these guidelines to avoid unintended injury to desirable plants.

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 downwards 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, or under unfavorable environmental 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-Orienting nozzles 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 a nozzle type that is designed for the intended application. With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Solid stream nozzles 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.

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 not in use, keep container closed to prevent spills and contamination.

Buyer and all users are responsible for all loss or damage in connection with the use or handling of purchase of this product or other materials that are not expressly recommended in this label. Mixing the 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 destruction to the crop. Injury occurs on areas to 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 drift to occur. 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 Solution Chart (Used by mixer to determine amount needed for different solution strengths)

Control Recommendations (Specific recommendations for control of different categories of weeds)

<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 1/2 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>2.5 gal</td>
</tr>
<tr>
<td>75 gal</td>
<td>3 qt</td>
<td>1 3/4 qt</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>

For use in knapsack sprayers, it is suggested that the recommended amount of this product be mixed with water in a larger container. Fill the knapsack sprayer with the mixed solution and add the correct amount of surfactant.

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 weak or gravity feed systems. Higher concentrations may be used in pressurized systems that are capable of handling this solution. Addition of a nonionic surfactant at a rate of 10 percent by volume of all 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. 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 1/2 pint 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.
Species specific control recommendations chart

(Label gives specific control recommendations for certain species)

Perennial Weeds

Apply this product to control most vigorously growing perennial weeds. Unless otherwise directed, apply when target plants are actively growing and most have reached early head or early bud stage of growth. Unless otherwise directed, allow at least 7 days after application before disturbing vegetation.

NOTE: If weeds have been mowed or tilled, do not treat until regrowth has reached the recommended stages. Fall treatments must be applied before frost begins.

Repeat treatments may be necessary to control weeds regenerating from underground parts or seed.

Specific Weed Control Recommendations: For perennial weeds, apply the recommended rate plus a surfactant such as a non-ionic surfactant containing 80% or greater 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.

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 perennial weeds: (Numbers in parentheses [ ] following common name of a listed weed species refer to “Specific Perennial Weed Control Recommendations” for that weed which follow the species listing.)

Specific Perennial Weed Control Recommendations:

1. Alligatorweed: Apply 6 pt/sq ft of this product per acre as a broadcast spray or as a 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 & Roadsides
- Industrial Plant Sites
- Lumberyards
- Parking Areas
- Parks
- Petroleum Tank Farms
- Pipeline, 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 levees, 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 authorities 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-steam 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.
- Floating mats of vegetation may require retreatment. Avoid wash-off of sprayed foliage by spray boat or recreational boat backwash or by rainfall within 6 hours of application. Do not re-treat within 24 hours following the initial treatment.
- Applications made to moving bodies of water must be made while traveling upstream to prevent concentration of this herbicide in water. When mailing any bankside applications, do not overlap more than 1 foot into open water. Do not spray in bodies of water where weeds do not exist. The maximum application rate of 7 1/2 pints per acre must not be exceeded in any single broadcast application that is being made over water.
- When emergent infestations require treatment of the total surface area of impounded water, treating the area in strips may avoid oxygen depletion due to decaying vegetation. Oxygen depletion may result in fish kill.

Wetland/aquatic information
(If you herbicidies 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 along electrical power, pipeline, and telephone rights-of-way, and in other utility sites associated with these rights-of-way, such as substations.

Application Rates¹:

<table>
<thead>
<tr>
<th>Method of Application</th>
<th>Application Rate</th>
<th>Spray Volume (g/acre)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadcast</td>
<td>1.5 to 7.5 g/acre</td>
<td>5 to 30</td>
</tr>
<tr>
<td>Aerial</td>
<td>1.5 to 7.5 g/acre</td>
<td>10 to 60</td>
</tr>
<tr>
<td>Ground</td>
<td>0.75 to 2% by volume</td>
<td>spray-to-wet</td>
</tr>
<tr>
<td>Spray-to-Wet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handgun, Backpack</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mistblower</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Volume Directed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spray</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Handgun, Backpack</td>
<td>5% to 10% by volume</td>
<td>partial coverage</td>
</tr>
<tr>
<td>Mistblower</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹Where repeat applications are necessary, do not exceed 8.0 quarts per acre per year.
²For low volume directed spray applications, coverage should be uniform with at least 50 percent 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 60 percent active ingredient. Use of a 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.
Use higher rates of this product within the recommended rate ranges for control or partial control of woody brush, trees, and hard-to-control perennial herbaceous weeds. For best results, apply to actively growing woody brush and trees after full leaf expansion and before fall color and leaf drop. Use increased rates within the recommended rate range to control perennial herbaceous weeds from emergence up to the appearance of seedheads, flowers or berries appear. Use lower rates within the recommended rate range to control annual herbaceous weeds and actively growing perennial herbaceous weeds after seedheads, flowers or berries appear. Apply to foliage of actively growing annual herbaceous weeds anytime after emergence.

**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 statement 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 to utility rights-of-way, tank mixtures with Arsenal 2WSL herbicides 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>
<th>Spray-to-Wet Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenal Applicator</td>
<td>2 to 14 fl/acre</td>
<td>Forestry site preparation</td>
<td></td>
</tr>
<tr>
<td>Concentrate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oust</td>
<td>1 to 4 oz/acre</td>
<td>Forestry site preparation, utility sites</td>
<td></td>
</tr>
<tr>
<td>Garlon 3A</td>
<td>1 to 4 qt/acre</td>
<td>Forestry site preparation, utility sites</td>
<td></td>
</tr>
<tr>
<td>Garlon 4</td>
<td>1 to 4 qt/acre</td>
<td>Forestry site preparation, utility sites</td>
<td></td>
</tr>
<tr>
<td>Arsenal 2WSL</td>
<td>2 to 32 fl/acre</td>
<td>Utility sites</td>
<td></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)
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)
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Herbicides to be used

- Rodeo/Roundup - Glyphosate
- Garlon 4/Tahoe 4 - Triclopyr
- Poast Plus - Sethoxydim
Herbicides

• Label Review

(Refer to printed herbicide labels)
Chemical Control

• Safe and little non-target impacts if used correctly
• Cost-efficient alternative for control
• Can be used in conjunction with mechanical techniques
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• Application Methods
  – Foliar Spray
  – Cut Stump
  – Basal Bark
Foliar

- Target individual plants or clumps
- Reduces non-target effects
- Typically low % solution (1-5%)
- Timing – need actively growing vegetation
Foliar

• Thoroughly wet all leaves to the point of run-off (but not beyond)
• Take care to treat most leaves on a plant
• Do not use foliar applications if rain is predicted within the next 24 hours
Cut stump/basal bark

- Very little non-target effects
- Can be labor intensive
- Could miss applications to smaller stems
- Typically high % solution (15-50%)
- Timing – Anytime, but spring (during leaf-out) is less effective
Cut stump

- After cutting down stem, immediately treat cut surface with herbicide.
- For small stems (under 4” in diameter) treat entire surface heavily enough that the herbicide just starts running down the side of the stem.
- For larger stems only treat the outer 1.5” – 2”
Basal Bark

- Treat the entire circumference of the stem from ground-level to 12”-18” height with oil-based herbicide
- If plant is multi-stemmed, then you must treat all stems
- Do not use this method if the stems are coated in silt, such as after a flood event, as this will greatly reduce efficacy
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2011 Invasive species to be potentially treated

• Garlic mustard
• Chinese yam
• Teasel
• Japanese stiltgrass
• Autumn olive
• Bush honeysuckle
• Sericea lespedeza
Garlic Mustard
Chinese Yam
Japanese Stiltgrass
Autumn Olive
Bush Honeysuckle
Sericea Lespedeza
Crab Orchard NWR

- Review of sites to be treated
  (Refer to printed CONWR maps)
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Treatment applications for each species

• Garlic mustard
  — 2% foliar application of glyphosate to rosettes

• Chinese yam
  — 2-3% foliar application of triclopyr

• Teasel
  — 2% foliar application of triclopyr or glyphosate to rosettes

• Japanese stiltgrass
  ¾-2% foliar application of sethoxydim or 2% foliar application of glyphosate

• Autumn olive
  — 17-25% cut stump or basal bark application of triclopyr

• Bush honeysuckle
  — 17-25% cut stump or basal bark application of triclopyr or 2% foliar application of triclopyr or glyphosate

• Tree of Heaven
  — 17-25% cut stump or basal bark application of triclopyr

• Sericea Lespedeza
  — 2-3% foliar application of triclopyr
Herbicide applications by volunteers on Crab Orchard NWR

• Under the supervision of applicator
  - Judson Spicer

• An integral part of the invasive species management plan for the Refuge

• All application techniques will be demonstrated to the volunteers in the field before treatments