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DISCLAIMER

Every effort has been made to ensure the accuracy of this guide for use by Alabama Department of Transportation (ALDOT) employees, consultants, and contractors. No guaranty is given as to the accuracy of the contents of this guide for use on work other than that for ALDOT. No responsibility is assumed by ALDOT for any errors caused by incomplete or inaccurate information contained in this guide relating to work outside the oversight of ALDOT.

Trade names used in this publication are for the purpose of providing specific information and no endorsement is implied. No discrimination of comparable products is intended. In the event of registration cancellation, the pesticide use recommendation is automatically cancelled.
INTRODUCTION

This section introduces the herbicide spray operator to the herbicide treatment program for the Alabama Department of Transportation. A successful program depends on the knowledge, training, and skills of personnel involved in the program. The future of the program and the responsibility for the program are dependent, in large measure, upon the spray applicators. Therefore, there are a number of things that each spray applicator must keep in mind at all times. Safety of the applicator and environmental considerations are first priorities.

The treatment program is not fixed indefinitely. You must stay updated on the ALDOT program as it applies to your division and district. It is important to follow the ALDOT program in accordance with Guideline for Operation 5-17, effective 2/13/89, as amended. All equipment must be in top operating condition at all times, and an accurate herbicide application report must be prepared and submitted each day.

BASIS FOR HERBICIDE TREATMENT RECOMMENDATIONS

The following treatment recommendations and pertinent information are intended to be a quick reference for materials and rates of herbicides approved for use in the vegetation management program of the Alabama Department of Transportation. Their recommended usage is based upon research, experience of use, safety, effectiveness and cost of treatment. Calendar dates are used for suggested target dates; however, such recommendations are subject to change under special circumstances depending upon the type of vegetation, soil conditions, weather variables, adjacent land use patterns and a host of other factors. Changes or additions to this general program must be issued and approved by the Bureau of Maintenance, Alabama Department of Transportation.
**TURF AREA WEED CONTROL**

**WARM SEASON RELEASE (DORMANT SEASON APPLICATION)**

*Oust® XP or Sulfomet™ XP*

**Rate of Application:**

Spring: 0.5 - 0.75 ounce of Oust® XP or Sulfomet™ XP per acre.

Fall: 1.0 ounce of Oust® XP or Sulfomet™ XP per acre.

**Mixing Instructions:**

1. Fill tank to 1/2 desired level, begin agitation.
2. Add Oust® XP or Sulfomet™ XP (pre-slurry the product first).
3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons of mixture.
4. Fill tank to desired level, continue agitation.

**Comments and Precautions:**

Use from November 15 to March 15 in well-established dormant Bermudagrass turf for winter weed control. Apply spray mixture at 25 gal. / A. Use equipment that is capable of uniform applications. **Keep well agitated at all times. Do not leave application mix in tank overnight.** If used in non-bermudagrass turf, such as Bahia or Fescue, damage or stand reduction may occur. Do not use a surfactant. **Extreme care must be taken to prevent drift to desirable plants or agricultural land. Do not apply when runoff is likely to occur, such as periods of intense rainfall, or when soils are saturated.** Apply only once per year. **A buffer of 25 feet must be observed along all bodies of water for broadcast applications of Oust® XP or Sulfomet™ XP; do not apply where water contamination is likely to occur.** Refer to the current label and Safety Data Sheet and follow instructions completely.
TURF AREA WEED CONTROL

WARM SEASON RELEASE (DORMANT SEASON APPLICATION)

Oust® XP or Sulfomet™ XP + glyphosate

Rate of Application:

0.5 ounce of Oust® XP or Sulfomet™ XP plus
0.375 lbs. ae of glyphosate per acre (see page 50).

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add Oust® XP or Sulfomet™ XP (pre-slurry the product first).
3. Add glyphosate product.
4. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
5. Fill to desired level, continue agitation.

Comments and Precautions:

Apply only when warm season grasses are completely dormant (January and February) prior to spring green-up of desirable turf grasses. Apply only to actively growing target weeds less than 12 inches tall. Extreme care must be taken to prevent drift to desirable plants or agricultural land. Do not apply when runoff is likely to occur, such as periods of intense rainfall, or when soils are saturated. Do not use on areas where the majority of the turf consists of Bahiagrass or Fescue. Do not apply more than once per season. A buffer of 25 feet must be observed along all bodies of water for broadcast applications of Oust® XP or Sulfomet™ XP; do not apply where water contamination is likely to occur. Keep well agitated at all times; do not leave application mix in tank overnight. Refer to the current label and Safety Data Sheet and follow instructions completely.
TURF AREA WEED CONTROL

WARM SEASON RELEASE (DORMANT SEASON APPLICATION)

EsplAnade® 200 SC

Rate of Application:

3.5 to 5.0 ounces of EsplAnade® 200 SC per acre.

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add EsplAnade® 200 SC, continue agitation.
3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons of mixture.
4. Fill tank to desired level, continue agitation throughout the fill process.

Comments and Precautions:

Apply prior to weed germination. EsplAnade® 200 SC has little post-emergent activity; if applied after germination of the target weed a post-emergent product should be included. Keep well agitated at all times. Do not leave application mix in tank overnight. Extreme care must be taken to prevent drift to desirable plants or agricultural land. Do not apply when runoff is likely to occur, such as periods of intense rainfall. Do not apply to saturated, frozen, or snow covered soils. Do not exceed 10 ounces per acre per year. Refer to the current label and Safety Data Sheet and follow instructions completely.
TURF AREA WEED CONTROL

WARM SEASON RELEASE (DORMANT SEASON APPLICATION)

Garlon® 3A + 2,4-D amine

Rate of Application:

1.0 pint of Garlon® 3A plus 2.0 pints of 2,4-D amine per acre.

Note: Vastlan™ may be substituted for Garlon® 3A @ 12.0 ounces per acre.

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add Garlon® 3A.
3. Add 2,4-D amine.
4. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
5. Add surfactant at the rate of 2 pints per 100 gallons of mixture.
6. Fill tank to desired level; continue agitation and mix well before spraying.

Comments and Precautions:

Apply to dormant warm season turf areas to control actively growing broadleaf weeds and brambles such as dewberries, which are not controlled by 2,4-D alone. Application is usually made between November and March. Make application when daytime temperatures exceed 60°F and are expected to remain at this level for a few days. See special label precautions when using these herbicides near sensitive sites or susceptible vegetation. Generally this material should not be applied when wind speeds exceed 5 mph or within one half mile of any crop, garden, greenhouse, or any other desirable vegetation that may be susceptible to this product. Refer to the current label and Safety Data Sheet and follow instructions completely.
TURF AREA WEED CONTROL

WARM SEASON RELEASE (DORMANT SEASON APPLICATION)

2,4-D amine + Perspective®

Rate of Application:

2.0 pints of 2,4-D amine plus 2.0 ounces of Perspective® per acre.

Note: Method® 240 SL may be substituted for Perspective® at 3.2 ounces per acre (1 pint per 5 acres).

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add Perspective® (pre-slurry the product first).
3. Add 2,4-D amine.
4. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
5. Add surfactant at the rate of 2 pints per 100 gallons of mixture.
6. Fill tank to desired level, continue agitation.

Comments and Precautions:

This application is particularly good on Buckhorn Plantain in late winter / early spring. Generally this material should not be applied when wind speeds exceed 5 mph or within one half mile of any crop, garden, greenhouse, or any other desirable vegetation that may be susceptible to this product. Do not leave Perspective® in the tank overnight; keep agitated at all times. Note: Where 2,4-D is not a viable option, Perspective® can be used alone, Statewide, at 3.75 ounces per acre (Method® 240 SL at 6.0 ounces) or, in the northern tier of State where Bahiagrass is not a major part of the turf, Escort® XP or MSM 60 at 0.5 to 1.0 ounces per acre can be substituted for 2,4-D. Refer to the current label and Safety Data Sheet and follow instructions completely.
TURF AREA WEED CONTROL

WARM SEASON RELEASE (DORMANT SEASON APPLICATION)

*Milestone®*

Rate of Application:

5.0 ounces of Milestone® per acre.

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add Milestone®.
3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
4. Add surfactant at the rate of 2 pints per 100 gallons of mixture.
5. Fill tank to desired level; continue agitation and mix well before spraying.

Comments and Precautions:

Make application when daytime temperatures exceed 60° F and are expected to remain at this level for a few days. Do not apply in areas of planned wildflower plots and avoid mowing treated areas for at least 7 days following the application. **Do not apply more than 7.0 ounces per acre per growing season.** Extreme care must be taken to prevent drift to desirable plants or agricultural land; see special label precautions when using this herbicide near sensitive sites or susceptible vegetation. Generally this material should not be applied when wind speeds exceed 5 mph or within one half mile of any crop, garden, greenhouse, or any other desirable vegetation that may be susceptible to this product. Refer to the current label and Safety Data Sheet and follow instructions completely.
TURF AREA WEED CONTROL

WARM SEASON RELEASE (DORMANT SEASON APPLICATION)

2,4-D amine

Rate of Application:

3.0 pints of 2,4-D amine per acre.

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add 2,4-D amine.
3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
4. Add surfactant at the rate of 2 pints per 100 gallons of mixture.
6. Fill tank to desired level and continue agitation and mix before spraying.

Comments and Precautions:

For broadleaf weed control, apply when weeds are small and tender, usually between November and March. Apply when daytime temperatures exceed 60° F. See special label precautions when using this herbicide near sensitive sites or susceptible vegetation. Generally this material should not be applied when wind speeds exceed 5 mph or within one half mile of any crop, garden, greenhouse, or any other desirable vegetation that may be susceptible to this product. Refer to the current label and Safety Data Sheet and follow instructions completely.
TURF AREA WEED CONTROL

WARM SEASON RELEASE (DORMANT SEASON APPLICATION)

2,4-D amine + glyphosate

Rate of Application:

2.0 pints of 2,4-D amine plus 0.375 lb. ae of glyphosate per acre (see page 50).

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add 2,4-D amine.
3. Add glyphosate product.
4. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
5. Fill tank to desired level, continue agitation and mix well before spraying.

Comments and Precautions:

Apply October through mid-March for control of small broadleaf weeds and suppression of perennial grasses. This application provides selective, non-residual control of most weeds. See special label precautions when using these herbicides near sensitive sites or susceptible vegetation. Generally this material should not be applied when wind speeds exceed 5 mph or within one half mile of any crop, garden, greenhouse, or any other desirable vegetation that may be susceptible to this product. Refer to the current label and Safety Data Sheet and follow instructions completely.
TURF AREA WEED CONTROL

WARM SEASON RELEASE (DORMANT SEASON APPLICATION)

glyphosate

Rate of Application:

0.375 to 0.50 lb. ae of glyphosate per acre (see page 50).

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.

2. Add glyphosate product.

3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.

4. Fill tank to desired level, continue agitation and mix well before spraying.

Comments and Precautions:

This application provides selective, non-residual control of many small weeds and suppression of Bermuda and other perennial grasses; it should be used October through February. For Dallisgrass control specifically, best results will be obtained in October to early November up to 2 weeks prior to frost. Do not use on areas where Bahiagrass is a major part of the turf. Discontinue use if unacceptable thinning of turf occurs. Refer to the current label and Safety Data Sheet and follow instructions completely.
TURF AREA WEED CONTROL

WARM SEASON RELEASE (DORMANT SEASON APPLICATION)

Telar® DF or Chlorsulfuron 75

Rate of Application:

0.25 to 0.5 ounces of Telar® DF or Chlorsulfuron 75 per acre.
(Use the 0.5 ounce rate early in the season when targeting Musk thistle).

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add Telar® DF or Chlorsulfuron 75 (pre-slurry the product first).
3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
4. Add surfactant at the rate of 2 pints per 100 gallons of mixture.
5. Fill tank to desired level; continue agitation.

Comments and Precautions:

Apply to established bermudagrass from December through February for the control of broadleaf weeds. Selective weed control is achieved through foliar and root absorption of the herbicide. Herbicide becomes non-selective when applied at excessive rate or at incorrect time. Telar® DF or Chlorsulfuron 75 should not be used on areas of desired Bahiagrass turf. Use spray preparation of Telar® DF or Chlorsulfuron 75 within 24 hours to avoid product degradation; it should not be left in the tank overnight. Refer to the current label and Safety Data Sheet and follow instructions completely.
TURF AREA WEED CONTROL

BROADLEAF WEED CONTROL (GROWING SEASON APPLICATION)

2,4-D amine

Rate of Application:
1.5 to 2.0 pints of 2,4-D amine per acre.

Mixing Instructions:
1. Fill tank to 1/2 desired level, begin agitation.
2. Add 2,4-D amine.
3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
4. Add surfactant at the rate of 2 pints per 100 gallons of mixture.
5. Fill tank to desired level and continue agitation and mix well before spraying.

Comments and Precautions:

For broadleaf weed control, use immediately after broadleaf weeds are fully emerged and small, usually late spring. See special label precautions when using this herbicide near sensitive sites or susceptible vegetation. Generally this material should not be applied when wind speeds exceed 5 mph or within one half mile of any crop, garden, greenhouse, or any other desirable vegetation that may be susceptible to this product. Refer to the current label and Safety Data Sheet and follow instructions completely.
TURF AREA WEED CONTROL

BROADLEAF WEED CONTROL (GROWING SEASON APPLICATION)

Garlon® 3A + 2,4-D amine

Rate of Application:

1.0 pint of Garlon® 3A plus 2.0 pints of 2,4-D amine per acre.

Note: Vastlan™ may be substituted for Garlon® 3A @ 12.0 ounces per acre.

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add Garlon® 3A.
3. Add 2,4-D amine.
4. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
5. Add surfactant at the rate of 2 pints per 100 gallons of mixture.
6. Fill tank to desired level, continue agitation and mix well before spraying.

Comments and Precautions:

Apply April through July to control difficult-to-control broadleaf weeds. See special label precautions when using these herbicides near sensitive sites or susceptible vegetation. Generally this material should not be applied when wind speeds exceed 5 mph or within one half mile of any crop, garden, greenhouse, or any other desirable vegetation that may be susceptible to this product. Refer to the current label and Safety Data Sheet and follow instructions completely.
TURF AREA WEED CONTROL

BROADLEAF WEED CONTROL (GROWING SEASON APPLICATION)

2,4-D amine + Perspective®

Rate of Application:

2.0 pints of 2,4-D amine plus 2.0 ounces of Perspective® per acre.
Note: Method® 240 SL may be substituted for Perspective® at 3.2 ounces per acre (1 pint per 5 acres).

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add Perspective® (pre-slurry the product first).
3. Add 2,4-D amine.
4. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
5. Add surfactant at the rate of 2 pints per 100 gallons of mixture.
6. Fill tank to desired level, continue agitation.

Comments and Precautions:

Generally this material should not be applied when wind speeds exceed 5 mph or within one half mile of any crop, garden, greenhouse, or any other desirable vegetation that may be susceptible to this product. Some stress may be noticeable on warm season turf when Perspective® is used in the summer heat. Do not leave Perspective® in the tank overnight; keep agitated at all times. Note: Where 2,4-D is not a viable option, Perspective® can be used alone, Statewide, at 3.75 ounces per acre (Method® 240 SL at 6.0 ounces) or, in the northern tier of State where Bahiagrass is not a major part of the turf, Escort® XP or MSM 60 at 0.5 to 1.0 ounces per acre can be substituted for 2,4-D. Refer to the current label and Safety Data Sheet and follow instructions completely.
TURF AREA WEED CONTROL

BROADLEAF WEED CONTROL (GROWING SEASON APPLICATION)

*Milestone®*

Rate of Application:
5.0 ounces of Milestone® per acre.

Mixing Instructions:
1. Fill tank to 1/2 desired level, begin agitation.
2. Add Milestone®.
3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
4. Add surfactant at the rate of 2 pints per 100 gallons of mixture.
5. Fill tank to desired level, continue agitation and mix well before spraying.

Comments and Precautions:

Apply during March through June to control broadleaf weeds. **Do not apply more than 7.0 ounces per acre per growing season.** Extreme care must be taken to prevent drift to desirable plants or agricultural land; see special label precautions when using this herbicide near sensitive sites or susceptible vegetation. Generally this material should not be applied when wind speeds exceed 5 mph or within one half mile of any crop, garden, greenhouse, or any other desirable vegetation that may be susceptible to this product. Refer to the current label and Safety Data Sheet and follow instructions completely.
TURF AREA WEED CONTROL

WEEDY GRASS CONTROL (GROWING SEASON APPLICATION)

Target® 6 Plus (MSMA)

Rate of Application:

2.0 pints of Target® 6 Plus per acre.

Mixing Instructions:

1. Fill tank to 1/2 desired level and begin agitation.

2. Add Target® 6 Plus.

3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.

4. Fill tank to desired level, continue agitation and mix well before spraying.

Comments and Precautions:

Use from May through September for suppression of problem grasses; air temperatures should exceed 75°F. For best results, apply one week to 10 days after mowing. Do not exceed the 2.0 pints/acre rate. MSMA is restricted to 2 broadcast applications per season; a buffer of 100 feet must be observed along all permanent bodies of water. Refer to the current label and Safety Data Sheet and follow instructions completely.
TURF AREA WEED CONTROL

BROADLEAF WEED CONTROL (GROWING SEASON APPLICATION)

Target® 6 Plus (MSMA) + 2,4-D amine

Rate of Application:

2.0 pints of Target® 6 Plus + 2.0 pints of 2,4-D amine per acre.

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add Target® 6 Plus.
3. Add 2,4-D amine.
4. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
5. Fill tank to desired level; continue agitation and mix well before spraying.

Comments and Precautions:

This application is to be used after weeds have fully emerged when temperatures have reached a minimum of 75°F (May - September). Use where both broadleaf and grassy weeds are problems and a broadcast treatment is required. See special label precautions when using these herbicides near sensitive sites or susceptible vegetation. Generally this material should not be applied when wind speeds exceed 5 mph or within one half mile of any crop, garden, greenhouse, or any other desirable vegetation that may be susceptible to this product. For best results, apply one week to 10 days after mowing. MSMA is restricted to 2 broadcast applications per season; a buffer of 100 feet must be observed along all permanent bodies of water. Refer to the current label and Safety Data Sheet and follow instructions completely.
TURF AREA WEED CONTROL

WARM SEASON RELEASE (BAHIAGRASS CONTROL)

Escort® XP or MSM 60

Rate of Application:

0.5 oz. to 1.0 ounces of Escort® XP or MSM 60 per acre.

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add Escort® XP or MSM 60 (pre-slurry the product first).
3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
4. Add surfactant at the rate of 2 pints per 100 gallons of mixture.
5. Fill tank to desired level; continue agitation.

Comments and Precautions:

Apply to established Bermudagrass from April through July for the control of bahiagrass and broadleaf weeds. Use higher rates where difficult to control broadleaf weeds are present (see label). Do not apply to large areas of Bahiagrass turf with little or no Bermuda present. When transitioning from Bahiagrass to Bermuda, apply complete fertilizer at a rate to provide nitrogen at 50 lb./A to the treated areas. Selective weed control is achieved through foliar and root absorption of the herbicide. Herbicide becomes non-selective when applied at excessive rates or at incorrect times. Escort® XP or MSM 60 should not be used on areas of desired Bahiagrass turf. Do not leave this product in the tank overnight. Refer to the current label and Safety Data Sheet and follow instructions completely.
TURF AREA WEED CONTROL

WARM SEASON RELEASE (BAHIAGRASS SEED-HEAD SUPPRESSION)

Derigo™

Rate of Application:

1.5 oz. to 2.0 ounces of Derigo™ per acre.

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.

3. Add Derigo™ (pre-slurry the product first).

3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.

4. Add surfactant at the rate of 2 pints per 100 gallons of mixture.

5. Fill tank to desired level; continue agitation.

Comments and Precautions:

Apply to actively growing established warm season grasses for seed-head suppression. Temporary discoloration, especially on Bahiagrass, may occur to grasses under stress from drought or extreme heat; apply only once per season to Bahiagrass. Avoid application to saturated soils or in front of impending rainfall. Applications should not be made to cool season grasses such as Fescue, Bluegrass or Ryegrass unless damage can be tolerated or control is desired. Do not exceed 6.0 ounces per acre per year. Do not leave this product in the tank overnight. Refer to the current label and Safety Data Sheet and follow instructions completely.
TURF AREA WEED CONTROL

WARM SEASON RELEASE

Pastora®

Rate of Application:

1.0 oz. to 1.5 ounces of Pastora® per acre.

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.

4. Add Pastora® (pre-slurry the product first).

3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.

4. Add surfactant at the rate of 2 pints per 100 gallons of mixture.

5. Fill tank to desired level; continue agitation.

Comments and Precautions:

Apply to actively growing established warm season for grass suppression; treatment should be made 10 to 12 days following mowing. This product has activity on Johnsongrass and Vaseygrass, but should not be used where damage to Bahiagrass can’t be tolerated. Temporary discoloration may occur to grasses under stress from drought or extreme heat. Avoid application to saturated soils or in front of impending rainfall. Do not make more than 2 applications per year; do not exceed 2.5 ounces per acre per year. Do not leave this product in the tank overnight. This product can be mixed with up to 6.0 ounces per acre of glyphosate to improve grassy weed control. Refer to the current label and Safety Data Sheet and follow instructions completely.
STRUCTURE AND PAVEMENT WEED CONTROL

GUARDRAIL WEED CONTROL (DORMANT SEASON APPLICATION)

_Oust® XP or Sulfomet™ XP + glyphosate_

Rate of Application:

0.5 oz. of Oust® XP or Sulfomet™ XP plus

0.375 lbs. ae of glyphosate per acre (see page 50).

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.

2. Add Oust® XP or Sulfomet™ XP (pre-slurry the product first).

3. Add glyphosate product.

4. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.

5. Fill to desired level, continue agitation.

Comments and Precautions:

Apply only when warm season grasses are completely dormant (January and February) prior to spring green-up of desirable turf grasses. Apply only to actively growing target weeds less than 12 inches tall. Extreme care must be taken to prevent drift to desirable plants or agricultural land. **A buffer of 25 feet must be observed along all bodies of water for broadcast applications of Oust® XP or Sulfomet™ XP; do not apply where water contamination is likely to occur.** Do not apply when runoff is likely to occur, such as periods of intense rainfall, or when soils are saturated. Do not use on areas where the majority of the turf consists of bahiagrass or fescue. Do not apply more than once per season. **Keep well agitated at all times; do not leave application mix in tank overnight.** Refer to the current label and Safety Data Sheet and follow instructions completely.
STRUCTURE AND PAVEMENT WEED CONTROL

GUARDRAIL WEED CONTROL (GROWING SEASON APPLICATION)

Surflan® AS + glyphosate

Rate of Application:

5.0 pints of Surflan® AS plus 3.0 lbs. ae of glyphosate per acre (see page 50).

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add Surflan® AS.
3. Add glyphosate product.
4. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
5. Fill tank to desired level; continue agitation.

Comments and Precautions:

Apply wherever target grass and broadleaf weeds are growing. This should be a limited use application for areas under guardrails where bare ground is desirable. Combination treatment provides non-selective, residual control of most weeds. Refer to the current label and Safety Data Sheet and follow instructions completely.
STRUCTURE AND PAVEMENT WEED CONTROL

PAVED ISLANDS, JOINTS, CRACKS
SLOPE PAVING AND RIP RAP

glyphosate

Rate of Application:

3.0 lbs. ae of glyphosate per acre (see page 50).

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add glyphosate product.
3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
4. Fill tank to desired level; continue agitation and mix well before spraying.

Comments and Precautions:

Use on actively growing target vegetation for complete non-selective, non-residual weed control. Do not spray in areas where turf may be damaged or erosion may occur as the result of this treatment. Refer to the current label and Safety Data Sheet and follow instructions completely.
STRUCTURE AND PAVEMENT WEED CONTROL

PAVED ISLANDS, JOINTS, CRACKS
SLOPE PAVING AND RIP RAP

_Arsenal® PowerLine™ + glyphosate_

Rate of Application:

**Broadcast:**
2.0 pints of Arsenal® PowerLine™ plus
2.0 lbs. ae of glyphosate per acre (see page 50).

**Spot Treat**
6.0 pints of Arsenal® PowerLine™ plus
2.0 gallons of glyphosate per 100 gallons of spray mixture.

Mixing Instructions:

1. Fill tank to 1/2 the desired level, begin agitation.
2. Add Arsenal® PowerLine™.
3. Add glyphosate product.
4. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
5. Fill tank to desired level, continue agitation and mix well before spraying.

Comments and Precautions:

Apply anytime from March through the growing season to weeds emerging through or under structures or pavement. Use equipment capable of making precise application. This is a non-selective, residual treatment. Do not use in areas where uptake of the herbicide by desirable plant roots is likely. Refer to the current label and Safety Data Sheet and follow instructions completely.
STRUCTURE AND PAVEMENT WEED CONTROL

PAVED ISLANDS, JOINTS, CRACKS
SLOPE PAVING AND RIP RAP

Velpar® L

Rate of Application:
16.0 pints of Velpar® L per acre.

Mixing Instructions:
1. Fill tank to 1/2 desired level, begin agitation.
2. Add Velpar® L.
3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
4. Fill to desired level, continue agitation and mix well before spraying.

Comments and Precautions:
Apply from February through July for non-selective residual weed control. Use precision application equipment only. Do not use in areas where uptake of the herbicide by desirable plant roots is likely. Refer to the current label and Safety Data Sheet and follow instructions completely. Note special precautions for off-target movement and root uptake.
OGRAPHOSATE

PAVED SHOULDERS

Rate of Application:

3.0 lbs. ae of glyphosate per acre (see page 50).

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.

2. Add glyphosate product.

3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.

4. Fill tank to desired level, continue agitation and mix well before spraying.

Comments and Precautions:

For use after weeds have emerged and are actively growing in paved shoulders and cracks. For control of vegetation encroaching from pavement edges, treat only areas where green stems and foliage exist. Refer to the current label and Safety Data Sheet and follow instructions completely.
STRUCTURE AND PAVEMENT WEED CONTROL

PAVED SHOULDERS

Arsenal® PowerLine™ + glyphosate

Rate of Application:

2.0 pints of Arsenal® PowerLine™ plus
2.0 lbs. ae of glyphosate per acre (see page 50).

Mixing Instructions:

1. Fill tank to 1/2 the desired level, begin agitation.
2. Add Arsenal® PowerLine™.
3. Add glyphosate product.
4. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
5. Fill tank to desired level; continue agitation and mix well before spraying.

Comments and Precautions:

Apply anytime from March through the growing season to weeds emerging through or under paved shoulders. Use equipment capable of making precise application. This is a non-selective, residual treatment. Do not use in areas where uptake of the herbicide by desirable plant roots is likely. Refer to the current label and Safety Data Sheet and follow instructions completely.
STRUCTURE AND PAVEMENT WEED CONTROL

BRIDGE ABUTMENTS, FENCES, SIGNPOSTS, ETC.

Garlon® 3A + 2,4-D amine

Rate of Application:

8.0 pints of Garlon® 3A plus 4.0 pints of 2,4-D amine per 100 gallons of spray mixture.  
Note: Vastlan™ may be substituted for Garlon® 3A @ 6.0 pints per 100 gallons.

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add Garlon® 3A.
3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
4. Add surfactant at the rate of 2 pints per 100 gallons of mixture.
5. Fill tank to desired level, continue agitation and mix well before spraying.

Comments and Precautions:

Apply during the growing season when weeds are actively growing.  Use this application only as a spot treatment in areas where vines, brush and kudzu are a problem.  Do not exceed 400 gallons of spray mixture per acre.  See special label precautions when using these herbicides near sensitive sites or susceptible vegetation.  Generally this material should not be applied when wind speeds exceed 5 mph or within one half mile of any crop, garden, greenhouse, or any other desirable vegetation that may be susceptible to this product.  Refer to the current label and Safety Data Sheet and follow instructions completely.
STRUCTURE AND PAVEMENT WEED CONTROL

BRIDGE ABUTMENTS, FENCES, SIGNPOSTS, ETC.

glyphosate

Rate of Application:

Broadcast: 3.0 lbs. ae of glyphosate per acre (see page 50).

Spot Treat: 8.0 pints of glyphosate per 100 gallons of spray mixture.

Mixing Instructions:
1. Fill tank to 1/2 desired level, begin agitation.
2. Add glyphosate product.
3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
4. Fill to desired level, continue agitation and mix well before spraying.

Comments and Precautions

Use on actively growing target vegetation for complete non-selective, non-residual control. Apply to green stems and foliage. **Spray only in areas where bare ground is desirable and erosion is not a problem.** Refer to the current label and Safety Data Sheet and follow instructions completely.
FORESTRY WEED CONTROL

CUT SURFACE TREATMENT

Garlon® 3A

Rate of Application:

1.0 gallon of Garlon® 3A mixed with 1.0 gallon of water.

Note: Vastlan™ may be substituted for Garlon® 3A at the same one to one ratio.

Mixing Instructions:

1. Add 1.0 gallon of Garlon 3A® to a 2.5 gallon container.
2. Add 1.0 gallon of water.
3. Add 2.0 fluid ounces of dye.
4. Mix well by shaking sealed container.

Comments and Precautions:

Application timing is critical. Use immediately following brush and tree cutting any time of year; however, spring applications during sap flow will yield reduced results. Spray or paint to cover the stump, not to point of runoff. Pay particular attention to the ring of bark on the outside of the stump (cambium layer). Refer to the current label and Safety Data Sheet and follow instructions completely.
FORESTRY WEED CONTROL

BASAL BARK OR CUT SURFACE TREATMENT

Pathfinder® II

Rate of Application:
Apply no more than 10.7 gallons of product per acre per year.

Mixing Instructions:
Pathfinder® II is a ready to use product; no mixing is necessary.

Basal Bark Treatment:
To control woody plants less than 6 inches in basal diameter, apply with a backpack or hand-can sprayer using low pressure and a solid cone or flat fan nozzle. Spray the basal portion of the plant, including the collar area, to thoroughly wet the lower 12 to 15 inches of the trunk and stems. Do not spray to run off. Application can be made at any time, including the dormant season.

Cut Stump Treatment:
To control re-sprouts, spray the cambium and bark area around the entire stump circumference. The sides of the stumps should be wetted down to the collar but not to the point of run off. Application can be made at any time; however, results may be reduced during periods of drought.

Comments and Precautions:
Do not apply directly to water or to areas where surface water is present. Do not apply to snow or frozen ground. Do not apply directly to or allow drift to contact grapes, cotton, vegetable crops, flowers, or other desirable broadleaf plants. Refer to the current label and Safety Data Sheet and follow instructions completely.
FORESTY WEED CONTROL

KUDZU CONTROL

*Milestone®*

**Rate of Application:**

5.0 ounces of Milestone® per acre.

**Mixing Instructions:**

1. Fill tank 1/2 desired level, begin agitation.
2. Add Milestone®.
3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
4. Add surfactant at the rate of 2 pints per 100 gallons of mixture.
5. Fill tank to desired level, continue agitation and mix well before spraying.

**Comments and Precautions:**

Treat when foliage is mature and kudzu is actively growing. Coverage of target foliage is important, but application should not be made to the point of runoff. Generally, this material should not be applied when wind speeds exceed 5 mph or within one half mile of any crop, garden, greenhouse, or any other desirable vegetation that may be susceptible to this product. Extreme care must be taken to prevent drift to desirable plants or agricultural land; see special label precautions when using this herbicide near sensitive sites or susceptible vegetation. **Do not apply more than 7.0 ounces per acre per growing season.** Refer to the current label and Safety Data Sheet and follow instructions completely.
FORESTRY WEED CONTROL

KUDZU CONTROL

Garlon® 3A

Rate of Application:

8.0 pints of Garlon® 3A per 100 gallons of spray mixture.
Note: Vastlan™ may be substituted for Garlon® 3A @ 6.0 pints per 100 gallons.

Mixing Instructions:

1. Fill tank 1/2 desired level, begin agitation.
2. Add Garlon® 3A.
3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
4. Add surfactant at the rate of 2 pints per 100 gallons of mixture.
5. Fill tank to desired level, continue agitation and mix well before spraying.

Comments and Precautions:

Treat when foliage is mature and kudzu is actively growing. Coverage of target foliage is important, but application should not be made to the point of runoff. See special label precautions when using these herbicides near sensitive sites or susceptible vegetation. Generally this material should not be applied when wind speeds exceed 5 mph or within one half mile of any crop, garden, greenhouse, or any other desirable vegetation that may be susceptible to this product. Refer to the current label and Safety Data Sheet and follow instructions completely.
FORESTRY WEED CONTROL

BRUSH CONTROL

Permitted Mixtures for Application by Utilities on Department Rights-of-Way

The limited use of the herbicides or tank mix combinations in applications will be governed by the following, prior to the issuance of the required permit:

1. Products and maximum per acre rates will be limited to those shown below:
   - Accord® XRT II 8.0 pints
   - Arsenal® PowerLine™ 1.0 pint
   - Escort® XP 1.0 ounce
   - Garlon® 3A or Vastlan™ 8.0 pints
   - Krenite® S 12.0 pints
   - Method® 240 SL 16.0 ounces
   - Milestone® 7.0 ounces
   - Streamline® 9.5 ounces
   - Viewpoint® 16.0 ounces

   ** All treatments will also include the appropriate surfactant and drift retardant agent at the label recommended rates.

2. The use of Garlon 4 is acceptable for basal or Brown Brush Monitor applications made from November 1 through February 28. Same rates as Garlon® 3A.

3. All applications will be made using properly maintained and calibrated equipment capable of delivering desired volumes.

4. Prior to the issuance of the required permit, the Maintenance Engineer and/or District Engineer in company with the applicant will ride and review the route segments proposed for treatment. This will be necessary to eliminate or exclude any areas where there may be trees on or adjacent to the right-of-way which are susceptible to damage from one or more of these combined herbicides. Treatments utilizing these chemicals should be curtailed where the possibility of root uptake or surface runoff may reach desirable trees. Trees, such as, but not limited to, pecan and oaks (ornamental or historical) should be given extra distance for safety purposes when determining application cut-off limits.

5. All stipulations of previously furnished guidelines must be followed.

6. The Office of the State Maintenance Engineer shall be notified as to locations and herbicide combinations applied by providing a copy of approved permit.
FORESTRY WEED CONTROL

BRUSH CONTROL

*Krenite® S*

Rate of Application:

12.0 to 16.0 pints of Krenite® S per 100 gallons of spray mixture.

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add Krenite® S.
3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
4. Add surfactant at the rate of 2 pints per 100 gallons of mixture.
5. Fill tank to desired level, continue agitation and mix well before spraying.

Comments and Precautions:

Timing and coverage are critical to the success of this treatment! Apply after full leaf expansion up until the beginning of fall coloration of hardwoods to chemically prune brush (mid-June through mid-October). When spraying, ensure good coverage of the foliage of the brush to be controlled; apply to the point of runoff. This application can also be used for low side trimming. When properly applied that portion of vegetation sprayed should not regenerate in the spring. Be aware that applications made during periods of dry weather may result in reduced control. Rainfall occurring within 24 hours of treatment may also result in reduced control. Refer to the current label and Safety Data Sheet and follow instructions completely.
FORESTRY WEED CONTROL

BRUSH CONTROL

*Capstone®*

Rate of Application:

8.0 pints of Capstone® per acre.

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.

2. Add Capstone®.

3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.

4. Add surfactant at the rate of 2 pints per 100 gallons of mixture.

5. Fill tank to desired level, continue agitation and mix well before spraying.

Comments and Precautions:

Apply during the latter part of the growing season (September to November) when brush is still actively growing and prior to the first frost of the season. Generally this material should not be applied when wind speeds exceed 5 mph or within one half mile of any crop, garden, greenhouse, or any other desirable vegetation that may be susceptible to this product. Extreme care must be taken to prevent drift to desirable plants or agricultural land. **Do not exceed 9 pints per acre per year.** Refer to the current label and Safety Data Sheet and follow instructions completely.
FORESTRY WEED CONTROL

BRUSH CONTROL

Garlon® 3A + Milestone®

Rate of Application:

4.0 pints of Garlon® 3A plus 5.0 ounces of Milestone® per acre.
Note: Vastlan™ may be substituted for Garlon® 3A @ 3.0 pints per acre.

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add Garlon® 3A.
3. Add Milestone®.
4. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
5. Add surfactant at the rate of 2 pints per 100 gallons of mixture.
6. Fill tank to desired level, continue agitation and mix well before spraying.

Comments and Precautions:

Apply during the latter part of the growing season (September to November) when brush is still actively growing and prior to the first frost of the season. Generally this material should not be applied when wind speeds exceed 5 mph or within one half mile of any crop, garden, greenhouse, or any other desirable vegetation that may be susceptible to this product. Extreme care must be taken to prevent drift to desirable plants or agricultural land. Do not apply more than 7.0 ounces of Milestone® per acre per growing season. Refer to the current label and Safety Data Sheet and follow instructions completely.
FORESTRY WEED CONTROL

BRUSH CONTROL

Garlon® 3A + 2,4-D amine

Rate of Application:

**Broadcast:** 8.0 pints of Garlon® 3A plus 4.0 pints of 2,4-D amine per acre.
*Note: Vastlan™ may be substituted for Garlon® 3A @ 6.0 pints per acre.*

**Spot Treat:** 8.0 pints of Garlon® 3A plus 4.0 pints of 2,4-D per 100 gallons of spray mixture. *Note: Vastlan™ may be substituted for Garlon® 3A @ 6.0 pints per 100 gallons of spray mix. Do not exceed 400 gallons of total spray per acre.*

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.

2. Add Garlon® 3A.

3. Add 2,4-D amine.

4. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.

5. Add surfactant at the rate of 2.0 pints per 100 gallon of mixture.

6. Fill tank to desired level, continue agitation and mix well before spraying.

Comments and Precautions:

Apply during the latter part of the growing season (September to November) when brush is still actively growing and prior to the first frost of the season. See special label precautions when using these herbicides near sensitive sites or susceptible vegetation. Generally this material should not be applied when wind speeds exceed 5 mph or within one half mile of any crop, garden, greenhouse, or any other desirable vegetation that may be susceptible to this product. Refer to the current label and Safety Data Sheet and follow instructions completely.
AQUATIC WEED CONTROL

SEWAGE LAGOONS (DUCKWEED CONTROL)

Diquat E-Pro 2L

Rate of Application:

8.0 pints of Diquat E-Pro 2L per surface acre of water in 100 gallons of water.

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add Diquat E-Pro 2L.
3. Add 4.0 pints of approved aquatic non-ionic surfactant (90% active ingredient) per 100 gallons of spray mixture.
4. Fill tank to desired level, continue agitation and mix well before spraying.

Comments and Precautions:

Apply during time of active growth for target vegetation as a broadcast spray to the water surface. Be sure the non-ionic surfactant is labeled and approved for aquatic use. Take the precautions necessary not to contaminate wetlands or water bodies not covered on the label. Best results are obtained when water temperatures are above 50° F. Refer to the current label and Safety Data Sheet and follow instructions completely. Follow all precautions as to personal protective equipment listed for agricultural use and observe all restrictions as to worker exposure during and after application.
AQUATIC WEED CONTROL

SEWAGE LAGOONS

Sonar® AS

Rate of Application:

4.0 pints of Sonar® AS per surface acre.

Mixing Instructions:

1. Fill tank to 1/2 the desired level, begin agitation.
2. Add Sonar® AS.
3. Fill tank to desired level, continue agitation and mix well before spraying.

Comments and Precautions:

Apply to actively growing aquatic weeds or inject below the water surface from spray nozzles. Sensitive weeds absorb the herbicide through treated water or from the soil. Desired weed control may not be achieved for 30 to 90 days after treatment. Water flow must be restricted for 7 days to prevent dilution of herbicide. Refer to the current label and Safety Data Sheet and follow instructions completely.
AQUATIC WEED CONTROL

SEWAGE LAGOONS

Accord® Concentrate or Rodeo®

Rate of Application:

8.0 pints of Accord® Concentrate or Rodeo® per 100 gallons of spray mixture.

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add Accord® Concentrate or Rodeo®.
3. Add 4.0 pints of approved aquatic non-ionic surfactant (90% active ingredient) per 100 gallons of spray mixture.
4. Fill tank to desired level, continue agitation and mix well before spraying.

Comments and Precautions:

Apply during time of active growth for target vegetation in areas around lagoon fringes for above water stems and foliage. Be sure the non-ionic surfactant is labeled and approved for aquatic use. Take the precautions necessary not to contaminate wetlands or water bodies not covered on the label. Refer to the current label and Safety Data Sheet and follow instructions completely.
AQUATIC WEED CONTROL

SPOT APPLICATIONS

\textit{Accord}® Concentrate or Rodeo®

Rate of Application:

8.0 pints of Accord® Concentrate or Rodeo® per 100 gallons of spray mixture.

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add Accord® Concentrate or Rodeo®.
3. Add 4.0 pints of an approved aquatic non-ionic surfactant (90% active ingredient) per 100 gallons of spray mixture.
4. Fill tank to desired level, continue agitation and mix well before spraying.

Comments and Precautions:

Apply during time of active growth for target vegetation in or adjacent to aquatic environments. For non-selective weed control, apply to green stems and foliage. Be sure the non-ionic surfactant is labeled and approved for aquatic use. \textbf{Do not spray when brush is over 5.0 feet in height (hand cut first).} Take the precautions necessary not to contaminate wetlands or water bodies not covered on the label. Refer to the current label and Safety Data Sheet and follow instructions completely.
SPECIFIC WEED PROBLEMS

COGONGRASS

glyphosate

Rate of Application:

Broadcast: 4.0 lbs. ae of glyphosate per acre (see page 50).

Spot Treat: 3.0 gallons of glyphosate per 100 gallons of spray mixture.

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add glyphosate product.
3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
4. Fill tank to desired level, continue agitation and mix well before spraying.

Comments and Precautions:

Use on actively growing target vegetation for complete non-residual control, non-selective control. Do not spray in large areas where turf may be damaged or erosion may occur as the result of this treatment. Refer to the current label and Safety Data Sheet and follow instructions completely.
SPECIFIC WEED PROBLEMS

COGONGRASS

Perspective® + Arsenal® PowerLine™

Rate of Application:

8.0 ounces of Perspective® plus 4.0 ounces of Arsenal® PowerLine™ per acre.
Note: Method® 240 SL may be substituted for Perspective® at 12.5 ounces per acre.
1.0 gallon of MSO per 100 gallons of spray mixture.

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Pre slurry and add Perspective®.
3. Add Arsenal® PowerLine™.
4. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
5. Add Methylated Seed Oil (MSO) at 1.0 gallon per 100 gallons to the mixture.
6. Fill tank to desired level, continue agitation.

Comments and Precautions:

Methylated Seed Oil (MSO) should be the surfactant of choice for this application. This application is most effective when applied in late October to early November (ahead of frost) to areas with adequate soil moisture. Care should be taken around the drip line of hardwoods. Refer to the current label and Safety Data Sheet and follow instructions completely.
SPECIFIC WEED PROBLEMS

JOHNSONGRASS TREATMENT

*OutRider®*

Rate of Application:

**Broadcast:** 1.33 ounce of OutRider® per acre for broadcast applications.

**Spot Treat:** 1.0 ounce of OutRider® per 100 gallons of spray mixture.

Mixing Instructions:

1. Fill tank to 1/2 desired level, begin agitation.
2. Add OutRider® (pre-slurry the product first).
3. Add drift retardant at 2.0 to 4.0 fl. oz. per 100 gallons to the mixture.
4. Add surfactant at the rate of 2.0 pints per 100 gallons of mixture.
5. Fill tank to desired level, continue agitation.

Comments and Precautions:

Use on actively growing target vegetation for selective control in desirable turf. Good control of Johnsongrass can be obtained from April through October; for best results do not apply within 12 days prior to or after mowing. Control of several broadleaf weeds, such as wild carrot, may also be obtained as the result of this treatment. **Do not leave this product in the tank overnight.** Refer to the current label and Safety Data Sheet and follow instructions completely.
GLYPHOSATE PRODUCTS AND CONVERSION CHART

There are many glyphosate products now on the market with varying formulations and concentrations; all are not equal. While Rodeo® continues to be the contracted glyphosate product for aquatic use, there are several choices available for non-aquatic glyphosate products.

The chart below provides the correct product use rates (lb. ae / acre) for non-aquatic glyphosate products.

<table>
<thead>
<tr>
<th>Rate Per Acre</th>
<th>Liquid</th>
<th>Liquid</th>
<th>Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.0 lb. ae/gal</td>
<td>3.7 lb. ae/gal</td>
<td>4.0 lb. ae/gal</td>
</tr>
<tr>
<td></td>
<td>2.5 gallon container</td>
<td>2.5 gallon container</td>
<td>15 gallon container</td>
</tr>
<tr>
<td>lb. acid equivalent (ae)</td>
<td>Roundup Pro®</td>
<td>Roundup PRO® Concentrate</td>
<td>Accord® XRT II</td>
</tr>
<tr>
<td>0.25 lb.</td>
<td>11.0 ounces</td>
<td>8.5 ounces</td>
<td>8.0 ounces</td>
</tr>
<tr>
<td>0.37 lb.</td>
<td>16.0 ounces</td>
<td>13.5 ounces</td>
<td>12.0 ounces</td>
</tr>
<tr>
<td>0.5 lb.</td>
<td>21.5 ounces</td>
<td>17.5 ounces</td>
<td>16.0 ounces</td>
</tr>
<tr>
<td>0.75 lb.</td>
<td>32.0 ounces</td>
<td>26.5 ounces</td>
<td>24.0 ounces</td>
</tr>
<tr>
<td>1.0 lb.</td>
<td>42.5 ounces</td>
<td>34.6 ounces</td>
<td>32.0 ounces</td>
</tr>
<tr>
<td>2.0 lb.</td>
<td>85.5 ounces</td>
<td>69.0 ounces</td>
<td>64.0 ounces</td>
</tr>
<tr>
<td>3.0 lb.</td>
<td>128.0 ounces</td>
<td>104.0 ounces</td>
<td>96.0 ounces</td>
</tr>
<tr>
<td>4.0 lb.</td>
<td>170.5 ounces</td>
<td>138.5 ounces</td>
<td>128.0 ounces</td>
</tr>
<tr>
<td>5.0 lb.</td>
<td>213.5 ounces</td>
<td>173.0 ounces</td>
<td>160.0 ounces</td>
</tr>
</tbody>
</table>
GLOSSARY

Absorption - The process by which a chemical moves from one system into another such as from the soil water into plant roots.

Adjuvant - Any substance in a formulation or additive which enhances the effectiveness of a pesticide.

Annual - A plant that germinates from seed, flowers, sets seed and dies in the same year.

Broadcast - A pesticide treatment applied over an entire area.

Broadleaf plants - A grouping of plants that share several common characteristics. These plants have two cotyledons, broad-bladed leaves with a net-like vein pattern, and showy, colored flowers.

Brownout - Rapid browning or burning of desirable vegetation by the application of a selective herbicide at the wrong application time.

Cambium - A tissue layer composed of cells capable of active cell division, producing xylem to the inside of the plant and phloem to the outside.

Compatible - Mixable in the spray tank for application together in the same carrier without undesirable altering of the components’ effects.

Dormant - State of inhibited germination of seeds or state of suspended growth or development in plants.

Formulation - A pesticide preparation supplied by the manufacturer for practical use.

Grass - A grouping of plants that share several common characteristics. Grasses have one monocotyledon, narrow, parallel-veined leaf blades, and non-showy, wind-pollinated flowers.

Half-life - The amount of time it takes for half of an applied pesticide to degrade.

Herbicide - A chemical used for killing plants or severely interrupting their normal growth processes.
**Inert** - Inactive or non-reacting.

**Label** - The directions for using a pesticide approved as a result of the EPA registration process and attached to the pesticide container.

**LD$_{50}$** - The dose (quantity) of a chemical calculated to be lethal to 50% of the organisms in a specific test situation. It is expressed as the weight of chemical in milligrams per unit body weight of the organism in kilograms (mg/kg).

**Leaching** - The downward movement of a water solution through the soil.

**Miscible liquid** - Two or more liquids that can be mixed and will remain mixed under normal conditions.

**MSDS** - Technical information sheet termed "Material Safety Data Sheet" available for each registered pesticide that contains specific safety, handling, and emergency procedures.

**Perennial** - A plant that lives three or more years.

**Postemergence** - An application made after the emergence or establishment of a crop or weed.

**Preemergence** - An application made prior to the emergence of the weed or crop.

**Selective herbicide** - A chemical that is more toxic to some plant species than to others.

**Solution** - A homogeneous mixture of two or more substances.

**Surfactant** - A material that improves the emulsifying, dispersing, spreading, wetting, or other surface modifying properties of liquids.

**Suspension** - A mixture containing finely divided particles evenly dispersed in a solid, liquid or gas.
CONVERSION FACTORS

Mass or Weight
1 pound = 16 ounces
1 pound = 0.4535924 kg (kilogram) = 453.5924 g (grams)
1 ounce = 0.0625 pounds = 28.349527 g (grams)
1 kg (kilogram) = 2.205 pounds

Volume
1 gallon = 128 fluid ounces = 3.785 L (liters) = 3785 ml (milliliters)
1 fluid ounce = 0.029573 L (liters) = 29.573 ml (milliliters)
1 L (liter) = 0.2642 gallons = 33.82 fluid ounces

Length or Distance
1 foot = 0.3048 m (meters)
1 m (meter) = 3.281 feet
1 mile = 5,280 feet = 1609 m (meters)

Surface or Area
1 acre = 4,047 m² (square meters) = 0.4047 ha (hectares)
1 acre = 43,560 square feet
1 square foot = 0.093 m² (square meters)
1 m² (square meter) = 10.76 square feet
1 ha (hectare) = 2.471 acres

Pressure
1 pound per square inch (psi) = 6.895 kPa (kilopascals)
1 kPa (kilopascal) = 0.146 pound per square inch (psi)
**Application Rates**

1 L/ha (liter per hectare) = 0.1069 gallons per acre = 13.68 fluid ounces per acre
1 gallon per acre = 9.354 L/ha (liters per hectare)
1 kg/ha (kilogram per hectare) = 0.8922 pounds per acre
1 pound per acre = 1.121 kg/ha (kilograms per hectare)

**Concentrations**

1 kg/L (kilogram per liter) = 8.33 pounds per gallon
1 pound per gallon = 0.1198 kg/L (kilograms per liter)
or 119.8 g/L (grams per liter)

**Speed**

1 mile per hour = 1.609 km/h (kilometers per hour) = 26.83 m/min (meters per minute)
1 mile per hour = 88 feet per minute

**Flow Rates**

1 gallon per minute = 3.785 L/min (liters per minute)
1 L/min (liter per minute) = 0.264 gallons per minute
**WIND SPEED ESTIMATIONS**

Wind conditions are obvious to the applicator and strict procedures must be followed. Spraying must stop anytime the spray solution cannot be maintained within the target area. ALDOT policy is to stop when wind velocity reaches 8 - 10 mph. Often times the crew can treat the downwind side of highways and return later to treat the opposite side when wind conditions are more favorable. Following are a number of field observations that spray operators may use to alert them to wind speed changes. Hand-held wind gauges can verify observations.

<table>
<thead>
<tr>
<th>Field Observations</th>
<th>Wind Speed (mph)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chimney smoke rises up, air motionless</td>
<td>0</td>
</tr>
<tr>
<td>Chimney smoke drifts slowly, air rises</td>
<td>1 - 3</td>
</tr>
<tr>
<td>Leaves quietly rustle, flags stir</td>
<td>4 - 7</td>
</tr>
<tr>
<td>Leaves and twigs move</td>
<td>8 - 12</td>
</tr>
<tr>
<td>Branches move and flags flap</td>
<td>13 - 18</td>
</tr>
<tr>
<td>Small trees sway and flags ripple</td>
<td>19 - 24</td>
</tr>
<tr>
<td>Large branches move and flags beat</td>
<td>25 - 30</td>
</tr>
<tr>
<td>Whole trees move and flags extend</td>
<td>31 - 38</td>
</tr>
<tr>
<td>Twigs break and walking is difficult</td>
<td>39 - 46</td>
</tr>
</tbody>
</table>
HERBICIDE RESISTANCE

One way to battle herbicide resistance is to mix (use multiple herbicides) or rotate the single use of herbicides with those of differing mechanisms or modes of action. Because ALS inhibitors, which have over 100 documented occurrences of resistance worldwide, have a single site mechanism of action and make up a large percentage of the products ALDOT uses, they are probably the products most in need of rotation. The chart below identifies mechanisms of action and can aid in the selection of herbicides for rotation.

<table>
<thead>
<tr>
<th>Trade Name</th>
<th>Method/Mode of Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenal Powerline / Habitat</td>
<td>ALS inhibition</td>
</tr>
<tr>
<td>Capstone</td>
<td>Auxin inhibition</td>
</tr>
<tr>
<td>Derigo</td>
<td>ALS inhibition</td>
</tr>
<tr>
<td>Diquat E-Pro 2L</td>
<td>Cell membrane destruction</td>
</tr>
<tr>
<td>Escort XP / MSM 60</td>
<td>ALS inhibition</td>
</tr>
<tr>
<td>EsplAnade 200 SC</td>
<td>Cellulose inhibition</td>
</tr>
<tr>
<td>Garlon 3A / Triclopyr</td>
<td>Auxin inhibition</td>
</tr>
<tr>
<td>glyphosate</td>
<td>Aromatic amino acid inhibition</td>
</tr>
<tr>
<td>Krenite S</td>
<td>Mitosis inhibition</td>
</tr>
<tr>
<td>Method</td>
<td>Auxin inhibition</td>
</tr>
<tr>
<td>Milestone</td>
<td>Auxin inhibition</td>
</tr>
<tr>
<td>Oust XP / Sulfometuron XP</td>
<td>ALS inhibition</td>
</tr>
<tr>
<td>OutRider</td>
<td>ALS inhibition</td>
</tr>
<tr>
<td>Pastora</td>
<td>ALS inhibition</td>
</tr>
<tr>
<td>Pathfinder II</td>
<td>Auxin inhibition</td>
</tr>
<tr>
<td>Perspective</td>
<td>ALS inhibition + Auxin inhibition</td>
</tr>
<tr>
<td>Sonar AS</td>
<td>Carotenoid pigment inhibition</td>
</tr>
<tr>
<td>Streamline</td>
<td>ALS inhibition + Auxin inhibition</td>
</tr>
<tr>
<td>Surflan As</td>
<td>Cell division inhibition</td>
</tr>
<tr>
<td>2,4-D</td>
<td>Auxin inhibition</td>
</tr>
<tr>
<td>Target 6 Plus (MSMA)</td>
<td>Cell membrane integrity / energy production</td>
</tr>
<tr>
<td>Telar DF / Chlorsulfuron</td>
<td>ALS inhibition</td>
</tr>
<tr>
<td>Vastlan</td>
<td>Auxin inhibition</td>
</tr>
<tr>
<td>Velpar L</td>
<td>Photosynthesis inhibition</td>
</tr>
<tr>
<td>Viewpoint</td>
<td>ALS inhibition + Auxin inhibition</td>
</tr>
</tbody>
</table>

Veg. Mgt. Man. Chapt. IV