



HERBICIDE OPERATIONS MANUAL

Prepared by:
Director of Maintenance Office

In cooperation with:
Safety & Health Office
Engineering District Offices
Traffic Engineering

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1. EMERGENCY PHONE NUMBERS

FOR ANY EMERGENCY

911



PESTICIDE EMERGENCY CONTACT INFORMATION



Contact Your Foreman and RME As Soon as Possible

Poison Control

From anywhere in the US, call:

1-800-222-1222

SC Dept. of Health & Environmental Control

1-888-481-0125

Chemtrec

(24 hours; for help with spills, leaks, fires, and
accidents involving a hazardous chemical)

1-800-262-8200

2. SUMMARY OF CHANGES

Following are the changes appearing in this edition of the Manual (versus the most recent previous edition dated September 2017):

Page	Description of Change
Page 4	<ul style="list-style-type: none">▪ Updated telephone number for Chemtrec
Section 3	<ul style="list-style-type: none">▪ Updated internet links.
Page 7	<ul style="list-style-type: none">▪ Changed products to reflect common chemical name only▪ Added Triclopyr Amine (TEA) to products list▪ Updated HMMS Material ID Numbers
Section 4.2	<ul style="list-style-type: none">▪ Updated Pre-Application Plan Forms
Section 4.3	<ul style="list-style-type: none">▪ Updated New Materials Policy
Section 4.4	<ul style="list-style-type: none">▪ Added “or equivalent” for Hazard Communication Labels
Section 4.7	<ul style="list-style-type: none">▪ Updated container disposal procedure to reflect current products contract specifications
Section 5.0	<ul style="list-style-type: none">▪ Updated work descriptions calendars▪ Added Triclopyr Amine (TEA) for Foliar AQUATIC applications under WD 200 and WD 300
Section 6.3	<ul style="list-style-type: none">▪ Removed injection unit calibration instructions
Section 7.2	<ul style="list-style-type: none">▪ Updated internet links
Section 8.2	<ul style="list-style-type: none">▪ Updated report forms to show common chemical names and generic classifications for adjuvants (removed brand names)▪ Added an application report for Foliar AQUATIC (WD 200 & WD 300) applications

3. OVERVIEW

The purpose of this manual is to provide information and guidance in promoting the safe and proper use of herbicides, thereby protecting the environment and the public health while performing indispensable highway maintenance and safety enhancement as part of the South Carolina Department of Transportation's Integrated Roadside Vegetation Management Program. This manual does not promote the widespread and indiscriminate use of herbicides to control vegetation along highway rights-of-way. It provides personnel and other individuals performing Herbicide Applications (Highway Maintenance Management System (HMMS) Activity 402) the fundamentals of herbicides, treatment guidelines, equipment, safety and record keeping.

This manual will be revised periodically to reflect new developments in materials, application techniques, management directives and product labelling. Regulations affecting herbicide usage and the registration status of specific materials and product labelling can change without notice. Current manufacturers' labeling is the final authority for use of all herbicides, adjuvants, and blends and in cases of conflict, supersedes guidance provided in this manual.

All persons performing herbicide applications on SCDOT right-of-way, including shop yards at SCDOT facilities, must possess a valid South Carolina Pesticide Applicator License certified in the Rights-of-Way Category 6.

All persons performing herbicide applications on SCDOT property located at landscape plots, rest areas, and/or flower beds (ornamentals) or lawn (turf) within or around SCDOT facilities must possess a valid South Carolina Pesticide Applicator License certified in the Ornamental and Turf Category 3.

All persons performing herbicide applications on SCDOT right-of-way in water must possess a valid South Carolina Pesticide Applicator License certified in the Aquatic Category 5.

Rules and regulations for the Enforcement of the South Carolina Pesticide Control Act as well as licensing information may be obtained from the following Clemson University Department of Pesticide Regulation internet website:

<http://www.clemson.edu/public/regulatory/pesticide-regulation/>

The National Pollutant Discharge Elimination System permit associated with pesticide applications into waters of the State may be obtained from the following South Carolina Department of Health and Environmental Control internet website:

https://scdhec.gov/sites/default/files/docs/Environment/docs/npdes_permit.pdf

A copy of SCDOT's Pesticide Discharge Management Plan and the Pesticide Discharge Notice of Intent is available on the SCDOT Intranet site located at:

<http://iwww.dot.state.sc.us/dom/irvm.aspx>

4. MATERIALS

4.1: CURRENT MATERIALS

Only herbicides, adjuvants, and blends, and the uses specified in this manual may be purchased and/or used within SCDOT rights-of-way unless written permission is obtained from the Director of Maintenance. Each approved material shall have assigned a unique Highway Maintenance Management System (HMMS) material identification code. The following table lists the materials currently approved for use in the SCDOT program.

APPROVED MATERIALS LIST													
Active Ingredient Common Name HMMS Material ID	Signal Word	APPROVED MONTHS FOR APPLICATION											
HERBICIDES													
Glyphosate (2502, 2578, 2579, 2582)	CAUTION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Triclopyr ester (BEE) (2532)	CAUTION	JAN	FEB	MAR									DEC
Fosamine (2564)	CAUTION								AUG	SEP	OCT	NOV	
Triclopyr Amine (TEA) (2503)	DANGER					MAY	JUN	JUL	AUG	SEP	OCT	NOV	
Aminopyralid (2572)	CAUTION				APR	MAY	JUN	JUL	AUG	SEP	OCT		
Sulfosulfuron (2516)	CAUTION					MAY	JUN	JUL	AUG	SEP	OCT		
Imazapic (2555)	CAUTION					MAY	JUN	JUL	AUG	SEP			
ADJUVANTS													
ANTI-FOAM (2530, 2577)	CAUTION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
ANTI-DRIFT (2567, 2576)	CAUTION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CROP OIL (2565,2573)	CAUTION	JAN	FEB	MAR									DEC
DYE (2541)	CAUTION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
SURFACTANT (2566)	CAUTION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
BLENDS													
Triclopyr ester (BEE) 20% Blend (Triclopyr Ester (BEE) + Crop Oil + Red Dye) (2531)	CAUTION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

4.2: ORDERING MATERIALS

Local (county) SCDOT Maintenance Offices may order herbicides, adjuvants, and blends specified in this manual by creating a SCEIS shopping cart. A completed PRE-APPLICATION PLAN FORM (provided in the pages immediately following) must accompany each cart. Orders shall reflect the lowest labeled effective application rate for the material unless conclusive evidence is provided that justifies a higher rate that does not exceed the maximum labeled rate. All SCEIS shopping carts that contain herbicides, adjuvants, and/or blends must have local, district, and headquarters approval.

HERBICIDE PRE-APPLICATION PLAN FORM: GLYPHOSATE

DATE:	OFFICE:
DISTRICT: 1 2 3 4 5 6 7	SHOPPING CART NO.
WORK DESCRIPTION:	
100-TOTAL VEG CONTROL [REDACTED] [REDACTED]	[REDACTED] 500-GRASSY WEEDS [REDACTED]
USE: Annuals, Perennials	SPECIES:

[illegible]

HERBICIDE PRE-APPLICATION PLAN FORM: FOSAMINE					
DATE:			OFFICE:		
DISTRICT: 1 2 3 4 5 6 7			SHOPPING CART NO.		
WORK DESCRIPTION: [REDACTED] 200-BRUSH 300-TREES [REDACTED] [REDACTED] [REDACTED]					
USE: Foliar Brush / Foliar Limbs			SPECIES:		
PLANNED APPLICATION DATE	ROUTE	BEGIN MP	END MP	APPLICATION AREA (acres)	
A	TOTAL ACRES =			ACRES	
B	MATERIAL APPLICATION RATE =			GA/AC	
C	TOTAL MATERIAL NEEDED IN GALLONS = A X B =			GA	
D	AMOUNT OF MATERIAL IN STOCKPILE =			GA	
AMOUNT OF MATERIAL TO ORDER = C – D =				GA	

HERBICIDE PRE-APPLICATION PLAN FORM: TRICLOPYR AMINE (TEA)					
DATE:			OFFICE:		
DISTRICT: 1 2 3 4 5 6 7			SHOPPING CART NO.		
WORK DESCRIPTION:					
USE: Foliar Brush / Foliar Limbs			SPECIES:		
PLANNED APPLICATION DATE	ROUTE	BEGIN MP	END MP	APPLICATION AREA (acres)	
A	TOTAL ACRES =				ACRES
B	MATERIAL APPLICATION RATE =				GA/AC
C	TOTAL MATERIAL NEEDED IN GALLONS = A X B =				GA
D	AMOUNT OF MATERIAL IN STOCKPILE =				GA
AMOUNT OF MATERIAL TO ORDER = C – D =					GA

[illegible]

HERBICIDE PRE-APPLICATION PLAN FORM: IMAZAPIC

DATE:

OFFICE:

DISTRICT: 1 2 3 4 5 6 7

SHOPPING CART NO.

WORK DESCRIPTION:

600-TURF

USE:

Suppression / Conversion

SPECIES:

Bahiagrass / Tall Fescue

[illegible]

[illegible]

ADJUVANT PRE-APPLICATION PLAN FORM: DYE

DATE:

OFFICE:

DISTRICT: 1 2 3 4 5 6 7

SHOPPING CART NO.

WORK DESCRIPTION:

100-TOTAL VEG CONTROL	200-BRUSH	300-TREES	400-BROADLEAF WEEDS	500-GRASSY WEEDS	600-TURF
100-TOTAL VEG CONTROL	200-BRUSH	300-TREES	400-BROADLEAF WEEDS	500-GRASSY WEEDS	600-TURF

[illegible]

BLEND PRE-APPLICATION PLAN FORM: TRICLOPYR ESTER 20% BLEND						
DATE:				OFFICE:		
DISTRICT: 1 2 3 4 5 6 7				SHOPPING CART NO.		
WORK DESCRIPTION: [REDACTED] 200-BRUSH 300-TREES [REDACTED] [REDACTED]						
USE: Basal Bark / Cut Stump (Backpack Only)				SPECIES:		
PLANNED APPLICATION DATE	ROUTE	BEGIN MP	END MP	APPLICATION AREA (acres)		
A	TOTAL ACRES =				ACRES	
B	MATERIAL APPLICATION RATE =			1	GA/AC	
C	TOTAL MATERIAL NEEDED IN GALLONS = A X B =				GA	
D	AMOUNT OF MATERIAL IN STOCKPILE =				GA	
AMOUNT OF MATERIAL TO ORDER = C-D =					GA	

4.3: NEW MATERIALS

SCDOT is always seeking ways to improve its vegetation management program and recognizes that materials (herbicides, adjuvants, and/or blends) exist that are not included in this manual. However, materials not specified in this manual may not be used even on a trial basis without evaluating as follows:

The manufacturer's representative of the new material must submit a written request for product review to the State Vegetation Manager to include a copy of the product labelling (at minimum – the product label and SDS).

The State Vegetation Manager will verify that the product is registered with the South Carolina Department of Pesticide Regulation. Materials not registered with the Department of Pesticide Regulation in South Carolina will not be considered. Only materials clearly labeled for roadside (or, highway right-of-way) use or for turf and ornamental use (such as for wildflowers and landscape plots or rest areas, and SCDOT facilities) or for aquatic use (such as for aquatic vegetation at bridges) as appropriate, will be considered. Materials are preferred to be labeled for the target plant species of interest, to be labeled with the least toxic signal word (i.e., CAUTION), and be available in returnable/refillable containers.

For a material determined to potentially have merit for the program, the State Vegetation Manager will survey the district offices for interest in demonstration applications performed by the material representative, or his/her agent, using his/her application equipment, on SCDOT right-of-way via an encroachment permit. The applicator must possess a valid South Carolina herbicide applicator license certified in Category 6, 3, and/or 5 as appropriate. All materials shall be applied per labeling. *Permission for a demonstration application does not constitute an agreement by SCDOT to incorporate a material into its program.* After satisfactory evaluation of the demonstration application by the material representative, SCDOT may elect to use the material on a trial basis under typical operating conditions, generally for at least one year/one season using SCDOT applicators and equipment. After satisfactory completion of the in-house trial, SCDOT may consider incorporation of the material into its program.

4.4: LABELS

Herbicide labels and labeling may be obtained using the following internet website:
www.cdms.net/manuf/manuf.asp

All persons handling, mixing, applying, and/or transporting herbicides or adjuvants must possess the respective material (product) label.

PARTS OF HERBICIDE LABELS

1. Brand Name: Each manufacturer has a brand name for each of its products. Different manufacturers may use different brand names for the same herbicide active ingredient. The brand name or trade name is the one used in advertisements.
2. Ingredient Statement: Each herbicide label must list what is in the product. The ingredient statement must list the official chemical name and/or common name for each active ingredient along with the percentage for each as part of the total product. Inert ingredients need not be named, but the label must show what percent of the total contents they make up. Chemical name is a complex name that identifies the chemical components and structure of the herbicide. The name is almost always listed in the ingredient statement on the label. Common name of an herbicide is that name accepted by the U.S. Environmental Protection Agency to make it easier to compare herbicide ingredients. By purchasing herbicides according to the common or chemical names, you will always be sure to get the right active ingredient.
3. EPA registration number: An EPA registration number is unique to that specific formulation and indicates that the product is registered with the Environmental Protection Agency (EPA).
4. Name and address of manufacturer: The law requires the maker or distributor of a product to put the name and address of the company on the label.
5. Net contents: The front panel of the herbicide label tells you how much is in the container. This can be expressed as pounds or ounces for dry formulations and as gallons, quarts, pints, or fluid ounces for liquids. Liquid formulations also may list the pounds of active ingredient per gallon of product.
6. Type of herbicide: The type of herbicide usually is listed on the front panel of the label. This short statement indicates in general terms what the product will control.
7. Type of formulation: The front panel of some herbicide labels indicates the type of formulation the product is. The formulation may be named or the label may show only the abbreviation of the formulation.
8. Restricted-Use Designation: When an herbicide is classified as restricted, the label will state "Restricted Use Herbicide" in a box at the top of the front panel. Below this heading may be a statement describing the reason for the restricted-use classification. Usually another statement will describe who can purchase and use the product.

FRONT-PANEL PRECAUTIONARY STATEMENTS

1. **Signal words and symbols:** The signal word - **DANGER, WARNING, OR CAUTION** - must appear in large letters on the front panel of the herbicide label. It indicates how acutely toxic the product is to humans. The signal word is immediately below the statement, "Keep out of reach of children", which also must appear on every label. The signal word is based not on the active ingredient alone, but on the contents of the formulated product. It reflects the hazard of any active ingredient, carriers, solvents, or inert ingredients. The signal word indicates the risk of acute effects from the four routes of exposure to an herbicide product (oral, dermal, inhalation, and eye) and is based on the one that is greatest. The signal word does not indicate the risk of delayed effects or allergic effects.

DANGER - signals that the herbicide is highly toxic. The product is very likely to cause acute illness from oral, dermal, or inhalation exposure, or to cause severe eye or skin irritation.

DANGER + POISON/SKULL AND CROSSBONES - All highly toxic herbicides that are very likely to cause acute illness through oral, dermal, or inhalation exposure will carry the word POISON in addition to the word DANGER.

WARNING - signals that the product is moderately likely to cause acute illness from oral, dermal, or inhalation exposure or that the product is likely to cause moderate skin or eye irritation.

CAUTION - signals that the product is slightly toxic.

2. **Statement of practical treatment (first aid):** Most herbicide products are required to include instructions on how to respond to an emergency exposure involving that product. Instructions usually include first aid measures and may include instructions to seek medical help.

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

1. **Acute effects statements:** The label or labeling will contain statements that indicate which route of entry (mouth, skin, eyes, lungs) is most likely and what specific actions to take to avoid acute effects from exposure to the herbicide. These statements may be on the front or side panel of the label, or they may be located somewhere else in the labeling.
2. **Delayed effects statements:** Herbicides that the EPA considers to have the potential to cause delayed effects must warn you of that fact. These statements will tell whether the product has been shown to cause problems such as tumors or reproductive problems in laboratory animals.
3. **Allergic effects statement:** If tests or other data indicate that the herbicide product has the potential to cause allergic effects, such as skin irritation or asthma, the product labeling must state that fact.
4. **Personal protective equipment statements:** These statements tell the **minimum** personal protective equipment that must be worn when using the herbicide. It is permissible to wear more personal protective equipment than is stated but not less.

ENVIRONMENTAL HAZARDS

This section of the herbicide labeling will indicate precautions for protecting the environment when you use the herbicide. Some general statements appear on the labeling of nearly every herbicide. The labeling will contain specific precautionary statements if the herbicide poses a specific hazard to the environment.

PHYSICAL OR CHEMICAL HAZARDS

This section of the herbicide labeling indicates any special fire, explosion, or chemical hazards the product may pose. The physical or chemical hazard statements are not located in the same place in all herbicide labeling. Some labeling groups them in a box under the heading "Physical or Chemical Hazards". Other labeling may list them on the front panel of the label beneath the signal word.

DIRECTIONS FOR USE

Under the heading "Directions for Use" on every herbicide product labeling is the following statement: "It is a violation of Federal law to use this product in a manner inconsistent with its labeling".

1. Use inconsistent with the labeling: It is illegal to use an herbicide in any way not permitted by the labeling. An herbicide may be used only on the plants, animals, or sites named in the directions for use. An applicator may not use higher dosages, higher concentrations, or more frequent applications. The applicator must follow all directions for use, including directions concerning safety, mixing, diluting, storage, and disposal. The applicator must wear the specified personal protective equipment. **The use directions and instructions are not advice, they are requirements.** Federal law **does** allow herbicides to be used in some ways not specifically mentioned in the labeling. Unless it would be in violation of the state laws, the applicator may:
 - a. Apply an herbicide at a dosage, concentration, or frequency **less** than that listed on the labeling.
 - b. Apply an herbicide to a target pest not listed on the labeling if the application is to a site that is listed.
 - c. Use an appropriate equipment or method of application that is not prohibited by the labeling.
 - d. Mix an herbicide or herbicides with a fertilizer if the labeling does not prohibit the mixture.
 - e. Mix two or more herbicides, if all of the dosages are at or below the recommended rate.
2. Entry statement: Some herbicide labeling contains a precaution about entering a treated area after application. This statement tells how much time must pass before people can enter a treated area except under special circumstances.
3. Storage and disposal: All herbicide labeling contains some instructions for storing the herbicide. Herbicide labeling also contains some general information about how to dispose of excess herbicide and the herbicide container in ways that are acceptable under Federal regulations. Do not bury or burn herbicides in South Carolina. Storage and disposal statements usually appear in a special section of the labeling entitled "Storage and Disposal". Follow the residue-removal requirements before disposing of or recycling the container.

SCDOT HAZARD COMMUNICATION LABELS

The following Hazard Communication label (or equivalent) must be completed and attached to all herbicide, adjuvant, and blend containers. This label must also be attached to backpacks used for herbicide applications.

CHEMICAL NAME _____ RESOURCE # _____		HAZARD KEY 4 - SEVERE 3 - SERIOUS 2 - MODERATE 1 - SLIGHT 0 - MINIMAL
<input type="checkbox"/> FIRE HAZARD		
<input type="checkbox"/> HEALTH HAZARD		
<input type="checkbox"/> INSTABILITY		
<input type="checkbox"/> PERSONAL PROTECTION		
PERSONAL PROTECTION		
A	G	
B	H	
C	I	
D	J	
E	K	
F	X	
Ask your supervisor for specialized handling directions		
Safety Glasses Goggles Face Shield Airline Hood or Mask Gloves Full Protective Suit Synthetic Apron Dust Respirator Vapor Respirator Combination Dust & Vapor Respirator Boots		
MANUFACTURER: _____ PHONE: _____		
emedco 800-442-3633 emedco.com NFPA49-V7		
EMEDCO 800-442-3633 emedco.com NFPA49-V7		

The following Global Harmonization System (GHS) label (or equivalent) is also required on secondary storage containers including but not limited to backpacks:

CHEMICAL NAME _____ See Safety Data Sheet	
SIGNAL WORD <input type="checkbox"/> DANGER <input type="checkbox"/> WARNING <small>Use Only One</small>	
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
HAZARD STATEMENT _____	
PRECAUTIONARY STATEMENT _____	
reorder - 440.777.6660 GHS 5.0x6.0	

Contact the SCDOT Safety and Health Office for questions related to these labels.

4.5: SAFETY DATA SHEETS (SDS)

Safety Data Sheets (SDS) may be obtained using the following internet website: www.cdms.net/manuf/manuf.asp. SDS's provide concise safety information about herbicides and adjuvants. All persons handling, mixing, applying, and/or transporting herbicides or adjuvants must possess the respective material (product) SDS sheet. The SDS is not a substitute for the product label as it does not provide instructions about how the product is to be used.

Item	Title	Description
1	Product and Company Identification	Identifies the material and supplier.
2	Composition/Information on Ingredients	Lists the product's individual hazardous chemicals and their relative percentage of concentration. The common name of the chemicals is also provided and the relative percentage of the inert ingredients is given as a single value.
3	Hazardous Identifications	Provides emergency overview and information for: a) Potential health effects, b) Eye, c) Skin, d) Ingestion, e) Inhalation, f) Systemic effects, g) Cancer Information, h) Teratology (birth defects), i) Reproductive effects, j) Potential other effects.
4	First Aid	a) Eyes, b) Skin, c) Ingestion, d) Inhalation, e) Note to Physician.
5	Fire Fighting Measures	a) Flash Point, b) Method used, c) Flammable limits, d) Extinguishing media, e) Fire & explosion hazards, f) Fire-fighting equipment, g) Hazardous products of combustion.
6	Accidental Release Measures	Action to take for spills/leaks.
7	Handling and Storage	Precautions to be taken in a) Handling and b) Storage.
8	Exposure Controls/Personal Protection	These precautions are suggested for conditions where the potential for exposure exists. Emergency conditions may require additional precautions. a) Exposure guidelines, b) Engineering controls, c) Recommendations for manufacturing, commercial blending, and packing workers – 1) Respiratory protection, 2) Skin protection, 3) Eye/face protection, d) Applicators, and all other handlers.
9	Physical and Chemical Properties	a) Boiling point, b) Vapor pressure, c) Vapor density, d) Solubility in water, e) Specific gravity, f) Appearance, g) Odor, h) pH.
10	Stability and Reactivity	a) Stability (conditions to avoid), b) Incompatibility (specific materials to avoid), c) Hazardous decomposition products, d) Hazardous polymerization.
11	Toxicological Information	a) Mutagenicity, b) Acute oral toxicity, c) Acute dermal toxicity, d) Skin irritation, e) Eye irritation, f) Acute inhalation toxicity, g) Skin sensitization, h) Carcinogenicity, i) Toxicity to reproduction/fertility, j) Developmental toxicity/teratogenicity.
12	Ecological Information	a) Environmental fate, b) Movement & partitioning, c) Degradation & persistence, d) Ecotoxicology.
13	Disposal Considerations	Disposal method – 1) product, 2) container.
14	Transport Information	For DOT regulatory information, if required, consult transportation regulations, product shipping papers, or contact manufacturer representative.
15	U.S. Regulatory Information	a) SARA 313 information, b) SARA hazard work description, c) Toxic Substances Control Act, d) State right-to-know, e) OSHA hazard communication standard, f) National Fire Protection Association (NFPA) ratings, g) Comprehensive Environmental Response Compensation and Liability Act (CERCLA/Superfund), h) RCRA Categorization Hazardous Code.
16	Other Information	SDS status.

4.6: HANDLING

The information provided in this section supplements the SCDOT Employee Safety Manual. Hazard is the risk of harmful effects from herbicides. Hazard depends on both the **toxicity** of the herbicide and the **exposure** a person will receive in any situation (**HAZARD = TOXICITY X EXPOSURE**). Toxicity is a measure of the herbicide's ability to cause harmful effects. Exposure means getting herbicide in or on the body. Herbicides may contact the body by oral exposure, inhalation exposure, ocular exposure, and/or dermal exposure.

Herbicides can cause three types of harmful effects: acute, delayed (chronic), and allergic. Acute effects are illnesses or injuries that may appear immediately after exposure (usually within 24 hours). Delayed effects do not appear immediately and may be caused by repeated exposure to herbicide over a long period of time or as a result of a single exposure that does not become apparent until much later. Allergic effects are harmful effects that some people develop in reaction to herbicides that do not cause the same reaction in most other people.

- Read the manufacturer's label and SDS sheet carefully and completely. Apply the material according to the label instructions. Never use a herbicide for a purpose not specifically stated on the label.
- Wear personal protective equipment as specified on the label.
- Always have access to an emergency eye wash.
- Avoid ingesting or inhaling herbicides. Never eat, drink, smoke or chew gum or tobacco while handling or applying herbicides.
- Remove clothes after using herbicides and bathe with plenty of soap and water. Wash work clothes separately from personal clothes.
- Wash hands often especially before eating, drinking, using toilet, smoking or chewing smokeless tobacco or gum.
- If herbicides are spilled on the skin or clothing, remove the clothing at once and wash the skin thoroughly with soap and water.
- Always mix herbicides in an open area where ventilation is adequate.
- Never use the hands or arms to stir herbicides or to reach into a container of herbicides.
- Wash spray equipment after each use to avoid hazardous accumulation. Collect wash water when cleaning spray equipment by using a catch basin or sump.
- Never spray directly into the wind or directly overhead.

The best way to limit hazard and to prevent harmful effects is to use low toxicity products and to prevent or reduce exposure to herbicides. **Exposure can be prevented or reduced by wearing the appropriate Personal Protective Equipment (PPE) as stated on the product label and SDS. Employees handling herbicides are ALWAYS required to wear at least the minimum PPE stated on the label and SDS. More PPE may be worn but NEVER LESS than the minimum stated on the label and SDS.**

MIXING/LOADING

Consult the label and SDS for the minimum PPE to use when mixing and/or loading materials.

APPLYING

Consult the label and SDS for the minimum PPE to use when applying materials.

DRIFT MANAGEMENT

Drift is the uncontrolled airborne movement of spray droplets, vapors, or dusts particles, away from the intended target of application. Reducing drift is important to prevent injury to non-targets (including desirable plants, animals, people, and natural resources). Virtually every herbicide application produces some amount of drift. How much drift depends on factors such as the formulation of the product, how the product is applied, weather conditions, and the size of the application area. Herbicide applications that are directed upward are the most subject to drift. Herbicides applied close to the target are less likely to drift than those applied from a greater height or distance from the target. High pressures and small nozzle openings produce very fine spray droplets resulting in high drift potential, whereas lower pressures and larger nozzle openings produce coarser sprays with larger droplet sizes therefore, have less drift potential. **Drift reduction is the applicator's responsibility!** To reduce drift:

- Read the label for specific instructions.
- **The use of a DEPOSITION AND DRIFT RETARDANT PRODUCT is required for all SCDOT herbicide applications EXCEPT for cut stump and basal bark applications.**
- Use the coarsest spray possible. A solid cone or fan spray nozzle produces larger droplet sizes than a hollow cone nozzle.
- Avoid spraying at temperatures above 90°F.
- Maintain and calibrate equipment regularly. Check and correct any leaks.
- Shrouds or skirts attached to the application equipment can help prevent drift.
- Do not apply herbicides when wind speeds are more than **7 mph**. (Use the following Wind Speed Table as a guide for determining wind speed.)

WIND SPEED TABLE

Use a Wind Gauge/Meter, if available, to determine wind speed.

FIELD OBSERVATIONS	WIND SPEED (MPH)
Chimney smoke rises up, air motionless	0
Chimney smoke drifts slowly, air rises	1 to 3
Leaves quietly rustle, flags stir	4 to 7
DO NOT APPLY HERBICIDES WHEN WIND EXCEEDS THIS LEVEL	
Leaves and twigs move	8 to 12
Branches move and flags flap	13 to 18

SPILLS

The following items are required, as a minimum, to be carried with the herbicide unit or kept at any location where herbicides are stored, mixed, or handled.

- Personal Protective Equipment (refer to label and SDS) including:
 - Chemical-Resistant Suit (such as *Tyvek*)
 - Chemical-Resistant Gloves
 - Chemical-Resistant Splash Goggles
 - Chemical-Resistant Boots
- Clean Water (for rinsing skin or flushing eyes)
- Soap (for skin)
- Shovel
- Broom
- Coarse Cat Litter **or** Oil Dry **or** Sand
- Absorbent Diking Tube(s)
- Absorbent Pillow(s)
- Activated Charcoal (for spills directly onto soil; granular formulation is easier to handle; generally 1 to 2 pounds is sufficient for most spills)
- Heavy Duty Plastic Garbage Bag

Extreme care should be exercised when using herbicides so that spills are avoided. Herbicide spills are potentially hazardous and should be dealt with immediately. Read and follow all labeling and SDS information.

If a spill does occur:

1. Shut off flow.
2. Protect yourself: rinse the material from your body and remove all contaminated clothing.
3. Contain the spill. DO NOT spread spill by washing it down. Prevent the spill from contaminating any water sources (lakes, ponds, rivers, drains, etc.).
4. Call for emergency assistance. Report spill to supervisor. If the spill is large contact the SC Department of Health and Environmental Control (1-888-481-0125).
5. Clean up the spill by removing the contaminated soil and/or by neutralizing the chemical with an application of activated charcoal.
6. Dispose of spill-soaked material in accordance with all Federal, State, and Local regulations.
7. Wash spills off sprayer and dispose of the contaminated rinse water in accordance with all Federal, State and local regulations.

STORAGE

- Store herbicides in a separate, dry, cool, well ventilated, securely locked building or room that meets all fire and building codes. Keep away from direct sunlight.
- Label the storage area “DANGER PESTICIDES KEEP OUT PESTICIDE STORAGE AREA” as shown below. These signs are available from the Clemson University Department of Herbicide Regulation. The sign must be legible from a distance of 25 feet.

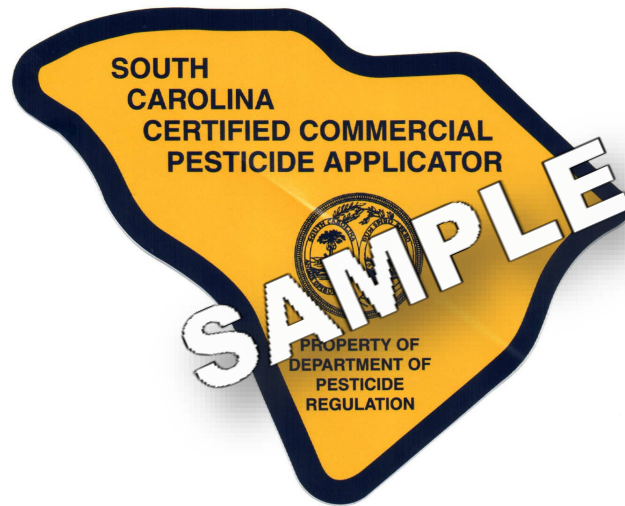


- Store individual products separately according to container contents.
- Always keep herbicides in the original containers with the labels intact.
- Many liquid concentrates are flammable. Store them to avoid fire hazard.
- DO NOT allow the herbicides to freeze or get too hot. Follow recommended storage temperatures provided on the label.
- DO NOT store herbicides with seed, feed, fertilizers, or any kind of food.
- Keep herbicides out of reach of children, pets, livestock, and non-licensed persons.
- Secondary containment must be provided. Secondary containment volume must be sufficient to contain the volume in the event one (1) container stored on the containment fails.

TRANSPORT

When transporting herbicides be sure to have/do:

- A valid South Carolina Pesticide Applicator's License.
- A copy of the product label and SDS.
- Personal Protective Equipment (PPE) as specified on the product label and SDS.
- An Emergency Spill Kit.
- Soap and water for cleaning hands, water for flushing eyes or skin.
- A tarpaulin for protection in case of rain.
- Emergency telephone numbers.
- Display a FLAMMABLE LIQUID Class placard only if transporting 1,000 lbs or more of undiluted (concentrate) herbicide.
- Herbicides must be transported in a steel truck bed. Do not transport herbicides in the passenger compartment of any vehicle.
- The vehicle must bear an identification symbol (as shown below), furnished by the Clemson University Department of Pesticide Regulation, on both the right and left sides of the vehicle. The symbol must be maintained clean and recognizable from a minimum distance of one hundred feet. (i.e., the top of the front quarter-panel).



- Secure and organize the load.
- Protect against temperature extremes.
- Park vehicle only in secure locations.
- Do not load edible food, seed, feed, beverages or tobacco products into same cargo area with herbicides.
- Avoid stacking herbicide containers.

4.7: EMPTY CONTAINER MANAGEMENT

The Environmental Protection Agency (EPA) and the South Carolina Department of Health and Environmental Control (DHEC) regulate the disposal of herbicide containers via authority granted to the Clemson University Department of Pesticide Regulation. The proper rinsing of empty herbicide containers (one-way, non-refillable containers) is a requirement of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Properly rinsed herbicide containers are considered non-hazardous solid waste by the Federal Resource Conservation and Recovery Act (RCRA), and by DHEC.

ONE-WAY CONTAINERS

- Follow the residue removal instructions on the product label.
- Always wear personal protective equipment while rinsing containers.
- Rinse containers immediately after emptying to ensure complete residue removal.
- Leave enough room in the sprayer tank to accommodate the rinsate.
- Pour rinsate into sprayer tank. Ensure product trapped in the handle is removed. Allow the container to drain into the sprayer tank for at least 30 seconds. Then, either triple-rinse or pressure-rinse the container as follows:

TO TRIPLE-RINSE:

- Fill the container one-quarter full of clean water. Replace cap securely and shake, roll and swirl the contents vigorously for **at least one full minute** to rinse all surfaces.
- Remove container cap and pour rinsate into the sprayer tank. Drain for at least 30 seconds.
- Repeat the fill, shake and drain procedure two (2) more times, using clean water.

TO PRESSURE-RINSE:

- Hold the container upside down over the sprayer tank opening so that rinsate will run into the sprayer tank. For ease and safety, puncture through the side of plastic containers with appropriate tool or pressure-rinsing nozzle. Follow specific manufacturer directions.
- Thoroughly rinse the empty container for the time interval recommended by the pressure-rinse nozzle manufacturer, but no less than 30 seconds, using at least 40 psi water pressure

AFTER RINSING:

- Puncture the bottom of the container so that it may not be reused.

DISPOSAL:

- NEVER reuse an empty pesticide container for any reason.
- Keep containers clean and dry.
- Store containers under shelter or in plastic bags on pallets out of sunlight.
- Dispose of rinsed, punctured containers in an approved Class III Landfill or contact SCDPR for recycling opportunities - <https://www.clemson.edu/public/regulatory/pesticide-regulation/special-programs/pesticide-container-recycling/index.html>

RETURNABLE (REFILLABLE) CONTAINERS & PALLETS

For pickup of empty returnable/refillable containers, contact the contract vendor to make arrangements for the return of the empty containers back to the manufacturer. *Each container is supposed to contain a label with the appropriate return information (vendor return label).* All containers should be promptly returned upon emptying.

5. WORK DESCRIPTIONS

WORK DESCRIPTION CALENDAR

The following is a snapshot of work descriptions and associated approved months for performing the related application. This calendar reflects general, average agency-wide (i.e., statewide) guidance. Actual application months/times will vary from location-to-location and may be shortened or extended depending upon conditions in a specific geographical location. Each applicator is responsible for monitoring local weather and seasonal changes to determine when conditions are actually suitable for an application and when an application should be suspended or discontinued.

Detailed prescriptions for each work description are provided in the following pages.

WORK DESCRIPTION	APPROVED APPLICATION MONTHS											
100 - Total Vegetation Control	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
200 - Brush	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
300 - Trees	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
400 – Broadleaf Weeds	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
500 – Grassy Weeds				APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	
600 - Turf					MAY	JUN	JUL	AUG	SEP	OCT	NOV	

APPLICATION METHODS

Broadcast

A broadcast application refers to applying an herbicide an amount per unit area (*e.g., gallons per acre; gallons per 1,000 square feet*).

Spot

Applying a percent solution, generally “spray-to-wet”, targeting individual plants is referred to as a spot application. This method is not for use with injection units. This method is often performed with conventional handguns and with backpack sprayers. The following table provides equivalents and conversions for commonly used for percent solution herbicide applications. Application rates must still conform to label rates (i.e., do not exceed label rates when performing spot applications.)

Percent (%) Solution	Decimal Equivalent	Gallons of Material Per 100 Gallons Solution	Fluid Ounces of Material Per 5 Gallons Solution	Fluid Ounces of Material Per 1 Gallon Solution
20	0.20	20	128	25.6
10	0.10	10	64	12.8
9	0.09	9	57.6	11.52
8	0.08	8	51.2	10.24
7	0.07	7	44.8	8.96
6	0.06	6	38.4	7.68
5	0.05	5	32	6.4
4	0.04	4	25.6	5.12
1.5	0.015	1.5	9.6	1.92
1.25	0.0125	1.25	8	1.6
1	0.01	1	6.4	1.28
0.75	0.0075	0.75	4.8	0.96

WORK DESCRIPTION 100 – TOTAL VEGETATION CONTROL

PURPOSE: To maintain approved roadside areas free of all vegetation. Generally, vegetation should **not exceed five (5) feet in height**.

APPROVED LOCATIONS: Impervious surfaces such as curbs, gutters, sidewalks, paved shoulders, paved/concrete ditches, and rip rap.

NOTE: This work description may **NOT** be used at guardrails, cable barriers, signs, delineators, fences, or any other SCDOT location where a natural surface exists.

USE or SPECIES	APPROVED MONTHS FOR APPLICATION												Herbicide	Application Method	Herbicide Rate	Carrier	Surfactant Rate	Anti-Drift Rate	OPTIONAL	
																			Dye Rate	Anti-Foam Rate
ANNUALS / PERENNIALS	J	F	M	A	M	J	J	A	S	O	N	D	GLYPHOSATE	Broadcast	3 to 7.5 pints/acre	Water (3 to 40 gals per acre)	½ to 2 pints per 100 gals spray	3 to 8 oz per 100 gals spray	10 to 16 oz per 100 gals spray	1 to 2 oz per 100 gals spray
	A	E	A	P	A	U	U	U	E	C	O	E		Spot	0.75 to 1.50 % solution	Water				

NOTES:

- Read and follow all labeling instructions.
- Apply to actively growing plants.
- Do not apply more than 6 quarts (= 12 pints) of GLYPHOSATE per acre per year per site.
- Use extreme care when applying GLYPHOSATE to prevent injury to desirable plants and crops.
- Avoid applying at excessive speed or pressure (less than 20 psi).

WORK DESCRIPTION 200 – BRUSH

PURPOSE: To control woody plants, including woody vines, less than five (5) feet tall and that may have several stems with a diameter, measured per single stem, of three (3) inches or less.

APPROVED LOCATIONS: All roadside locations where brush occurs except where prohibited by labeling.

USE or SPECIES	APPROVED MONTHS FOR APPLICATION												Herbicide	Application Method	Herbicide Rate	Carrier	Surfactant (BREWER 90-10) Rate	Crop Oil (BREWER 83-17) Rate	Anti-Drift (POLY CONTROL 2) Rate	OPTIONAL	
																				Dye (HI-LIGHT BLUE LIQUID) Rate	Anti-Foam (BREWER DEFOAMER) Rate
BASAL BARK	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TRICLOPYR ESTER (BEE) 20% BLEND (Backpack Use Only)	Spot	20% Ready-to-Use						
FOLIAR								AUG	SEP	OCT	NOV		FOSAMINE	Broadcast	1.5 to 6 gals/acre	Water (20 to 50 gals per acre)	½ to 2 pints per 100 gals spray		3 to 8 oz per 100 gals spray	10 to 16 oz per 100 gals spray	1 to 2 oz per 100 gals spray
FOLIAR (AQUATIC)					MAY	JUN	JUL	AUG	SEP	OCT	NOV		TRICLOPYR AMINE (TEA)	Broadcast	2 to 3 gals/acre	Water (20 or more gals per acre)	½ to 2 pints per 100 gals spray		3 to 8 oz per 100 gals spray	10 to 16 oz per 100 gals spray	1 to 2 oz per 100 gals spray
DORMANT STEM	JAN	FEB	MAR									DEC	TRICLOPYR ESTER (BEE)	Broadcast	4 to 8 quarts/acre	Water (10 or more gals per acre)		2 to 3 gallons per 100 gals spray	3 to 8 oz per 100 gals spray	10 to 16 oz per 100 gals spray	1 to 2 oz per 100 gals spray

NOTES:

- Read and follow all labeling instructions.
- **BASAL BARK:** For backpacks or small hand-held sprayers. Each individual plant must be treated. Do NOT broadcast or treat the foliage. Spray from ground to 12 to 15 inches high completely around each stem for best results. Do NOT apply when bark is wet.
- **FOLIAR: Leaves must be present and** application may occur until development of full fall coloration. Do not apply more than 6 gals FOSAMINE/acre/year/location. Complete coverage essential.
- **FOLIAR AQUATIC (TRICLOPYR AMINE):** Protective eyewear and chemical resistant gloves required. Category 5 (Aquatic) Pesticide Applicator's Endorsement required.
- **FOLIAR AQUATIC (TRICLOPYR AMINE):** Applications during the months on May-July may only occur with concurrence from the State Vegetation Manager.
- **DORMANT:** No leaves present. Complete coverage essential. Do NOT apply when bark is wet. Do NOT apply after budbreak. Use low pressure (20 to 40 psi).

WORK DESCRIPTION 300 – TREES

PURPOSE: To prevent re-growth of trees larger than 3 inches in diameter measured at a height of 5 feet above the ground. Each individual stump must be treated. And, to control the growth of roadside tree limbs (non-ornamental) less than 10 feet high.

APPROVED LOCATIONS: All roadside locations where (non-ornamental) trees occur except where prohibited by labeling.

USE or SPECIES	APPROVED MONTHS FOR APPLICATION												Herbicide	Application Method	Herbicide Rate	Carrier	Surfactant (BREWER 90-10) Rate	Crop Oil (BREWER 83-17) Rate	Anti-Drift (POLY CONTROL 2) Rate	OPTIONAL	
																				Dye (HI-LIGHT BLUE LIQUID) Rate	Anti-Foam (BREWER DEFOAMER) Rate
CUT STUMP	J A N	F E B	M A R	A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V	D E C	TRICLOPYR ESTER (BEE) 20% BLEND (Backpack Use Only)	Spot	20% Ready-To- Use						
LIMB/SIDE TRIMMING - FOLIAR								A U G	S E P	O C T	N O V		FOSAMINE	Broadcast	1.5 to 6 gals/acre	Water (20 to 50 gals per acre)	½ to 2 pints per 100 gals spray		3 to 8 oz per 100 gals spray	10 to 16 oz per 100 gals spray	1 to 2 oz per 100 gals spray
LIMB/SIDE TRIMMING – FOLIAR (AQUATIC)					M A Y	J U N	J U L	A U G	S E P	O C T	N O V		TRICLOPYR AMINE (TEA)	Broadcast	2 to 3 gals/acre	Water (20 or more gals per acre)	½ to 2 pints per 100 gals spray		3 to 8 oz per 100 gals spray	10 to 16 oz per 100 gals spray	1 to 2 oz per 100 gals spray
LIMB/SIDE TRIMMING - DORMANT	J A N	F E B	M A R									D E C	TRICLOPYR ESTER (BEE)	Broadcast	4 to 8 quarts/acre	Water (10 or more gals per acre)		2 to 3 gallons per 100 gals spray	3 to 8 oz per 100 gals spray	10 to 16 oz per 100 gals spray	1 to 2 oz per 100 gals spray

NOTES:

- Read and follow all labeling instructions. Do NOT apply to water.
- **CUT STUMP:** FOR BACKPACKS OR SMALL HAND-HELD SPRAYERS ONLY! Each individual stump must be treated. DO NOT BROADCAST. Spray the root collar area, sides of the stump and the outer portion of the cut surface including the cambium until thoroughly wet, but not to the point of runoff. Treat any time of year except when the bark is wet or water or snow prevents spraying to the ground line. Clear all leaf litter, sawdust or other debris away from the base of the stump before applying.
- **LIMB TRIMMING:** Only controls limbs that are sprayed. Limbs must be mechanically trimmed **within (before OR after) 12 months of** applying herbicide.
- **FOLIAR:** Leaves must be present and application may occur until development of full fall coloration. Do not apply more than 6 gals FOSAMINE/acre/year/location. Complete coverage essential.
- **FOLIAR AQUATIC (TRICLOPYR AMINE):** Protective eyewear and chemical resistant gloves required. Category 5 (Aquatic) Pesticide Applicator's Endorsement required.
- **FOLIAR AQUATIC (TRICLOPYR AMINE):** Applications during the months on May-July may only occur with concurrence from the State Vegetation Manager.
- **DORMANT:** No leaves present. Complete coverage essential. Do NOT apply when bark is wet. Do NOT apply after budbreak. Use low pressure (20 to 40 psi).

WORK DESCRIPTION 400 – BROADLEAF WEEDS

PURPOSE: To control non-woody, herbaceous broadleaf weeds that generally are <u>less than 2 ½ feet high</u> .																				
APPROVED LOCATIONS: All roadside locations where broadleaf weeds occur except where prohibited by labeling.																				
USE or SPECIES	APPROVED MONTHS FOR APPLICATION												Herbicide	Application Method	Herbicide Rate	Carrier	Surfactant (BREWER 90-10) Rate	Anti-Drift (POLY CONTROL 2) Rate	OPTIONAL	
																			Dye (HI-LIGHT BLUE LIQUID) Rate	Anti-Foam (BREWER DEFOAMER) Rate
BROADLEAF WEEDS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AMINOPYRALID	Broadcast	4 to 7 fluid ounces/acre	Water (10 or more gals per acre)	2 pints per 100 gals spray	3 to 8 oz per 100 gals spray	10 to 16 oz per 100 gals spray	1 to 2 oz per 100 gals spray

NOTES:

- Read and follow all labeling instructions. Do not apply to water.
- Apply to actively growing plants.
- Provides residual control. **Do NOT exceed 7 fluid ounces / acre / year / location.**
- Do not mow for at least 14 days following application.

WORK DESCRIPTION 500 – GRASSY WEEDS

PURPOSE: To control grasses indicated when the grasses generally do <u>not exceed five (5) feet in height</u> .																				
APPROVED LOCATIONS: All roadside locations where the indicated grassy weeds occur except where prohibited by labeling.																				
USE or SPECIES	APPROVED MONTHS FOR APPLICATION											Herbicide	Application Method	Herbicide Rate	Carrier	Surfactant (BREWER 90-10) Rate	Anti-Drift (POLY CONTROL 2) Rate	OPTIONAL		
																		Dye (HI-LIGHT BLUE LIQUID) Rate	Anti-Foam (BREWER DEFOAMER) Rate	
BAMBOO				A P R	M A Y	J U N	J U L	A U G	S E P	O C T			GLYPHOSATE	Broadcast	1.5 to 7.5 quarts/acre	Water (10 to 60 gals per acre)	½ to 2 pints per 100 gals spray	3 to 8 oz per 100 gals spray	10 to 16 oz per 100 gals spray	1 to 2 oz per 100 gals spray
														Spot	4 to 10% solution					
COGONGRASS				A P R	M A Y	J U N	J U L	A U G	S E P	O C T			GLYPHOSATE	Broadcast	4.5 to 7.5 pints/acre	Water (10 to 40 gals per acre)	½ to 2 pints per 100 gals spray	3 to 8 oz per 100 gals spray	10 to 16 oz per 100 gals spray	1 to 2 oz per 100 gals spray
GIANT REED							J U L	A U G	S E P	O C T	N O V		GLYPHOSATE	Spot	1.5% solution	Water (see notes)	½ to 2 pints per 100 gals spray	3 to 8 oz per 100 gals spray	10 to 16 oz per 100 gals spray	1 to 2 oz per 100 gals spray
JOHNSONGRASS				A P R	M A Y	J U N	J U L	A U G	S E P	O C T	N O V		SULFOSULFURON	Broadcast	0.75 to 2 oz /acre	Water (10 to 50 gals per acre)	2 pints per 100 gals spray	3 to 8 oz per 100 gals spray	10 to 16 oz per 100 gals spray	1 to 2 oz per 100 gals spray
														Spot	1 oz/100 gals of water					

NOTES:

- Read and follow all labeling instructions. Do NOT apply to water.
- **BAMBOO:** Mow or cut and allow bamboo to resprout not to exceed 5 feet tall to have sufficient foliage for the spray solution to cover foliage completely. Make application before frost. Repeat as necessary. Use a higher rate in the rate range for dense stands and larger plants. Do NOT exceed 8 quarts per acre per year per site.
- **COGONGRASS:** Apply when at least 18 inches tall. Repeat as necessary. Replant the area per the latest edition of the SCDOT Standard Specifications for Highway Construction as necessary.
- **GIANT REED:** Cut first, in June or July, then treat regrowth that is less than 5 feet tall.
- **JOHNSONGRASS:** Best results are obtained when in early stages of growth and not disturbed by mowing or other factors for 12 to 14 days prior to, or 12 to 14 days after application. Do NOT exceed 1 oz/acre/year/location on tall fescue sites. Do NOT exceed 2.66 oz/acre/year on all other sites.
- **Spot:** when applying as % solution, do not exceed the labeled rate per acre:

WORK DESCRIPTION 600 – TURF

PURPOSE: To control the growth of roadside turf including bahiagrass and tall fescue.

APPROVED LOCATIONS: All roadside turf locations except where prohibited by labeling.

USE or SPECIES	APPROVED MONTHS FOR APPLICATION												Herbicide	Application Method	Herbicide Rate	Carrier	Surfactant (BREWER 90-10) Rate	Anti-Drift (POLY CONTROL 2) Rate	OPTIONAL	
																			Dye (HI-LIGHT BLUE LIQUID) Rate	Anti-Foam (BREWER DEFOAMER) Rate
SEEDHEAD SUPPRESSION						M	J	J	A	S	O	N	IMA	Broadcast	2 to 3 oz/acre	Water (5 or more gals per acre)	2 pints per 100 gals spray	3 to 8 oz per 100 gals spray	10 to 16 oz per 100 gals spray	1 to 2 oz per 100 gals spray
CONVERSION PHASE I						M	J	J	A	S	O	N	IMA	Broadcast	4 oz/acre	Water (5 or more gals per acre)	2 pints per 100 gals spray	3 to 8 oz per 100 gals spray	10 to 16 oz per 100 gals spray	1 to 2 oz per 100 gals spray
CONVERSION PHASE II						M	J	J	A	S	O	N	IMA	Broadcast	6 oz/acre	Water (5 or more gals per acre)	2 pints per 100 gals spray	3 to 8 oz per 100 gals spray	10 to 16 oz per 100 gals spray	1 to 2 oz per 100 gals spray

NOTES:

- Read and follow all labeling instructions. Do NOT apply to water.
- **Do NOT exceed 12 oz/acre/year per location.**
- **SEEDHEAD SUPPRESSION:** Apply after bahia green-up but prior to bahia seedhead appearance. Make the first cut (mow) of the season then wait 7 to 10 days before making the 1st application. Do NOT reapply within 45 to 60 days of application. *Ideally make 1st application during May, before June 1. Evaluate 45 to 60 days later then make 2nd application if desired (generally during July).*
- **CONVERSION PHASE I:** Minimum 50% ground cover by centipede grass or bermudagrass.
- **CONVERSION PHASE II:** Minimum 75% ground cover by centipede grass or bermudagrass.
- Do NOT treat areas under poor growing conditions such as drought stress, disease or insect damage.

6. PRE-APPLICATION (BEFORE)

6.1: INSTRUCTIONS/CHECKLIST

The District Maintenance Engineer and staff with assistance of the Director of Maintenance Office, if necessary, should determine the scope of their respective district herbicide program within the guidelines of this manual. The Integrated Roadside Vegetation Program (IRVM) Plan will contain lists of roads where herbicide applications are prescribed. The Resident Maintenance Engineer should implement the plan following the guidelines set forth in this manual.

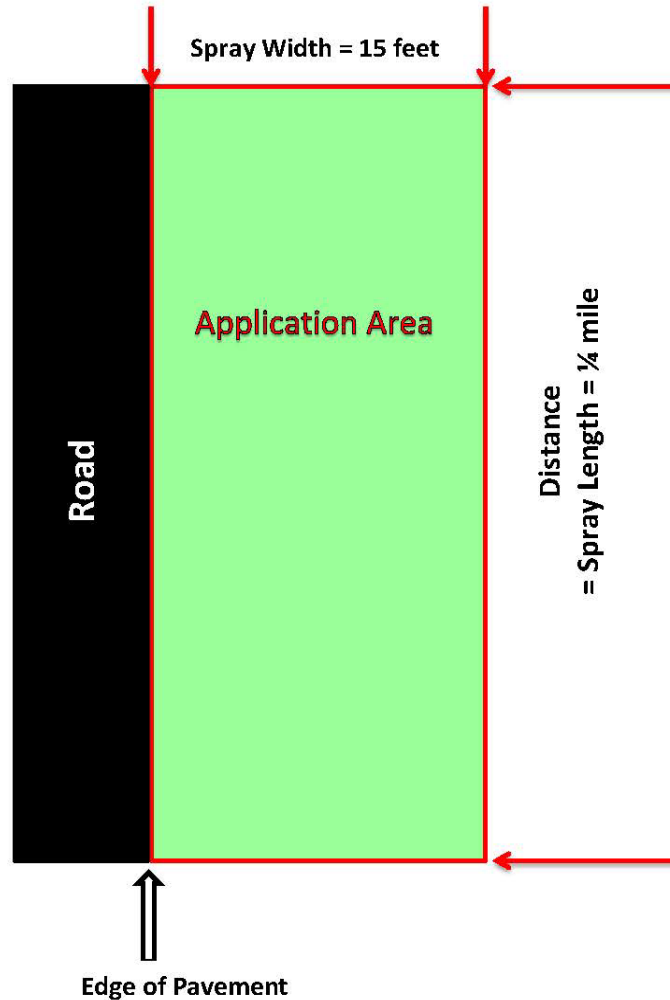
BEFORE applying herbicides:

- ☐ Review the respective Pre-Application Plan Form
- ☐ Survey/scout the area to:
- ☐ Identify/confirm the target weed(s) present
- ☐ Determine the size of the application area (See Section 6.2)
- ☐ Verify that an herbicide application is needed and suitable. In some cases, other methods of vegetation management may be more appropriate (such as mechanical cutting).
- ☐ Identify DO NOT SPRAY areas including but not limited to:
 - Water bodies (creeks, rivers, streams, ponds, lakes, etc.)
 - Along fences where grazing livestock can reach
 - Adjacent to gardens and crops (agricultural fields)
 - Next to residential property where the landowner maintains the right-of-way
 - Playgrounds, schools, hospitals, wells
 - Organic farms, beehives, etc.,
 - US Forest Service lands
- ☐ Verify the application is within the allowed calendar stated in the Herbicide Operations Manual Work Description. For season-sensitive applications such as dormant applications, verify that seasonal conditions are suitable for an application.
- ☐ Verify that weather conditions, including wind speed, are suitable for applying herbicides. Observe drift management best practices.
 - Do NOT apply when wind speed exceeds 7 miles per hour.
 - Avoid spraying at temperatures above 90°F or when temperatures are at or below freezing (32°F).
 - Do NOT apply when rain is forecast.
- ☐ Ensure proper traffic control is available.
- ☐ Calibrate equipment AND DOCUMENT USING THE **CALIBRATION FORM** within 7 calendar days of making an application or anytime changes or adjustments are made.

6.2: CALCULATE APPLICATION AREA

Following are **examples** for calculating typical areas for **broadcast applications**.
Actual dimensions will vary. Actual dimensions must be used for real applications.

EXAMPLE: ROADSIDE or MEDIAN



Distance = Spray Length

= 1/4 mile = 0.25 mile

0.25 mile x 5,280 feet/mile = 1,320 feet

Spray Width

= 15 feet

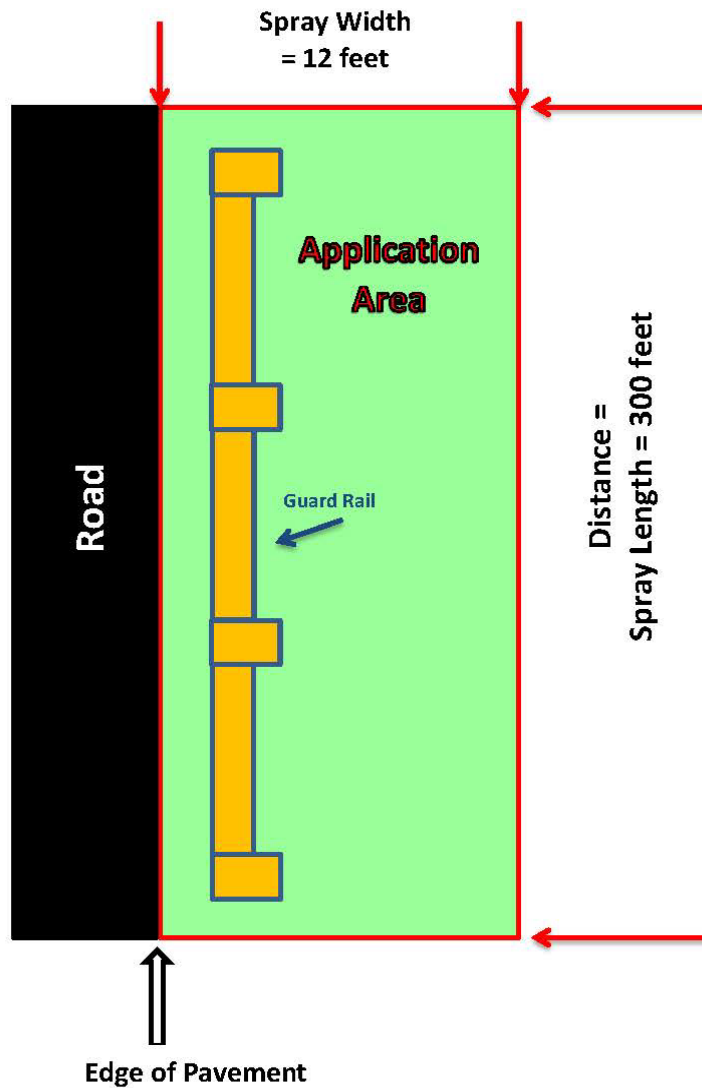
Application Area

= Spray Length x Spray Width

= 1,320 feet x 15 feet = 19,800 square feet

19,800 square feet x 1 acre/43,560 square feet = 0.45 acre

EXAMPLE: GUARD RAIL / CABLE RAIL

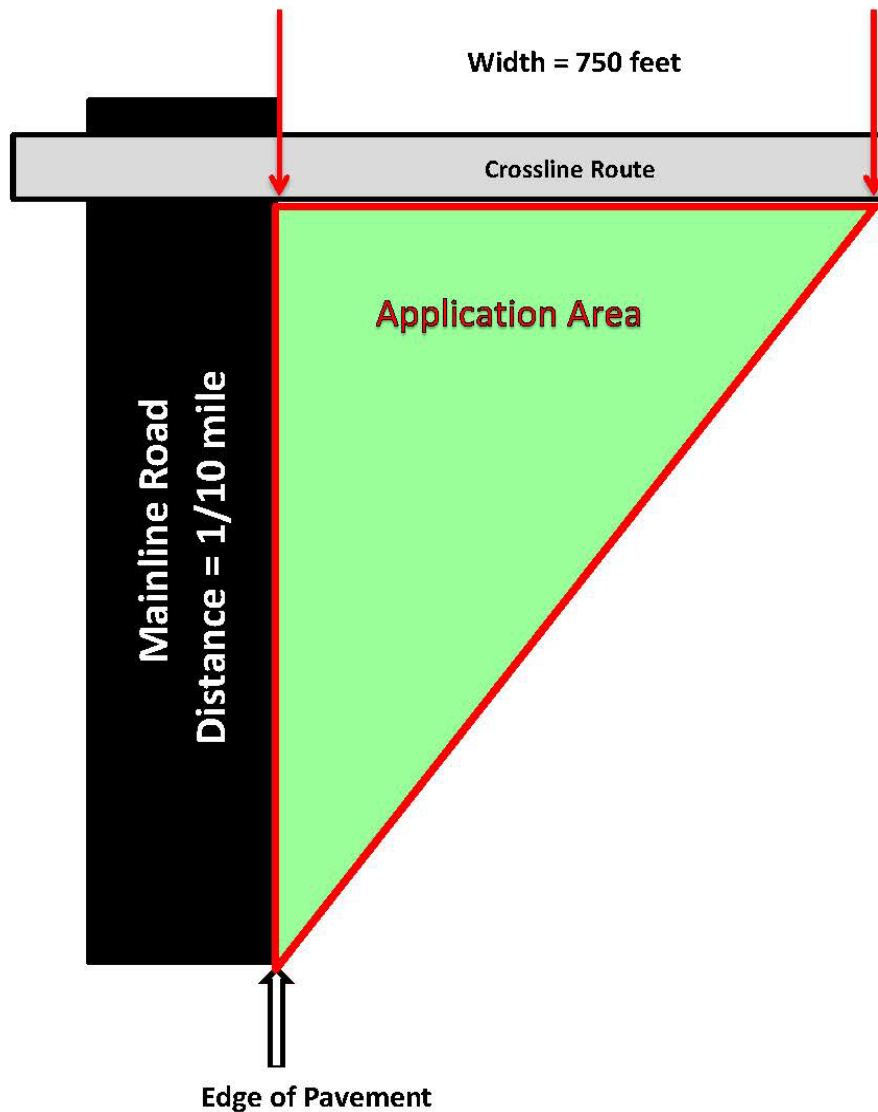


Distance = Spray Length
= 300 feet

Spray Width
= 12 feet

Application Area
= Spray Length x Spray Width
= 300 feet x 12 feet = 3,600 square feet
3,600 square feet x 1 acre/43,560 square feet = 0.083 acre

EXAMPLE: INTERCHANGE

**Distance**

= Length of Interchange along mainline road = 1/10 mile
1/10 mile = 0.1 mile x 5,280 feet/mile = 528 feet

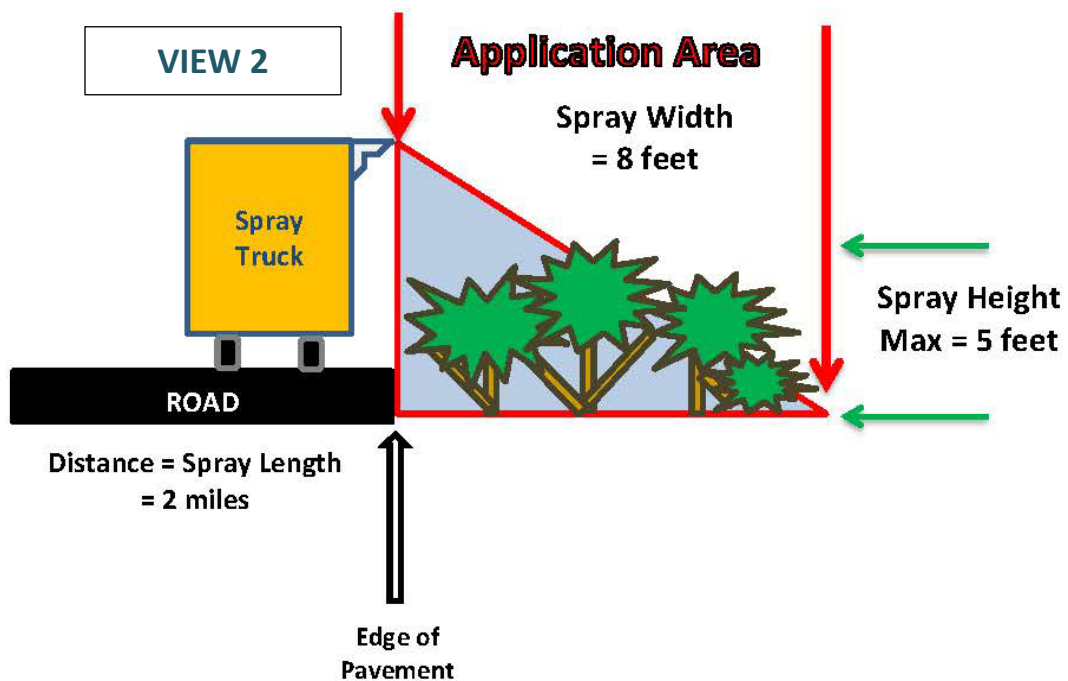
Width

= Width of Interchange along crossline route = 750 feet

Application Area

= $\frac{1}{2}$ (Distance x Width)
= $\frac{1}{2}$ (528 feet x 750 feet) = $\frac{1}{2}$ (396,000) = 198,000 square feet
198,000 square feet x 1 acre/43,560 square feet = 4.5 acres

EXAMPLE: BRUSH



Distance = Spray Length

= 2 miles

2 miles x 5,280 feet/mile = 10,560 feet

Spray Width

= 8 feet

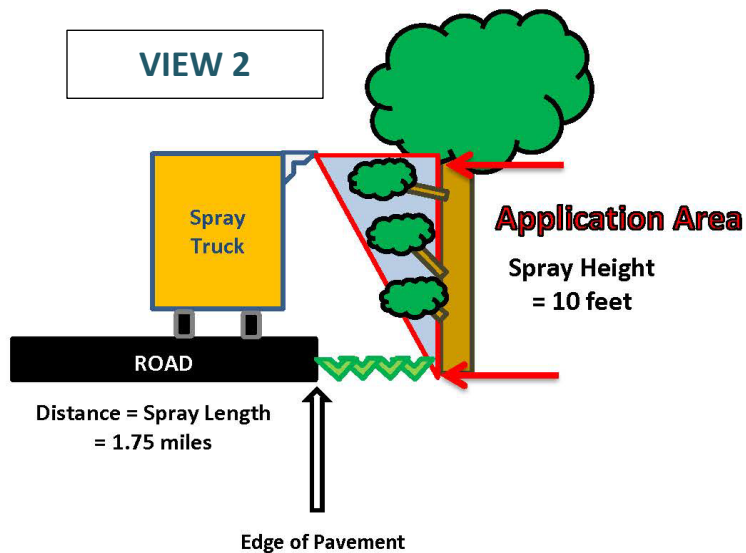
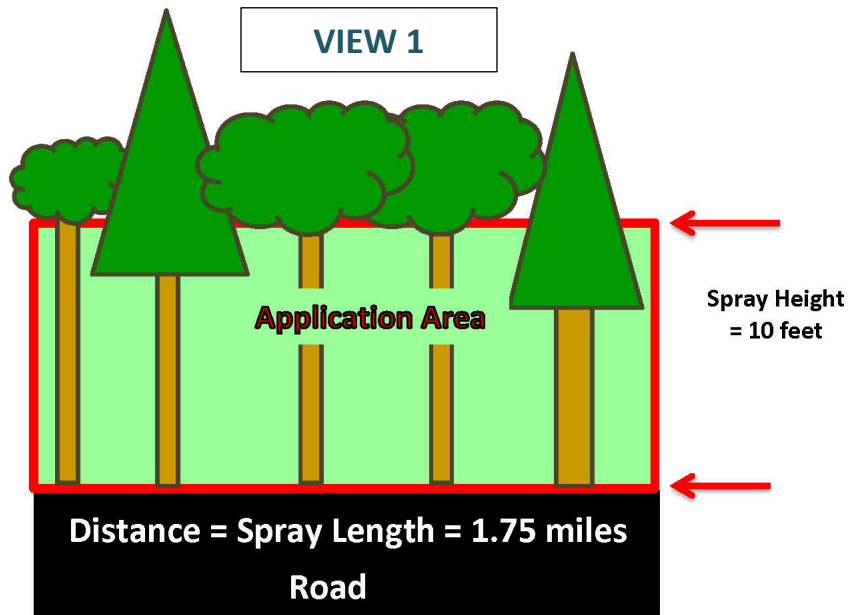
Application Area

= Spray Length x Spray Width

= 10,560 feet x 8 feet = 84,480 square feet

84,480 square feet x 1 acre/43,560 square feet = 1.9 acres

EXAMPLE: TREE LIMB/SIDE TRIMMING



Distance = Spray Length

= 1.75 miles

1.75 miles x 5,280 feet/mile = 9,240 feet

Spray Height

= 10 feet

Application Area

= Spray Length x Spray Height

= 9,240 feet x 10 feet = 92,400 square feet

92,400 square feet x 1 acre/43,560 square feet = 2.1 acres

6.3: CALIBRATION

Herbicides must be applied at a uniform and specified rate in order to obtain effective and economical results. Consequently, proper calibration of the sprayer is an important part of a successful herbicide program.

All herbicide application equipment (including injection units, conventional units, backpacks and handguns) shall be calibrated, and documented (by completing the respective Calibration Form), within seven calendar days prior to that application (i.e., the calibration date must occur within seven days of the application date) or anytime changes or adjustments to the equipment are made. For injection units and conventional units, it is only necessary to ensure the application feature (i.e, nozzle(s)) that will be utilized has/have been calibrated. Calibration is not necessary during weeks when no application is scheduled to occur using the respective application equipment.

CALIBRATION FORM: BACKPACK			
DATE:		ORG UNIT:	
DISTRICT: 1 2 3 4 5 6 7		COUNTY:	
EQUIP ID:		OPERATOR:	
WORK DESCRIPTION: 100-TOTAL VEG CONTROL 200-BRUSH 300-TREES 400-BROADLEAF WEEDS 500-GRASSY WEEDS 600-TURF			
A	<p>Each backpack sprayer must be calibrated for each applicator. Rinse tank then fill with water. Do NOT add herbicide. Clean nozzle. Run sprayer to flush hose and nozzle. Ensure proper spray pattern. Check for and correct leaks. Place tank on level surface then fill with water to a specified line. Mark a test area (25 ft x 20 ft). Spray the test area walking a normal pace using uniform pressure.</p> <p>TEST AREA = 25 FT x 20 FT =</p>	500	<p>OPERATING PRESSURE = _____ psi</p> <p>SPRAY HEIGHT = _____ feet</p> <p>SQUARE FEET</p>
B	<p>Place tank on level surface then measure amount of water needed to refill to the line.</p> <p>OUNCES WATER TO REFILL THE TANK=</p>		OUNCES APPLIED PER 500 SQUARE FEET
C	<p>Convert "B" to gallons.</p> <p>GALLONS APPLIED PER 500 SQUARE FEET = B/128 =</p>		GALLONS APPLIED PER 500 SQUARE FEET
D	<p>Convert "C" to gallons per 1,000 square feet.</p> <p>GALLONS APPLIED PER 1,000 SQUARE FEET = C x 2 =</p>		GALLONS APPLIED PER 1,000 SQUARE FEET
E	<p>Convert "D" to gallons per acre.</p> <p>GALLONS APPLIED PER ACRE = D x 43.56 =</p>		<p>SPRAY VOLUME OUTPUT PER ACRE =GALLONS WATER APPLIED PER ACRE = GPA = GA/AC <i>(Transfer this value to "B" on the Spray Preparation Worksheet and to "B" on the Adjuvant Pre-Application Plan Form)</i></p>

CALIBRATION FORM: CONVENTIONAL UNIT-BOOMLESS HANDGUN			
DATE:		ORG UNIT:	
DISTRICT: 1 2 3 4 5 6 7		COUNTY:	
EQUIP ID:		OPERATOR:	
WORK DESCRIPTION: 100-TOTAL VEG CONTROL 200-BRUSH 300-TREES 400-BROADLEAF WEEDS 500-GRASSY WEEDS 600-TURF			
A	<p>Handgun sprayers must be calibrated for each applicator. Rinse tank then fill with water. Do NOT add herbicide. Clean nozzle. Run sprayer to flush hose and nozzle. Ensure proper spray pattern. Check for and correct leaks. Mark a test area (10 ft x 100 ft or 20 ft x 50 ft).</p> <p>TEST AREA = ____ FT x ____ FT =</p>	1,000	SQUARE FEET
B	<p>Time how long it takes to spray the test area walking at normal pace using uniform pressure.</p> <p>TIME TO SPRAY 1,000 SQUARE FEET=</p>		<p>OPERATING PRESSURE = _____ psi SPRAY HEIGHT = _____ feet</p> <p>SECONDS</p>
C	<p>Spray and collect water in a bucket for the same amount of time it took to spray the test area.</p> <p>COLLECT WATER IN BUCKET FOR "B" SECONDS =</p>		OUNCES WATER COLLECTED = OUNCES WATER APPLIED PER 1,000 SQUARE FEET
D	<p>Convert "C" to gallons per 1,000 square feet.</p> <p>GALLONS APPLIED PER 1,000 SQUARE FEET = C/128 =</p>		GALLONS WATER APPLIED PER 1,000 SQUARE FEET
E	<p>Convert "D" to gallons per acre.</p> <p>GALLONS APPLIED PER ACRE = D x 43.56 =</p>		<p>SPRAY VOLUME OUTPUT PER ACRE =GALLONS WATER APPLIED PER ACRE = GPA = GA/AC (Transfer this value to "B" on the Spray Preparation Worksheet and to "B" on the Adjuvant Pre-Application Plan Form)</p>

CALIBRATION FORM: CONVENTIONAL UNIT-BOOMLESS			
DATE:		ORG UNIT:	
DISTRICT: 1 2 3 4 5 6 7		COUNTY:	
EQUIP ID:		OPERATOR:	
WORK DESCRIPTION: 100-TOTAL VEG CONTROL 200-BRUSH 300-TREES 400-BROADLEAF WEEDS 500-GRASSY WEEDS 600-TURF			
A	Rinse tank then fill with water. Do NOT add herbicide. Clean nozzle(s) and screen(s). Run sprayer to flush hoses and nozzle(s). Ensure proper spray pattern, uniformity and nozzle overlap by operating sprayer over a paved surface. Check for and correct leaks. Mark a test distance of 100 feet. TEST DISTANCE =	100	FEET
B	Determine the time required to travel the test distance at operating speed. TIME TO TRAVEL 100 FEET =		SECONDS
C	Convert the test distance speed to feet per minute. = (A/B) x 60 =		FEET PER MINUTE
D	Convert "C" to miles per hour = C/88 =		MILES PER HOUR
E	With nozzles operating, set normal operating pressure. Do NOT exceed 40 psi. Hold a large trash bag over the nozzle(s). Collect spray (i.e., water) for 30 seconds. Transfer water to graduated pitchers then measure. =		OPERATING PRESSURE = _____ psi SPRAY HEIGHT = _____ feet GALLONS WATER PER 30 SECONDS
F	Convert "E" to gallons per minute. = E x 2 =		GALLONS WATER PER MINUTE
G	Operate nozzle(s) at normal operating pressure. Drive over paved area then measure the width of the spray pattern area. =		FEET SPRAY WIDTH
H	Convert "G" to inches. = G x 12 =		INCHES SPRAY WIDTH
I	Calculate the water applied in gallons per acre. = (5,940 x F) / (D x H) =		SPRAY VOLUME OUTPUT PER ACRE =GALLONS WATER APPLIED PER ACRE = GPA = GA/AC <i>(Transfer this value to "B" on the Spray Preparation Worksheet and to "B" on the Adjuvant Pre-Application Plan Form))</i>

CALIBRATION FORM: CONVENTIONAL UNIT-BOOM			
DATE:		ORG UNIT:	
DISTRICT: 1 2 3 4 5 6 7		COUNTY:	
EQUIP ID:		OPERATOR:	
WORK DESCRIPTION: 100-TOTAL VEG CONTROL 200-BRUSH 300-TREES 400-BROADLEAF WEEDS 500-GRASSY WEEDS 600-TURF			
A	Rinse tank then fill with water. Do NOT add herbicide. Clean nozzles and screens. Run sprayer to flush hoses and nozzles. Ensure proper spray pattern, uniformity, and nozzle overlap by operating sprayer over a paved surface. Replace any nozzle when its output varies more than 10%. Check for and correct leaks. Mark a test distance of 100 feet. TEST DISTANCE =	100	FEET
B	Determine the time required to travel the test distance. TIME TO TRAVEL TEST DISTANCE =		SECONDS
C	CONVERT TEST DISTANCE SPEED TO FEET PER MINUTE = (A/B) x 60 =		FEET PER MINUTE
D	CONVERT TEST DISTANCE SPEED TO MILES PER HOUR = C/88 =		MILES PER HOUR
E	NOZZLE SPACING WIDTH =		INCHES
F	With all nozzles operating, set normal operating pressure. Do NOT exceed 40 psi. Use a bucket to collect water spray for 30 seconds from each nozzle. NOZZLE # 1 =		OPERATING PRESSURE = _____ psi SPRAY HEIGHT = _____ feet OUNCES WATER PER 30 SECONDS
	NOZZLE # 2 =		OUNCES WATER PER 30 SECONDS
	NOZZLE # 3 =		OUNCES WATER PER 30 SECONDS
	NOZZLE # 4 =		OUNCES WATER PER 30 SECONDS
	NOZZLE # 5 =		OUNCES WATER PER 30 SECONDS
	NOZZLE # 6 =		OUNCES WATER PER 30 SECONDS
	NOZZLE # 7 =		OUNCES WATER PER 30 SECONDS
G	WATER OUTPUT COLLECTED FROM ALL NOZZLES		OUNCES WATER PER 30 SECONDS FROM ALL NOZZLES
H	Convert "G" to gallons. = G/128=		GALLONS WATER PER 30 SECONDS FROM ALL NOZZLES
I	AVERAGE GALLONS WATER COLLECTED PER NOZZLE = H/NUMBER OF NOZZLES		AVERAGE GALLONS WATER COLLECTED IN 30 SECONDS PER NOZZLE
J	= I x 2 =		AVERAGE GALLONS WATER COLLECTED PER MINUTE
K	DETERMINE TOTAL SPRAY VOLUME OUTPUT IN GALLONS PER ACRE = (5,940 x J)/(D x E)		SPRAY VOLUME OUTPUT PER ACRE =GALLONS WATER APPLIED PER ACRE = GPA = GA/AC <i>(Transfer this value to "B" on the Spray Preparation Worksheet and to "B" on the Adjuvant Pre-Application Plan Form)</i>

CALIBRATION INSTRUCTIONS: INJECTION UNIT

This information is not intended to replace the manufacturer's instructions for calibration.
First, determine the TOTAL SPRAY VOLUME OUTPUT.
Then calibrate the HERBICIDE OUTPUT.

CALIBRATION FORM: INJECTION UNIT-Total Spray Volume Output			
DATE:		ORG UNIT:	
DISTRICT: 1 2 3 4 5 6 7		COUNTY:	
EQUIP ID:		OPERATOR:	
WORK DESCRIPTION: 100-TOTAL VEG CONTROL 200-BRUSH 300-TREES 400-BROADLEAF WEEDS 500-GRASSY WEEDS 600-TURF			
A	Rinse tank then fill with water. Do NOT add herbicide. Clean nozzle(s) and screen(s). Run sprayer to flush hoses and nozzle(s). Ensure proper spray pattern, uniformity, and nozzle overlap by operating sprayer over a paved surface. Check for and correct leaks. Mark a test distance of 100 feet. TEST DISTANCE =	100	FEET
B	Determine the time required to travel the test distance at operating speed. TIME TO TRAVEL 100 FEET=		SECONDS
C	Convert the test distance speed to feet per minute. = (A/B) x 60 =		FEET PER MINUTE
D	Convert "C" to miles per hour = C/88 =		MILES PER HOUR
E	With nozzles operating, set normal operating pressure. Do NOT exceed 40 psi. Hold a large trash bag over the nozzle(s). Collect spray (i.e., water) for 30 seconds. Transfer water to graduated pitchers then measure. =		OPERATING PRESSURE = _____ psi SPRAY HEIGHT = _____ feet GALLONS WATER PER 30 SECONDS
F	Convert "E" to gallons per minute. = E x 2 =		GALLONS WATER PER MINUTE
G	Operate nozzle(s) at normal operating pressure. Drive over paved area then measure the width of the spray pattern area. =		FEET SPRAY WIDTH
H	Convert "G" to inches. = G x 12 =		INCHES SPRAY WIDTH
I	Calculate the water applied in gallons per acre. = (5,940 x F) / (D x H) =		SPRAY VOLUME OUTPUT PER ACRE =GALLONS WATER APPLIED PER ACRE = GPA = GA/AC <i>(Transfer this value to "B" on the Spray Preparation Worksheet and to "B" on the Adjuvant Pre-Application Plan Form)</i>

CALIBRATION FORM: INJECTION UNIT – Herbicide Output

DATE:		COUNTY:	
PUMP # 1			
Test # 1			
A	OLD PUMP CALIBRATION (PC#)		WHEN ACCURATELY CALIBRATED, D WILL EQUAL TO OR BE VERY CLOSE TO THE VALUE OF C. IF NOT, CALCULATE THE NEW PUMP CALIBRATION NUMBER (E) THEN RUN TEST # 2.
B	APPLICATION RATE (OUNCES)		
C	OUNCES COLLECTED		
D	OUNCES INDICATED ON COMPUTER		
E	NEW PC # = (C/D) x A = OUNCES COLLECTED/OUNCES INDICATED x OLD PC#		
Test # 2			
F	OLD PUMP CALIBRATION (PC#)		WHEN ACCURATELY CALIBRATED, I WILL EQUAL TO OR BE VERY CLOSE TO THE VALUE OF H. IF NOT, CALCULATE THE NEW PUMP CALIBRATION NUMBER (J) THEN RUN TEST # 3.
G	APPLICATION RATE (OUNCES)		
H	OUNCES COLLECTED		
I	OUNCES INDICATED ON COMPUTER		
J	NEW PC# = (H/I) x F =		
Test # 3			
K	OLD PUMP CALIBRATION (PC #)		WHEN ACCURATELY CALIBRATED, N WILL EQUAL TO OR BE VERY CLOSE TO THE VALUE OF M. IF NOT, CALCULATE THE NEW PUMP CALIBRATION NUMBER (O) THEN RUN TEST # 4.
L	APPLICATION RATE (OUNCES)		
M	OUNCES COLLECTED		
N	OUNCES INDICATED ON COMPUTER		
O	NEW PC # = (M/N) x K =		
Test # 4			
P	OLD PUMP CALIBRATION (PC#)		BY NOW, S SHOULD EQUAL TO OR BE VERY CLOSE TO THE VALUE OF R.
Q	APPLICATION RATE (OUNCES)		
R	OUNCES COLLECTED		
S	OUNCES INDICATED ON COMPUTER		
PUMP # 2			
Test # 1			
AA	OLD PUMP CALIBRATION (PC#)		WHEN ACCURATELY CALIBRATED, DD WILL EQUAL TO OR BE VERY CLOSE TO THE VALUE OF CC. IF NOT, CALCULATE THE NEW PUMP CALIBRATION NUMBER (EE) THEN RUN TEST # 2.
BB	APPLICATION RATE (OUNCES)		
CC	OUNCES COLLECTED		
DD	OUNCES INDICATED ON COMPUTER		
EE	NEW PC # = (CC/DD) x AA =		
Test # 2			
FF	OLD PUMP CALIBRATION (PC#)		WHEN ACCURATELY CALIBRATED, II WILL EQUAL TO OR BE VERY CLOSE TO THE VALUE OF HH. IF NOT, CALCULATE THE NEW PUMP CALIBRATION NUMBER (JJ) THEN RUN TEST # 3.
GG	APPLICATION RATE (OUNCES)		
HH	OUNCES COLLECTED		
II	OUNCES INDICATED ON COMPUTER		
JJ	NEW PC # = (HH/II) x FF =		
Test # 3			
KK	OLD PUMP CALIBRATION (PC#)		WHEN ACCURATELY CALIBRATED, NN WILL EQUAL TO OR BE VERY CLOSE TO THE VALUE OF MM. IF NOT, CALCULATE THE NEW PUMP CALIBRATION NUMBER (EE) THEN RUN TEST # 4.
LL	APPLICATION RATE (OUNCES)		
MM	OUNCES COLLECTED		
NN	OUNCES INDICATED ON COMPUTER		
OO	NEW PC # = (MM/NN) x KK =		
Test # 4			
PP	OLD PUMP CALIBRATION (PC#)		BY NOW, SS SHOULD EQUAL TO OR BE VERY CLOSE TO THE VALUE OF RR.
QQ	APPLICATION RATE (OUNCES)		
RR	OUNCES COLLECTED		
SS	OUNCES INDICATED ON COMPUTER		

6.4: SPRAY PREPARATION

- ☐ Always read labeling before preparing handling herbicides. Wear Personal Protective Equipment (PPE) as stated in the label and SDS. Check all equipment for leaks BEFORE preparing an application.
- ☐ Complete a Spray Preparation Form prior to each application BEFORE loading materials into application equipment.
- ☐ Ensure application rate does NOT exceed label rate.
- ☐ Use of a drift control agent is required for every application.
- ☐ Only mix/load enough herbicide into the truck tank or backpack sprayer to apply in one day. Do NOT use the truck or a backpack sprayer to store herbicides!

CONVERSION TABLES

AREA MEASURE
1 acre = 43,560 square feet
LINEAR MEASURE
1 foot = 12 inches
1 mile = 5,280 feet
LIQUID MEASURE
1 tablespoon = 3 teaspoons
1 fluid ounce = 2 tablespoons = 30 cubic centimeters
1 cup = 8 fluid ounces
1 pint = 2 cups = 16 fluid ounces
1 quart = 2 pints = 32 fluid ounces
1 gallon = 4 quarts = 8 pints = 128 fluid ounces
WEIGHT MEASURE
1 gallon of water = 8.33 pounds
1 pound = 16 ounces

BACKPACK

WATER-BASED HERBICIDE APPLICATIONS, in order:

- Carrier (water: add ½ of volume needed)
- Herbicide
- Surfactant OR Crop Oil as specified in respective Work Description
- Dye
- Anti-Drift
- Anti-Foam (If foaming is a problem during mixing)
- Carrier (water: add balance of water needed)

OIL-BASED HERBICIDE APPLICATIONS

- Place pre-mixed (ready-to-use) product into backpack.

CONVENTIONAL UNIT

Combine the following in the spray tank, in order:

- Carrier (water: add ½ of volume needed)
- Herbicide
- Surfactant OR Crop Oil as specified in respective Work Description
- Dye
- Anti-Drift
- Anti-Foam (If foaming is a problem during mixing)
- Carrier (water: add balance of water needed)

INJECTION UNIT

Combine the following in the carrier tank, in order:

- Carrier (water: add ½ of volume needed)
- Surfactant OR Crop Oil as specified in respective Work Description
- Dye
- Anti-Drift
- Anti-Foam (If foaming is a problem during mixing)
- Carrier (water: add balance of water needed)

Place the following in the chemical tank(s):

- Herbicide

SPRAY PREPARATION FORM: BACKPACK – Broadcast Application			
DATE:		ORG UNIT:	
DISTRICT: 1 2 3 4 5 6 7		COUNTY:	
EQUIP ID:		OPERATOR:	
WORK DESCRIPTION: 100-TOTAL VEG CONTROL 200-BRUSH 300-TREES 400-BROADLEAF WEEDS 500-GRASSY WEEDS 600-TURF			
TOTAL SPRAY SOLUTION			
A	FULL TANK VOLUME CAPACITY =		GALLONS PER FULL TANK
B	SPRAY VOLUME OUTPUT = (OPERATING PRESSURE = psi)		GALLONS PER ACRE, GPA or GA/AC (insert value "E" from calibration worksheet)
C	MAXIMUM ACRES PER TANK = A/B =		ACRES PER FULL TANK
D	TARGET ACRES TO SPRAY TODAY =		ACRES
E1	SPRAY VOLUME TO PREPARE = (D/C) x A =		GALLONS TOTAL SPRAY SOLUTION TO PREPARE
E2	CONVERT TO OUNCES = E x 128 =		OUNCES TOTAL SPRAY SOLUTION TO PREPARE
WATER (PUT ½ TOTAL WATER VOLUME NEEDED IN THE TANK INITIALLY)			
F1	= E x 0.5 =		GALLONS WATER TO PUT INTO TANK INITIALLY
F2	CONVERT TO OUNCES = F x 128 =		OUNCES WATER TO PUT INTO TANK INITIALLY
HERBICIDE			
G	BRAND NAME = _____ Maximum Label Rate: _____ Application Rate =		EPA Reg No _____ Lot No _____ INDICATE UNIT AND AREA
H	Application Rate, GALLONS PER ACRE =		GALLONS PER ACRE
I1	HERBICIDE AMOUNT TO PUT IN TANK = D x H =		GALLONS HERBICIDE TO PUT IN TANK
I2	CONVERT TO OUNCES = I1 x 128 =		OUNCES HERBICIDE TO PUT IN TANK
SURFACTANT (BREWER 90-10)			
J	LABEL RATE =		PINTS PER 100 GALLONS SPRAY
K1	SURFACTANT AMOUNT TO PUT IN TANK =(E/100) x J =		PINTS SURFACTANT TO PUT IN TANK
K2	CONVERT TO GALLONS = K1/8 =		GALLONS SURFACTANT TO PUT IN TANK
K3	CONVERT TO OUNCES = K2 x 128 =		OUNCES SURFACTANT TO PUT IN TANK
CROP OIL (BREWER 83-17)			
L	LABEL RATE =		GALLONS PER 100 GALLONS SPRAY
M1	CROP OIL AMOUNT TO PUT IN TANK =(E/100) x L =		GALLONS CROP OIL TO PUT IN TANK
M2	CONVERT TO OUNCES = M1 x 128 =		OUNCES CROP OIL TO PUT IN TANK
DYE (HI-LIGHT BLUE LIQUID)			
N	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
O	VOLUME BLUE DYE TO PUT IN TANK = (E/100) x N =		OUNCES BLUE DYE TO PUT IN TANK
ANTI-DRIFT (POLY CONTROL 2)			
P	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
Q	VOLUME ANTI-DRIFT TO PUT IN TANK = (E/100) x P =		OUNCES ANTI-DRIFT TO PUT IN TANK
ANTI-FOAM (BREWER DEFOAMER)			
R	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
S	VOLUME ANTI-FOAM TO PUT IN TANK = (E/100) x R =		OUNCES ANTI-FOAM TO PUT IN TANK
WATER (REMAINING VOLUME TO PUT INTO TANK)			
T	= E2-F2-I2-K3-M2-O-Q-S =		OUNCES WATER TO PUT IN TANK

SPRAY PREPARATION FORM: BACKPACK – Spot Application			
DATE:		ORG UNIT:	
DISTRICT: 1 2 3 4 5 6 7		COUNTY:	
EQUIP ID:		OPERATOR:	
WORK DESCRIPTION: 100-TOTAL VEG CONTROL 200-BRUSH 300-TREES 400-BROADLEAF WEEDS 500-GRASSY WEEDS 600-TURF			
TOTAL SPRAY SOLUTION			
A	FULL TANK VOLUME CAPACITY =		GALLONS PER FULL TANK
B	SPRAY VOLUME OUTPUT = (OPERATING PRESSURE = psi)		GALLONS PER ACRE, GPA or GA/AC (insert value "E" from calibration worksheet)
C	MAXIMUM ACRES PER TANK = A/B =		ACRES PER FULL TANK
D	TARGET ACRES TO SPRAY TODAY =		ACRES
E1	SPRAY VOLUME TO PREPARE TODAY = (D/C) x A =		GALLONS TOTAL SPRAY SOLUTION TO PREPARE
E2	CONVERT TO OUNCES = E1 x 128 =		OUNCES TOTAL SPRAY SOLUTION TO PREPARE
WATER (PUT ½ TOTAL WATER VOLUME NEEDED IN THE TANK INITIALLY)			
F1	= E x 0.5 =		GALLONS WATER TO PUT IN TANK INITIALLY
F2	CONVERT TO OUNCES = F1 x 128 =		OUNCES WATER TO PUT IN TANK INITIALLY
HERBICIDE			
G	BRAND NAME = _____ Maximum Label Rate= _____ Application Rate = _____		EPA Reg No _____ Lot No _____ PERCENT (%) SOLUTION
H1	HERBICIDE AMOUNT TO PUT IN TANK = E x (G/100) =		GALLONS HERBICIDE TO PUT IN TANK
H2	CONVERT TO OUNCES = H1 x 128 =		OUNCES HERBICIDE TO PUT IN TANK
SURFACTANT (BREWER 90-10)			
I	LABEL RATE =		PINTS PER 100 GALLONS SPRAY
J1	SURFACTANT AMOUNT TO PUT IN TANK = (E/100) x I =		PINTS SURFACTANT TO PUT IN TANK
J2	CONVERT TO GALLONS = J/8 =		GALLONS SURFACTANT TO PUT IN TANK
J3	CONVERT TO OUNCES = J2 x 128 =		OUNCES SURFACTANT TO PUT IN TANK
CROP OIL (BREWER 83-17)			
K	LABEL RATE =		GALLONS PER 100 GALLONS SPRAY
L1	CROP OIL AMOUNT TO PUT IN TANK = (E/100) x K =		GALLONS CROP OIL TO PUT IN TANK
L2	CONVERT TO OUNCES = L1 x 128 =		OUNCES CROP OIL TO PUT IN TANK
DYE (HI-LIGHT BLUE LIQUID)			
M	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
N	BLUE DYE AMOUNT TO PUT IN TANK = (E/100) x M =		OUNCES BLUE DYE TO PUT IN TANK
ANTI-DRIFT (POLY CONTROL 2)			
O	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
P	ANTI-DRIFT AMOUNT TO PUT IN TANK = (E/100) x O =		OUNCES ANTI-DRIFT TO PUT IN TANK
ANTI-FOAM (BREWER DEFOAMER)			
Q	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
R	ANTI-FOAM AMOUNT TO PUT IN TANK = (E/100) x Q =		OUNCES ANTI-FOAM TO PUT IN TANK
WATER (REMAINING VOLUME TO PUT INTO TANK)			
S	= E2-F2-H2-J3-L2-N-P-R =		OUNCES WATER TO PUT IN TANK

SPRAY PREPARATION FORM: CONVENTIONAL UNIT-BOOMLESS HANDGUN – Broadcast Application			
DATE:		ORG UNIT:	
DISTRICT: 1 2 3 4 5 6 7		COUNTY:	
EQUIP ID:		OPERATOR:	
WORK DESCRIPTION: 100-TOTAL VEG CONTROL 200-BRUSH 300-TREES 400-BROADLEAF WEEDS 500-GRASSY WEEDS 600-TURF			
TOTAL SPRAY SOLUTION			
A	FULL TANK VOLUME CAPACITY =		GALLONS PER FULL TANK
B	SPRAY VOLUME OUTPUT = (OPERATING PRESSURE = psi)		GALLONS PER ACRE, GPA or GA/AC (insert value "E" from calibration worksheet)
C	MAXIMUM ACRES PER TANK = A/B =		ACRES PER FULL TANK
D	TARGET ACRES TO SPRAY TODAY =		ACRES
E	SPRAY VOLUME TO PREPARE TODAY = (D/C) x A =		GALLONS TOTAL SPRAY SOLUTION TO PREPARE FOR TODAY'S APPLICATION
WATER (PUT ½ TOTAL WATER VOLUME NEEDED IN THE TANK INITIALLY)			
F	= E x 0.5 =		GALLONS WATER TO PUT INTO TANK INITIALLY
HERBICIDE			
G	BRAND NAME = _____		EPA Reg No _____ Lot No _____
	Maximum Label Rate= _____ Application Rate =		INDICATE UNIT AND AREA
H	Application Rate, GALLONS PER ACRE =		GALLONS PER ACRE
I	HERBICIDE AMOUNT TO PUT INTO TANK = D x H =		GALLONS HERBICIDE TO PUT INTO TANK
SURFACTANT (BREWER 90-10)			
J	LABEL RATE =		PINTS PER 100 GALLONS SPRAY
K	VOLUME SURFACTANT TO PUT INTO TANK = (E/100) x J =		PINTS SURFACTANT TO PUT INTO TANK
	CONVERT TO GALLONS = K/8 =		GALLONS SURFACTANT TO PUT INTO TANK
CROP OIL (BREWER 83-17)			
L	LABEL RATE =		GALLONS PER 100 GALLONS SPRAY
M	VOLUME CROP OIL TO PUT INTO TANK = (E/100) x L =		GALLONS CROP OIL TO PUT INTO TANK
DYE (HI-LIGHT BLUE LIQUID)			
N	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
O	VOLUME BLUE DYE TO PUT INTO TANK = (E/100) x N =		OUNCES BLUE DYE TO PUT INTO TANK
	CONVERT TO GALLONS = O/128 =		GALLONS BLUE DYE TO PUT INTO TANK
ANTI-DRIFT (POLY CONTROL 2)			
P	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
Q	VOLUME ANTI-DRIFT TO PUT INTO TANK = (E/100) x P =		OUNCES ANTI-DRIFT TO PUT INTO TANK
	CONVERT TO GALLONS = Q/128 =		GALLONS ANTI-DRIFT TO PUT INTO TANK
ANTI-FOAM (BREWER DEFOAMER)			
R	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
S	VOLUME ANTI-FOAM TO PUT INTO TANK = (E/100) x R =		OUNCES ANTI-FOAM TO PUT INTO TANK
	CONVERT TO GALLONS = S/128 =		GALLONS ANTI-FOAM TO PUT INTO TANK
WATER (REMAINING VOLUME TO PUT INTO TANK)			
T	= E-F-I-K-M-O-Q-S =		GALLONS WATER TO PUT INTO TANK

SPRAY PREPARATION FORM: CONVENTIONAL UNIT -BOOMLESS HANDGUN – Spot Application			
DATE:		ORG UNIT:	
DISTRICT: 1 2 3 4 5 6 7		COUNTY:	
EQUIP ID:		OPERATOR:	
WORK DESCRIPTION: 100-TOTAL VEG CONTROL 200-BRUSH 300-TREES 400-BROADLEAF WEEDS 500-GRASSY WEEDS 600-TURF			
TOTAL SPRAY SOLUTION			
A	FULL TANK VOLUME CAPACITY =		GALLONS PER FULL TANK
B	SPRAY VOLUME OUTPUT = (OPERATING PRESSURE = psi)		GALLONS PER ACRE, GPA or GA/AC (insert value "E" from calibration worksheet)
C	MAXIMUM ACRES PER TANK = A/B=		ACRES PER FULL TANK
D	TARGET ACRES TO SPRAY TODAY =		ACRES
E	SPRAY VOLUME TO PREPARE TODAY = (D/C) x A =		GALLONS TOTAL SPRAY SOLUTION TO PREPARE FOR TODAY'S APPLICATION
WATER (PUT ½ TOTAL WATER VOLUME NEEDED IN THE TANK INITIALLY)			
F	= E x 0.5 =		GALLONS WATER TO PUT INTO TANK INITIALLY
HERBICIDE			
G	BRAND NAME = _____ Maximum Label Rate= _____ Application Rate = _____		EPA Reg No _____ Lot No _____ PERCENT (%) SOLUTION
H	HERBICIDE AMOUNT TO PUT INTO TANK = E x (G/100) =		GALLONS HERBICIDE TO PUT INTO TANK
SURFACTANT (BREWER 90-10)			
I	LABEL RATE =		PINTS PER 100 GALLONS SPRAY
J	VOLUME SURFACTANT TO PUT INTO TANK = (E/100) x I =		PINTS SURFACTANT TO PUT INTO TANK
	CONVERT TO GALLONS = J/8 =		GALLONS SURFACTANT TO PUT INTO TANK
CROP OIL (BREWER 83-17)			
K	LABEL RATE =		GALLONS PER 100 GALLONS SPRAY
L	VOLUME CROP OIL TO PUT INTO TANK = (E/100) x K =		GALLONS CROP OIL TO PUT INTO TANK
DYE (HI-LIGHT BLUE LIQUID)			
M	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
N	VOLUME BLUE DYE TO PUT INTO TANK = (E/100) x M =		OUNCES BLUE DYE TO PUT INTO TANK
	CONVERT TO GALLONS = N/128 =		GALLONS BLUE DYE TO PUT INTO TANK
ANTI-DRIFT (POLY CONTROL 2)			
O	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
P	VOLUME ANTI-DRIFT TO PUT INTO TANK = (E/100) x O =		OUNCES ANTI-DRIFT TO PUT INTO TANK
	CONVERT TO GALLONS = P/128 =		GALLONS ANTI-DRIFT TO PUT INTO TANK
ANTI-FOAM (BREWER DEFOAMER)			
Q	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
R	VOLUME ANTI-FOAM TO PUT INTO TANK = (E/100) x Q=		OUNCES ANTI-FOAM TO PUT INTO TANK
	CONVERT TO GALLONS = R/128 =		GALLONS ANTI-FOAM TO PUT INTO TANK
WATER (REMAINING VOLUME TO PUT INTO TANK)			
S	= E-F-H-J-L-N-P-R =		GALLONS WATER TO PUT INTO TANK

SPRAY PREPARATION FORM: CONVENTIONAL UNIT BOOMLESS – Broadcast Application			
DATE:		ORG UNIT:	
DISTRICT: 1 2 3 4 5 6 7		COUNTY:	
EQUIP ID:		OPERATOR:	
WORK DESCRIPTION: 100-TOTAL VEG CONTROL 200-BRUSH 300-TREES 400-BROADLEAF WEEDS 500-GRASSY WEEDS 600-TURF			
TOTAL SPRAY SOLUTION			
A	FULL TANK VOLUME CAPACITY =		GALLONS PER FULL TANK
B	SPRAY VOLUME OUTPUT = (OPERATING PRESSURE = psi)		GALLONS PER ACRE, GPA or GA/AC (insert value "I" from calibration worksheet)
C	MAXIMUM ACRES PER TANK = A/B =		ACRES PER FULL TANK
D	TARGET ACRES TO SPRAY TODAY =		ACRES
E	SPRAY VOLUME TO PREPARE TODAY = (D/C) x A =		GALLONS TOTAL SPRAY SOLUTION TO PREPARE FOR TODAY'S APPLICATION
WATER (PUT ½ TOTAL WATER VOLUME NEEDED IN THE TANK INITIALLY)			
F	= E x 0.5 =		GALLONS WATER TO PUT INTO TANK INITIALLY
HERBICIDE			
G	BRAND NAME = _____		EPA Reg No _____ Lot No _____
	Maximum Label Rate= _____		INDICATE UNIT AND AREA
	Application Rate =		
H	Application Rate, GALLONS PER ACRE =		GALLONS PER ACRE
I	HERBICIDE AMOUNT TO PUT INTO TANK = D x H =		GALLONS HERBICIDE TO PUT INTO TANK
SURFACTANT (BREWER 90-10)			
J	LABEL RATE =		PINTS PER 100 GALLONS SPRAY
K	VOLUME SURFACTANT TO PUT INTO TANK = (E/100) x J =		PINTS SURFACTANT TO PUT INTO TANK
	CONVERT TO GALLONS = K/8 =		GALLONS SURFACTANT TO PUT INTO TANK
CROP OIL (BREWER 83-17)			
L	LABEL RATE =		GALLONS PER 100 GALLONS SPRAY
M	VOLUME CROP OIL TO PUT INTO TANK = (E/100) x L =		GALLONS CROP OIL TO PUT INTO TANK
DYE (HI-LIGHT BLUE LIQUID)			
N	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
O	VOLUME BLUE DYE TO PUT INTO TANK = (E/100) x N =		OUNCES BLUE DYE TO PUT INTO TANK
	CONVERT TO GALLONS = O/128 =		GALLONS BLUE DYE TO PUT INTO TANK
ANTI-DRIFT (POLY CONTROL 2)			
P	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
Q	VOLUME ANTI-DRIFT TO PUT INTO TANK = (E/100) x P =		OUNCES ANTI-DRIFT TO PUT INTO TANK
	CONVERT TO GALLONS = Q/128 =		GALLONS ANTI-DRIFT TO PUT INTO TANK
ANTI-FOAM (BREWER DEFOAMER)			
R	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
S	VOLUME ANTI-FOAM TO PUT INTO TANK = (E/100) x R =		OUNCES ANTI-FOAM TO PUT INTO TANK
	CONVERT TO GALLONS = S/128 =		GALLONS ANTI-FOAM TO PUT INTO TANK
WATER (REMAINING VOLUME TO PUT INTO TANK)			
T	= E-F-I-K-M-O-Q-S =		GALLONS WATER TO PUT INTO TANK

SPRAY PREPARATION FORM: CONVENTIONAL UNIT BOOMLESS – Spot Application			
DATE:		ORG UNIT:	
DISTRICT: 1 2 3 4 5 6 7		COUNTY:	
EQUIP ID:		OPERATOR:	
WORK DESCRIPTION: 100-TOTAL VEG CONTROL 200-BRUSH 300-TREES 400-BROADLEAF WEEDS 500-GRASSY WEEDS 600-TURF			
TOTAL SPRAY SOLUTION			
A	FULL TANK VOLUME CAPACITY =		GALLONS PER FULL TANK
B	SPRAY VOLUME OUTPUT = (OPERATING PRESSURE = psi)		GALLONS PER ACRE, GPA or GA/AC (insert value "E" from calibration worksheet)
C	MAXIMUM ACRES PER TANK = A/B =		ACRES PER FULL TANK
D	TARGET ACRES TO SPRAY TODAY =		ACRES
E	SPRAY VOLUME TO PREPARE TODAY = (D/C) x A =		GALLONS TOTAL SPRAY SOLUTION TO PREPARE FOR TODAY'S APPLICATION
WATER (PUT ½ TOTAL WATER VOLUME NEEDED IN THE TANK INITIALLY)			
F	= E x 0.5 =		GALLONS WATER TO PUT INTO TANK INITIALLY
HERBICIDE			
G	BRAND NAME= _____		EPA Reg No _____ Lot No _____
	Maximum Label Rate= _____ Application Rate =		PERCENT (%) SOLUTION
H	HERBICIDE AMOUNT TO PUT INTO TANK = E x (G/100) =		GALLONS HERBICIDE TO PUT INTO TANK
SURFACTANT (BREWER 90-10)			
I	LABEL RATE =		PINTS PER 100 GALLONS SPRAY
J	VOLUME SURFACTANT TO PUT INTO TANK = (E/100) x I =		PINTS SURFACTANT TO PUT INTO TANK
	CONVERT TO GALLONS = J/8 =		GALLONS SURFACTANT TO PUT INTO TANK
CROP OIL (BREWER 83-17)			
K	LABEL RATE =		GALLONS PER 100 GALLONS SPRAY
L	VOLUME CROP OIL TO PUT INTO TANK = (E/100) x K =		GALLONS CROP OIL TO PUT INTO TANK
DYE (HI-LIGHT BLUE LIQUID)			
M	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
N	VOLUME BLUE DYE TO PUT INTO TANK = (E/100) x M =		OUNCES BLUE DYE TO PUT INTO TANK
	CONVERT TO GALLONS = N/128 =		GALLONS BLUE DYE TO PUT INTO TANK
ANTI-DRIFT (POLY CONTROL 2)			
O	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
P	VOLUME ANTI-DRIFT TO PUT INTO TANK = (E/100) x O =		OUNCES ANTI-DRIFT TO PUT INTO TANK
	CONVERT TO GALLONS = P/128 =		GALLONS ANTI-DRIFT TO PUT INTO TANK
ANTI-FOAM (BREWER DEFOAMER)			
Q	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
R	VOLUME ANTI-FOAM TO PUT INTO TANK = (E/100) x Q =		OUNCES ANTI-FOAM TO PUT INTO TANK
	CONVERT TO GALLONS = R/128 =		GALLONS ANTI-FOAM TO PUT INTO TANK
WATER (REMAINING VOLUME TO PUT INTO TANK)			
S	= E-F-H-J-L-N-P-R =		GALLONS WATER TO PUT INTO TANK

SPRAY PREPARATION FORM: CONVENTIONAL UNIT-BOOM – Broadcast Application			
DATE:		ORG UNIT:	
DISTRICT: 1 2 3 4 5 6 7		COUNTY:	
EQUIP ID:		OPERATOR:	
WORK DESCRIPTION: 100-TOTAL VEG CONTROL 200-BRUSH 300-TREES 400-BROADLEAF WEEDS 500-GRASSY WEEDS 600-TURF			
TOTAL SPRAY SOLUTION			
A	FULL TANK VOLUME CAPACITY =		GALLONS PER FULL TANK
B	SPRAY VOLUME OUTPUT = (OPERATING PRESSURE = psi)		GALLONS PER ACRE, GPA or GA/AC (insert value "E" from calibration worksheet)
C	MAXIMUM ACRES PER TANK = A/B =		ACRES PER FULL TANK
D	TARGET ACRES TO SPRAY TODAY =		ACRES
E	SPRAY VOLUME TO PREPARE TODAY = (D/C) x A =		GALLONS TOTAL SPRAY SOLUTION TO PREPARE FOR TODAY'S APPLICATION
WATER (PUT ½ TOTAL WATER VOLUME NEEDED IN THE TANK INITIALLY)			
F	= E x 0.5 =		GALLONS WATER TO PUT INTO TANK INITIALLY
HERBICIDE			
G	BRAND NAME = _____ Maximum Label Rate= _____ Application Rate = _____		EPA Reg No _____ Lot No _____ INDICATE UNIT AND AREA
H	Application Rate, GALLONS PER ACRE =		GALLONS PER ACRE
I	HERBICIDE AMOUNT TO PUT INTO TANK = D x H =		GALLONS HERBICIDE TO PUT INTO TANK
SURFACTANT (BREWER 90-10)			
J	LABEL RATE =		PINTS PER 100 GALLONS SPRAY
K	VOLUME SURFACTANT TO PUT INTO TANK = (E/100) x J =		PINTS SURFACTANT TO PUT INTO TANK
	CONVERT TO GALLONS = K/8 =		GALLONS SURFACTANT TO PUT INTO TANK
CROP OIL (BREWER 83-17)			
L	LABEL RATE =		GALLONS PER 100 GALLONS SPRAY
M	VOLUME CROP OIL TO PUT INTO TANK = (E/100) x L =		GALLONS CROP OIL TO PUT INTO TANK
DYE (HI-LIGHT BLUE LIQUID)			
N	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
O	VOLUME BLUE DYE TO PUT INTO TANK = (E/100) x N =		OUNCES BLUE DYE TO PUT INTO TANK
	CONVERT TO GALLONS = O/128 =		GALLONS BLUE DYE TO PUT INTO TANK
ANTI-DRIFT (POLY CONTROL 2)			
P	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
Q	VOLUME ANTI-DRIFT TO PUT INTO TANK = (E/100) x P =		OUNCES ANTI-DRIFT TO PUT INTO TANK
	CONVERT TO GALLONS = Q/128 =		GALLONS ANTI-DRIFT TO PUT INTO TANK
ANTI-FOAM (BREWER DEFOAMER)			
R	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
S	VOLUME ANTI-FOAM TO PUT INTO TANK = (E/100) x R =		OUNCES ANTI-FOAM TO PUT INTO TANK
	CONVERT TO GALLONS = S/128 =		GALLONS ANTI-FOAM TO PUT INTO TANK
WATER (REMAINING VOLUME TO PUT INTO TANK)			
T	= E-F-I-K-M-O-Q-S =		GALLONS WATER TO PUT INTO TANK

SPRAY PREPARATION FORM: CONVENTIONAL UNIT-BOOM – Spot Application			
DATE:		ORG UNIT:	
DISTRICT: 1 2 3 4 5 6 7		COUNTY:	
EQUIP ID:		OPERATOR:	
WORK DESCRIPTION: 100-TOTAL VEG CONTROL 200-BRUSH 300-TREES 400-BROADLEAF WEEDS 500-GRASSY WEEDS 600-TURF			
TOTAL SPRAY SOLUTION			
A	FULL TANK VOLUME CAPACITY =		GALLONS PER FULL TANK
B	SPRAY VOLUME OUTPUT = (OPERATING PRESSURE = psi)		GALLONS PER ACRE, GPA or GA/AC (insert value "E" from calibration worksheet)
C	MAXIMUM ACRES PER TANK = A/B =		ACRES PER FULL TANK
D	TARGET ACRES TO SPRAY TODAY =		ACRES
E	SPRAY VOLUME TO PREPARE TODAY = (D/C) x A =		GALLONS TOTAL SPRAY SOLUTION TO PREPARE FOR TODAY'S APPLICATION
WATER (PUT ½ TOTAL WATER VOLUME NEEDED IN THE TANK INITIALLY)			
F	= E x 0.5 =		GALLONS WATER TO PUT INTO TANK INITIALLY
HERBICIDE			
G	BRAND NAME = _____		EPA Reg No _____ Lot No _____
	Maximum Label Rate= _____ Application Rate =		PERCENT (%) SOLUTION
H	HERBICIDE AMOUNT TO PUT INTO TANK = E x (G/100) =		GALLONS HERBICIDE TO PUT INTO TANK
SURFACTANT (BREWER 90-10)			
I	LABEL RATE =		PINTS PER 100 GALLONS SPRAY
J	VOLUME SURFACTANT TO PUT INTO TANK = (E/100) x I =		PINTS SURFACTANT TO PUT INTO TANK
	CONVERT TO GALLONS = J/8 =		GALLONS SURFACTANT TO PUT INTO TANK
CROP OIL (BREWER 83-17)			
K	LABEL RATE =		GALLONS PER 100 GALLONS SPRAY
L	VOLUME CROP OIL TO PUT INTO TANK = (E/100) x K =		GALLONS CROP OIL TO PUT INTO TANK
DYE (HI-LIGHT BLUE LIQUID)			
M	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
N	VOLUME BLUE DYE TO PUT INTO TANK = (E/100) x M =		OUNCES BLUE DYE TO PUT INTO TANK
	CONVERT TO GALLONS = N/128 =		GALLONS BLUE DYE TO PUT INTO TANK
ANTI-DRIFT (POLY CONTROL 2)			
O	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
P	VOLUME ANTI-DRIFT TO PUT INTO TANK = (E/100) x O =		OUNCES ANTI-DRIFT TO PUT INTO TANK
	CONVERT TO GALLONS = P/128 =		GALLONS ANTI-DRIFT TO PUT INTO TANK
ANTI-FOAM (BREWER DEFOAMER)			
Q	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
R	VOLUME ANTI-FOAM TO PUT INTO TANK = (E/100) x Q =		OUNCES ANTI-FOAM TO PUT INTO TANK
	CONVERT TO GALLONS = R/128 =		GALLONS ANTI-FOAM TO PUT INTO TANK
WATER (REMAINING VOLUME TO PUT INTO TANK)			
S	= E-F-H-J-L-N-P-R =		GALLONS WATER TO PUT INTO TANK

SPRAY PREPARATION FORM: INJECTION UNIT – Broadcast Application			
DATE:		ORG UNIT:	
DISTRICT: 1 2 3 4 5 6 7		COUNTY:	
EQUIP ID:		OPERATOR:	
WORK DESCRIPTION: 100-TOTAL VEG CONTROL 200-BRUSH 300-TREES 400-BROADLEAF WEEDS 500-GRASSY WEEDS 600-TURF			
TOTAL SPRAY SOLUTION			
A	FULL TANK VOLUME CAPACITY =		GALLONS PER FULL CARRIER (WATER) TANK
B	SPRAY VOLUME OUTPUT = (OPERATING PRESSURE = psi)		GALLONS PER ACRE, GPA or GA/AC (insert value "E" from calibration worksheet)
C	MAXIMUM ACRES PER TANK = A/B =		ACRES PER FULL CARRIER TANK
D	TARGET ACRES TO SPRAY TODAY =		ACRES
E	SPRAY VOLUME TO PREPARE TODAY = (D/C) x A =		GALLONS TOTAL SPRAY SOLUTION TO PREPARE FOR TODAY'S APPLICATION
WATER (PUT ½ TOTAL WATER VOLUME NEEDED IN THE TANK INITIALLY)			
F	= E x 0.5 =		GALLONS WATER TO PUT INTO CARRIER TANK INITIALLY
HERBICIDE			
G	BRAND NAME = _____		EPA Reg No _____ Lot No _____
	Maximum Label Rate= _____ Application Rate =		INDICATE UNIT AND AREA
H	Application Rate, GALLONS PER ACRE =		GALLONS PER ACRE
I	HERBICIDE AMOUNT TO PUT INTO TANK = D x H =		GALLONS HERBICIDE TO PUT INTO CHEMICAL TANK
SURFACTANT (BREWER 90-10)			
J	LABEL RATE =		PINTS PER 100 GALLONS SPRAY
K	VOLUME SURFACTANT TO PUT INTO TANK = (E/100) x J =		PINTS SURFACTANT TO PUT INTO CARRIER TANK
	CONVERT TO GALLONS = K/8 =		GALLONS SURFACTANT TO PUT INTO CARRIER TANK
CROP OIL (BREWER 83-17)			
L	LABEL RATE =		GALLONS PER 100 GALLONS SPRAY
M	VOLUME CROP OIL TO PUT INTO TANK = (E/100) x L =		GALLONS CROP OIL TO PUT INTO CARRIER TANK
DYE (HI-LIGHT BLUE LIQUID)			
N	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
O	VOLUME BLUE DYE TO PUT INTO TANK = (E/100) x N =		OUNCES BLUE DYE TO PUT INTO CARRIER TANK
	CONVERT TO GALLONS = O/128 =		GALLONS BLUE DYE TO PUT INTO CARRIER TANK
ANTI-DRIFT (POLY CONTROL 2)			
P	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
Q	VOLUME ANTI-DRIFT TO PUT INTO TANK = (E/100) x P =		OUNCES ANTI-DRIFT TO PUT INTO CARRIER TANK
	CONVERT TO GALLONS = Q/128 =		GALLONS ANTI-DRIFT TO PUT INTO CARRIER TANK
ANTI-FOAM (BREWER DEFOAMER)			
R	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
S	VOLUME ANTI-FOAM TO PUT INTO TANK = (E/100) x R =		OUNCES ANTI-FOAM TO PUT INTO CARRIER TANK
	CONVERT TO GALLONS = S/128 =		GALLONS ANTI-FOAM TO PUT INTO CARRIER TANK
WATER (REMAINING VOLUME TO PUT INTO TANK)			
T	= E-F-I-K-M-O-Q-S =		GALLONS WATER TO PUT INTO CARRIER TANK

SPRAY PREPARATION FORM: INJECTION UNIT – Spot Application			
DATE:		ORG UNIT:	
DISTRICT: 1 2 3 4 5 6 7		COUNTY:	
EQUIP ID:		OPERATOR:	
WORK DESCRIPTION: 100-TOTAL VEG CONTROL 200-BRUSH 300-TREES 400-BROADLEAF WEEDS 500-GRASSY WEEDS 600-TURF			
TOTAL SPRAY SOLUTION			
A	FULL TANK VOLUME CAPACITY =		GALLONS PER FULL CARRIER (WATER) TANK
B	SPRAY VOLUME OUTPUT = (OPERATING PRESSURE = psi)		GALLONS PER ACRE, GPA or GA/AC (insert value "E" from calibration worksheet)
C	MAXIMUM ACRES PER TANK = A/B =		ACRES PER FULL CARRIER TANK
D	TARGET ACRES TO SPRAY TODAY =		ACRES
E	SPRAY VOLUME TO PREPARE TODAY = (D/C) x A =		GALLONS TOTAL SPRAY SOLUTION TO PREPARE FOR TODAY'S APPLICATION
WATER (PUT ½ TOTAL WATER VOLUME NEEDED IN THE TANK INITIALLY)			
F	= E x 0.5 =		GALLONS WATER TO PUT INTO CARRIER TANK INITIALLY
HERBICIDE			
G	BRAND NAME = _____		EPA Reg No _____ Lot No _____
	Maximum Label Rate= _____ Application Rate =		PERCENT (%) SOLUTION
H	HERBICIDE AMOUNT TO PUT INTO TANK = E x (G/100) =		GALLONS HERBICIDE TO PUT INTO CHEMICAL TANK
SURFACTANT (BREWER 90-10)			
I	LABEL RATE =		PINTS PER 100 GALLONS SPRAY
J	VOLUME SURFACTANT TO PUT INTO TANK = (E/100) x I =		PINTS SURFACTANT TO PUT INTO CARRIER TANK
	CONVERT TO GALLONS = J/8 =		GALLONS SURFACTANT TO PUT INTO CARRIER TANK
CROP OIL (BREWER 83-17)			
K	LABEL RATE =		GALLONS PER 100 GALLONS SPRAY
L	VOLUME CROP OIL TO PUT INTO TANK = (E/100) x K =		GALLONS CROP OIL TO PUT INTO CARRIER TANK
DYE (HI-LIGHT BLUE LIQUID)			
M	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
N	VOLUME BLUE DYE TO PUT INTO TANK = (E/100) x M =		OUNCES BLUE DYE TO PUT INTO CARRIER TANK
	CONVERT TO GALLONS = N/128 =		GALLONS BLUE DYE TO PUT INTO CARRIER TANK
ANTI-DRIFT (POLY CONTROL 2)			
O	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
P	VOLUME ANTI-DRIFT TO PUT INTO TANK = (E/100) x O =		OUNCES ANTI-DRIFT TO PUT INTO CARRIER TANK
	CONVERT TO GALLONS = P/128 =		GALLONS ANTI-DRIFT TO PUT INTO CARRIER TANK
ANTI-FOAM (BREWER DEFOAMER)			
Q	LABEL RATE =		OUNCES PER 100 GALLONS SPRAY
R	VOLUME ANTI-FOAM TO PUT INTO TANK = (E/100) x Q=		OUNCES ANTI-FOAM TO PUT INTO CARRIER TANK
	CONVERT TO GALLONS = R/128 =		GALLONS ANTI-FOAM TO PUT INTO CARRIER TANK
WATER (REMAINING VOLUME TO PUT INTO TANK)			
S	= E-F-H-J-L-N-P-R =		GALLONS WATER TO PUT INTO CARRIER TANK

7. APPLICATION (DURING)

7.1: INSTRUCTIONS/CHECKLIST

- ☐ Carry your Pesticide Applicator License
- ☐ Carry a list of Emergency Phone Numbers (See Section 1)
- ☐ Carry a copy of the label and SDS for every product that is being applied
- ☐ Wear PPE as stated in the label.
- ☐ Set up appropriate Work Zone Traffic Control (See Section 7.2)
- ☐ Follow the pre-application plan. Only apply to locations that have been surveyed/scouted beforehand.
- ☐ Do NOT apply to areas identified as “DO NOT SPRAY AREAS” (See Section 6.1)
- ☐ Do NOT overlap spray.
- ☐ **Monitor wind speed frequently.** Record each time the route changes.
- ☐ Stop spraying anytime conditions are unfavorable.
- ☐ Stop spraying anytime equipment malfunctions.
- ☐ Stay aware of surroundings.

7.2: WORK ZONE TRAFFIC CONTROL

Work Zone Traffic Control information is cited from the *SCDOT Vegetation Management Guidelines*. In cases of conflict due to updates or changes, the *SCDOT Vegetation Management Guidelines* supersede language stated in the *SCDOT Herbicide Operations Manual*.

All Work Zone Traffic Control shall be in place daily before any work commences. All Work Zone Traffic Control devices shall be promptly removed daily when work is complete. Work Zone Traffic Control shall comply with the latest editions of the following documents:

- *Manual on Uniform Traffic Control Devices (MUTCD)*:
http://mutcd.fhwa.dot.gov/kno_2009.htm
- *SCDOT Standard Specifications for Highway Construction*:
<https://www.scdot.org/business/standard-specifications.aspx>
- Approved Products List for Traffic Control Devices in Work Zones:
<https://www.scdot.org/business/traffic-control-devices.aspx>
- Applicable SCDOT Traffic Control Standard Drawings
<https://www.scdot.org/business/standard-drawings.aspx>
- Engineering Directive No. 32 – Hourly Restrictions for Lane Closures on Interstates and Primary Routes (For areas where dual lines of cable guardrail are in place on the interstate requiring the work be conducted under lane closures:
<https://www.scdot.org/business/workzone-traffic-control.aspx>

Work shall be planned and carried out to minimize inconvenience to the traveling public and adjacent landowners. All work zone traffic control devices, except for Category IV devices, shall comply with the requirements of the National Cooperative Highway Research Program Report 350 (NCHRP Report 350). Only traffic control devices listed on the “*Approved Products List For Traffic Control Devices In Work Zones*” are acceptable. This list also includes the implementation dates and any special conditions or restrictions for each device.

Flagmen, warning signs, barricades, and/or other suitable protective devices shall be placed not less than five hundred feet in each direction from the work site while loading or unloading materials or equipment.

All signs mounted on portable sign supports shall have a minimum mounting height of five feet from the ground (i.e., soil surface) to the bottom of the sign. Signs shall be reasonably clean and clearly legible. Faded/deteriorated/illegible signs are not acceptable.

A standard Slow Moving Vehicle (SMV) emblem shall be mounted on the rear of all slow-moving equipment/vehicles. Equipment/vehicles shall conform to the prevailing OSHA standards.

Equipment/vehicles shall adhere to the following ***SCDOT Warning Light Standards***:

Purpose:

1. Allow drivers to perceive the presence of people, vehicles, and/or equipment alongside the roadway without dominating driver attention.
2. Establish uniform lighting configurations that are easily recognized as roadside construction and maintenance activities.
3. Accomplish the above with reliable, maintainable, quality, and cost-effective components and technologies.

Requirements:

1. All warning lights used during construction and/or maintenance activities shall be SAE Class 1 lighting.
2. Lighting shall provide 360 degree visibility and be clearly visible at distances ranging from no less than 1/3 mile to as much as 1 mile.
3. Lighting flash pattern shall be a quad flash alternating left-right pattern (wig-wag). This pattern introduces an animation effect to the warning lights which helps a driver notice the warning lights earlier than a non-animated flash pattern.

Approved Lighting:

1. Full Length Bar - Federal Signal LPX45DS or equal
2. Mini Bar - Federal Signal 454201HL-02 or equal
3. Beacon - STAR 257H8TAL-A LED or equal

At a minimum, workers shall wear a class II safety vest in accordance with the Federal Highway Administration (FHWA) Worker Visibility Rule. All high-visibility safety apparel is required to have an orange-red background. Faded/deteriorated vests are not acceptable.

8. POST-APPLICATION (AFTER)

8.1: INSTRUCTIONS/CHECKLIST

- ☐ Wash hands, arms and face.
- ☐ Inspect, clean, and empty equipment.
- ☐ Do NOT leave/store herbicides in equipment. Store herbicides in designated, secure storage area.
- ☐ Complete the appropriate **Herbicide Application Report Form** for each application. (See Section 8.2)
- ☐ Monitor the site/treatment area periodically to evaluate the effectiveness of the application and to verify no off-target impacts.

8.2: APPLICATION REPORT FORMS

Following are the Herbicide Application Report Forms. A form is available for each respective work description. Complete all items on the form for each application. Transfer the Herbicide Application Report data into the HMMS (Highway Maintenance Management System) Daily Work Report module. Herbicide Application Reports must be kept for at least two years.

HERBICIDE APPLICATION REPORT – WD 100 TOTAL VEGETATION CONTROL													
OrgUnit:		Approved Months for Application											Date:
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	
Activity: 402 - HERBICIDE APPLICATION					Work Description: 100 – TOTAL VEGETATION CONTROL, Perennials					Work County:			
Proj#		Asset Group			Asset			Special Event					
Type	Route	Aux	BMP	EMP	Length	Direct	Pos	AccpUnit (Ac)	TIME	TEMP	WS		
LABOR													
OrgUnit		Employee #		Employee Name						Hrs Worked			
EQUIPMENT													
OrgUnit				Equipment		Equipment Description				Hours			
MATERIAL													
OrgUnit		Material Code		Material Description				(Total) Quantity Applied			UOM		
				Herbicide Common Name: Glyphosate Brand Name: Manufacturer: EPA Reg. No.: Lot No.:									
		N/A		Carrier: Water									
				Surfactant:									
				Dye (OPTIONAL):									
				Anti-Drift:									
				Anti-Foam (OPTIONAL):									
COMMENTS													
SPRAY HEIGHT = _____ feet													
Time (AM/PM):		Temperature (°F):		Weather: Sunny Cloudy Pt. Cloudy Clear		Wind Speed (mph): (must be ≤ 7 mph)		Method: Broadcast Spot		Calibration Date (MM/DD/YY):		Spray Width (ft):	
Operating Pressure (psi):		Operating Speed (mph):		Herbicide Rate Amt/acre: _____ % Solution: _____					Spray Output (gpa): (from calibration)				
NAME				SIGNATURE				LICENSE NO.					

HERBICIDE APPLICATION REPORT – WD 200 BRUSH, BASAL BARK (Triclopyr Ester 20% Blend)														
OrgUnit:		Approved Months for Application											Date:	
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Activity: 402 - HERBICIDE APPLICATION					Work Description: 200 – BRUSH, Basal Bark					Work County:				
Proj#		Asset Group			Asset			Special Event						
Type	Route	Aux	BMP	EMP	Length	Direct	Pos	AccpUnit (Ac)	TIME	TEMP	WS			
LABOR														
OrgUnit		Employee #		Employee Name						Hrs Worked				
EQUIPMENT														
OrgUnit				Equipment		Equipment Description					Hours			
MATERIAL														
OrgUnit		Material Code		Material Description				(Total) Quantity Applied			UOM			
				Herbicide Common Name: Triclopyr Ester Blend Brand Name: Manufacturer: EPA Reg. No.: Lot No:										
COMMENTS														
SPRAY HEIGHT = _____ feet														
Time (AM/PM):		Temperature (°F):		Weather: Sunny Cloudy Pt. Cloudy Clear		Wind Speed (mph): (must be ≤ 7 mph)		Method: Spot		Calibration Date (MM/DD/YY):		Spray Width (ft): N/A		
Operating Pressure (psi):		Operating Speed (mph): N/A		Herbicide Rate (% solution): 20% solution				Spray Output (gpa): (from calibration)						
NAME				SIGNATURE						LICENSE NO.				

HERBICIDE APPLICATION REPORT – WD 200 BRUSH, FOLIAR AQUATIC (Triclopyr Amine)													
OrgUnit:		Approved Months for Application										Date:	
						May	Jun	Jul	Aug	Sep	Oct	Nov	
Activity: 402 - HERBICIDE APPLICATION					Work Description: 200 – BRUSH, Foliar AQUATIC					Work County:			
Proj#		Asset Group			Asset			Special Event					
Type	Route	Aux	BMP	EMP	Length	Direct	Pos	AccpUnit (Ac)	TIME	TEMP	WS		
LABOR													
OrgUnit		Employee #		Employee Name						Hrs Worked			
EQUIPMENT													
OrgUnit				Equipment		Equipment Description				Hours			
MATERIAL													
OrgUnit		Material Code		Material Description				(Total) Quantity Applied		UOM			
				Herbicide Common Name: Triclopyr Amine (TEA) Brand Name: Manufacturer: EPA Reg No.: LOT NO.:									
		N/A		Carrier: Water									
				Surfactant:									
				Dye (OPTIONAL):									
				Anti-Drift:									
				Anti-Foam (OPTIONAL):									
COMMENTS													
SPRAY HEIGHT = _____ feet													
Time (AM/PM):		Temperature (°F):		Weather: Sunny Cloudy Pt. Cloudy Clear		Wind Speed (mph): (must be ≤ 7 mph)		Method: Broadcast		Calibration Date (MM/DD/YY):		Spray Width (ft):	
Operating Pressure (psi):		Operating Speed (mph):		Herbicide Rate Amt/acre: _____				Spray Output (gpa): (from calibration)					
NAME				SIGNATURE					LICENSE NO.				

HERBICIDE APPLICATION REPORT – WD 200 BRUSH, FOLIAR (Fosamine)													
OrgUnit:		Approved Months for Application										Date:	
									Aug	Sep	Oct	Nov	
Activity: 402 - HERBICIDE APPLICATION					Work Description: 200 – BRUSH, Foliar				Work County:				
Proj#		Asset Group			Asset			Special Event					
Type	Route	Aux	BMP	EMP	Length	Direct	Pos	AccpUnit (Ac)	TIME	TEMP	WS		
LABOR													
OrgUnit		Employee #		Employee Name						Hrs Worked			
EQUIPMENT													
OrgUnit				Equipment		Equipment Description				Hours			
MATERIAL													
OrgUnit		Material Code		Material Description				(Total) Quantity Applied		UOM			
				Herbicide Common Name: Fosamine Brand Name: Manufacturer: EPA Reg No.: LOT NO.:									
		N/A		Carrier: Water									
				Surfactant:									
				Dye (OPTIONAL):									
				Anti-Drift:									
				Anti-Foam (OPTIONAL):									
COMMENTS													
SPRAY HEIGHT = _____ feet													
Time (AM/PM):		Temperature (°F):		Weather: Sunny Cloudy Pt. Cloudy Clear		Wind Speed (mph): (must be ≤ 7 mph)		Method: Broadcast		Calibration Date (MM/DD/YY):		Spray Width (ft):	
Operating Pressure (psi):		Operating Speed (mph):		Herbicide Rate Amt/acre: _____				Spray Output (gpa): (from calibration)					
NAME				SIGNATURE					LICENSE NO.				

HERBICIDE APPLICATION REPORT – WD 200 BRUSH, DORMANT STEM (Triclopyr Ester)												
OrgUnit:		Approved Months for Application										Date:
		Jan	Feb	Mar								Dec
Activity: 402 - HERBICIDE APPLICATION					Work Description: 200 – BRUSH, Dormant Stem				Work County:			
Proj#		Asset Group			Asset			Special Event				
Type	Route	Aux	BMP	EMP	Length	Direct	Pos	AccpUnit (Ac)	TIME	TEMP	WS	
LABOR												
OrgUnit		Employee #		Employee Name						Hrs Worked		
EQUIPMENT												
OrgUnit				Equipment		Equipment Description				Hours		
MATERIAL												
OrgUnit		Material Code		Material Description				(Total) Quantity Applied		UOM		
				Herbicide Common Name: Triclopyr Ester (BEE) Brand Name: Manufacturer: EPA Reg No: LOT NO.:								
		N/A		Carrier: Water								
				Crop Oil:								
				Dye (OPTIONAL):								
				Anti-Drift:								
				Anti-Foam (OPTIONAL):								
COMMENTS												
SPRAY HEIGHT = _____ feet												
Time (AM/PM):		Temperature (°F):		Weather: Sunny Cloudy Pt. Cloudy Clear		Wind Speed (mph): (must be ≤ 7 mph)		Method: Broadcast		Calibration Date (MM/DD/YY):		Spray Width (ft):
Operating Pressure (psi):		Operating Speed (mph):		Herbicide Rate Amt/acre: _____				Spray Output (gpa): (from calibration)				
NAME				SIGNATURE					LICENSE NO.			

HERBICIDE APPLICATION REPORT – WD 200 BRUSH, KUDZU (Aminopyralid)													
OrgUnit:		Approved Months for Application										Date:	
							Jun	Jul	Aug	Sep	Oct		
Activity: 402 - HERBICIDE APPLICATION					Work Description: 200 – BRUSH, Kudzu					Work County:			
Proj#		Asset Group			Asset			Special Event					
Type	Route	Aux	BMP	EMP	Length	Direct	Pos	AccpUnit (Ac)	TIME	TEMP	WS		
LABOR													
OrgUnit		Employee #		Employee Name						Hrs Worked			
EQUIPMENT													
OrgUnit				Equipment		Equipment Description					Hours		
MATERIAL													
OrgUnit		Material Code		Material Description				(Total) Quantity Applied			UOM		
				Herbicide Common Name: Aminopyralid Brand Name: Manufacturer: EPA Reg No.: LOT NO.:									
		N/A		Carrier: Water									
				Surfactant:									
				Dye (OPTIONAL):									
				Anti-Drift:									
				Anti-Foam (OPTIONAL):									
COMMENTS													
SPRAY HEIGHT = _____ feet													
Time (AM/PM):		Temperature (°F):		Weather: Sunny Cloudy Pt. Cloudy Clear		Wind Speed (mph): (must be ≤ 7 mph)		Method: Broadcast		Calibration Date (MM/DD/YY):		Spray Width (ft):	
Operating Pressure (psi):		Operating Speed (mph):		Herbicide Rate Amt/acre: _____					Spray Output (gpa): (from calibration)				
NAME				SIGNATURE					LICENSE NO.				

HERBICIDE APPLICATION REPORT – WD 300 TREES, CUT STUMP (Triclopyr Ester Blend)													
OrgUnit:		Approved Months for Application										Date:	
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Activity: 402 - HERBICIDE APPLICATION					Work Description: 300 – TREES, Cut Stump					Work County:			
Proj#		Asset Group			Asset			Special Event					
Type	Route	Aux	BMP	EMP	Length	Direct	Pos	AccpUnit (Ac)	TIME	TEMP	WS		
LABOR													
OrgUnit		Employee #		Employee Name						Hrs Worked			
EQUIPMENT													
OrgUnit				Equipment		Equipment Description					Hours		
MATERIAL													
OrgUnit		Material Code		Material Description				(Total) Quantity Applied			UOM		
				Herbicide Common Name: Triclopyr Ester Blend Brand Name: Manufacturer: EPA Reg No.: LOT NO.:									
COMMENTS													
SPRAY HEIGHT = _____ feet													
Time (AM/PM):		Temperature (°F):		Weather: Sunny Cloudy Pt. Cloudy Clear		Wind Speed (mph): (must be ≤ 7 mph)		Method: Spot		Calibration Date (MM/DD/YY):		Spray Width (ft): N/A	
Operating Pressure (psi):		Operating Speed (mph): N/A		Herbicide Rate 20% solution					Spray Output (gpa): (from calibration)				
NAME				SIGNATURE					LICENSE NO.				

HERBICIDE APPLICATION REPORT – WD 300 TREES, LIMB TRIM-FOLIAR AQUATIC (Triclopyr Amine)													
OrgUnit:		Approved Months for Application										Date:	
						May	Jun	Jul	Aug	Sep	Oct	Nov	
Activity: 402 - HERBICIDE APPLICATION					Work Description: 300 – TREES, Limb Trimming- Foliar					Work County:			
Proj#		Asset Group			Asset			Special Event					
Type	Route	Aux	BMP	EMP	Length	Direct	Pos	AccpUnit (Ac)	TIME	TEMP	WS		
LABOR													
OrgUnit		Employee #		Employee Name							Hrs Worked		
EQUIPMENT													
OrgUnit				Equipment		Equipment Description					Hours		
MATERIAL													
OrgUnit		Material Code		Material Description				(Total) Quantity Applied			UOM		
				Herbicide Common Name: Triclopyr Amine (TEA) Brand Name: Manufacturer: EPA Reg No.: LOT NO.:									
		N/A		Carrier: Water									
				Surfactant:									
				Dye (OPTIONAL):									
				Anti-Drift:									
				Anti-Foam (OPTIONAL):									
COMMENTS													
SPRAY HEIGHT = _____ feet													
Time (AM/PM):		Temperature (°F):		Weather: Sunny Cloudy Pt. Cloudy Clear		Wind Speed (mph): (must be ≤ 7 mph)		Method: Broadcast		Calibration Date (MM/DD/YY):		Spray Width (ft):	
Operating Pressure (psi):		Operating Speed (mph):		Herbicide Rate Amt/acre: _____					Spray Output (gpa): (from calibration)				
NAME				SIGNATURE					LICENSE NO.				

HERBICIDE APPLICATION REPORT – WD 300 TREES, LIMB TRIM-FOLIAR (Fosamine)												
OrgUnit:		Approved Months for Application										Date:
								Aug	Sep	Oct	Nov	
Activity: 402 - HERBICIDE APPLICATION					Work Description: 300 – TREES, Limb Trimming- Foliar				Work County:			
Proj#		Asset Group			Asset			Special Event				
Type	Route	Aux	BMP	EMP	Length	Direct	Pos	AccpUnit (Ac)	TIME	TEMP	WS	
LABOR												
OrgUnit		Employee #		Employee Name						Hrs Worked		
EQUIPMENT												
OrgUnit				Equipment		Equipment Description				Hours		
MATERIAL												
OrgUnit		Material Code		Material Description				(Total) Quantity Applied			UOM	
				Herbicide Common Name: Fosamine Brand Name: Manufacturer: EPA Reg No.: LOT NO.:								
		N/A		Carrier: Water								
				Surfactant:								
				Dye (OPTIONAL):								
				Anti-Drift:								
				Anti-Foam (OPTIONAL):								
COMMENTS												
SPRAY HEIGHT = _____ feet												
Time (AM/PM):		Temperature (°F):		Weather: Sunny Cloudy Pt. Cloudy Clear		Wind Speed (mph): (must be ≤ 7 mph)		Method: Broadcast		Calibration Date (MM/DD/YY):		Spray Width (ft):
Operating Pressure (psi):		Operating Speed (mph):		Herbicide Rate Amt/acre: _____					Spray Output (gpa): (from calibration)			
NAME				SIGNATURE					LICENSE NO.			

HERBICIDE APPLICATION REPORT – WD 300 TREES, LIMB TRIM-DORMANT (Triclopyr Ester)												
OrgUnit:		Approved Months for Application										Date:
		Jan	Feb	Mar								Dec
Activity: 402 - HERBICIDE APPLICATION					Work Description: 300 – TREES, Limb Trimming- Dormant					Work County:		
Proj#		Asset Group			Asset			Special Event				
Type	Route	Aux	BMP	EMP	Length	Direct	Pos	AccpUnit (Ac)	TIME	TEMP	WS	
LABOR												
OrgUnit		Employee #		Employee Name						Hrs Worked		
EQUIPMENT												
OrgUnit				Equipment		Equipment Description				Hours		
MATERIAL												
OrgUnit		Material Code		Material Description			(Total) Quantity Applied			UOM		
				Herbicide Common Name: Triclopyr Ester Brand Name: Manufacturer: EPA Reg No.: LOT NO.:								
		N/A		Carrier: Water								
				Crop Oil:								
				Dye (OPTIONAL):								
				Anti-Drift:								
				Anti-Foam (OPTIONAL):								
COMMENTS												
SPRAY HEIGHT = _____ feet												
Time (AM/PM):		Temperature (°F):		Weather: Sunny Cloudy Pt. Cloudy Clear		Wind Speed (mph): (must be ≤ 7 mph)		Method: Broadcast		Calibration Date (MM/DD/YY):		Spray Width (ft):
Operating Pressure (psi):		Operating Speed (mph):		Herbicide Rate Amt/acre: _____					Spray Output (gpa): (from calibration)			
NAME				SIGNATURE					LICENSE NO.			

HERBICIDE APPLICATION REPORT – WD 400 BROADLEAF WEEDS (Aminopyralid)														
OrgUnit:		Approved Months for Application											Date:	
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Activity: 402 - HERBICIDE APPLICATION					Work Description: 400 – BROADLEAF WEEDS, Perennials / Thistle					Work County:				
Proj#		Asset Group			Asset			Special Event						
Type	Route	Aux	BMP	EMP	Length	Direct	Pos	AccpUnit (Ac)	TIME	TEMP	WS			
LABOR														
OrgUnit		Employee #		Employee Name							Hrs Worked			
EQUIPMENT														
OrgUnit				Equipment		Equipment Description					Hours			
MATERIAL														
OrgUnit		Material Code		Material Description				(Total) Quantity Applied			UOM			
				Herbicide Common Name: Aminopyralid Brand Name: Manufacturer: EPA Reg No.: LOT NO.:										
		N/A		Carrier: Water										
				Surfactant:										
				Dye (OPTIONAL):										
				Anti-Drift:										
				Anti-Foam (OPTIONAL):										
COMMENTS														
SPRAY HEIGHT = _____ feet														
Time (AM/PM):		Temperature (°F):		Weather: Sunny Cloudy Pt. Cloudy Clear		Wind Speed (mph): (must be ≤ 7 mph)		Method: Broadcast		Calibration Date (MM/DD/YY):		Spray Width (ft):		
Operating Pressure (psi):		Operating Speed (mph):		Herbicide Rate Amt/acre: _____					Spray Output (gpa): (from calibration)					
NAME				SIGNATURE					LICENSE NO.					

HERBICIDE APPLICATION REPORT – WD 500 GRASSY WEEDS-COGONGRASS (Glyphosate)													
OrgUnit:		Approved Months for Application										Date:	
					Apr	May	Jun	Jul	Aug	Sep	Oct		
Activity: 402 - HERBICIDE APPLICATION					Work Description: 500 – GRASSY WEEDS, Cogongrass					Work County:			
Proj#		Asset Group			Asset			Special Event					
Type	Route	Aux	BMP	EMP	Length	Direct	Pos	AccpUnit (Ac)	TIME	TEMP	WS		
LABOR													
OrgUnit		Employee #		Employee Name							Hrs Worked		
EQUIPMENT													
OrgUnit				Equipment		Equipment Description					Hours		
MATERIAL													
OrgUnit		Material Code		Material Description				(Total) Quantity Applied			UOM		
				Herbicide Common Name: Glyphosate Brand Name: Manufacturer: EPA Reg.No.: LOT NO.:									
		N/A		Carrier: Water									
				Surfactant:									
				Dye (OPTIONAL):									
				Anti-Drift:									
				Anti-Foam (OPTIONAL):									
COMMENTS													
SPRAY HEIGHT = _____ feet													
Time (AM/PM):		Temperature (°F):		Weather: Sunny Cloudy Pt. Cloudy Clear		Wind Speed (mph): (must be ≤ 7 mph)		Method: Broadcast Spot		Calibration Date (MM/DD/YY):		Spray Width (ft):	
Operating Pressure (psi):		Operating Speed (mph):		Herbicide Rate (amt/acre, amt/MSF, OR %soln):					Spray Output (gpa): (from calibration)				
NAME				SIGNATURE					LICENSE NO.				

HERBICIDE APPLICATION REPORT – WD 500 GRASSY WEEDS-BAMBOO/GIANT REED (Glyphosate)												
OrgUnit:		Approved Months for Application										Date:
									Aug	Sep	Oct	
Activity: 402 - HERBICIDE APPLICATION					Work Description: 500 – GRASSY WEEDS, Bamboo / Giant Reed				Work County:			
Proj#		Asset Group			Asset			Special Event				
Type	Route	Aux	BMP	EMP	Length	Direct	Pos	AccpUnit (Ac)	TIME	TEMP	WS	
LABOR												
OrgUnit		Employee #		Employee Name						Hrs Worked		
EQUIPMENT												
OrgUnit				Equipment		Equipment Description				Hours		
MATERIAL												
OrgUnit		Material Code		Material Description				(Total) Quantity Applied		UOM		
				Herbicide Common Name: Glyphosate Brand Name: Manufacturer: EPA Reg.No.: LOT NO.:								
		N/A		Carrier: Water								
				Surfactant:								
				Dye (OPTIONAL):								
				Anti-Drift:								
				Anti-Foam (OPTIONAL):								
COMMENTS												
SPRAY HEIGHT = _____ feet												
Time (AM/PM):		Temperature (°F):		Weather: Sunny Cloudy Pt. Cloudy Clear		Wind Speed (mph): (must be ≤ 7 mph)		Method: Broadcast Spot		Calibration Date (MM/DD/YY):		Spray Width (ft):
Operating Pressure (psi):		Operating Speed (mph):		Herbicide Rate (amt/acre, amt/MSF, OR %soln):					Spray Output (gpa): (from calibration)			
NAME				SIGNATURE					LICENSE NO.			

HERBICIDE APPLICATION REPORT – WD 500 GRASSY WEEDS-JOHNSONGRASS (Sulfosulfuron)													
OrgUnit:		Approved Months for Application										Date:	
					Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	
Activity: 402 - HERBICIDE APPLICATION					Work Description: 500 – GRASSY WEEDS, Johnsongrass					Work County:			
Proj#		Asset Group			Asset			Special Event					
Type	Route	Aux	BMP	EMP	Length	Direct	Pos	AccpUnit (Ac)	TIME	TEMP	WS		
LABOR													
OrgUnit		Employee #		Employee Name						Hrs Worked			
EQUIPMENT													
OrgUnit		Equipment		Equipment Description						Hours			
MATERIAL													
OrgUnit	Material Code	Material Description						(Total) Quantity Applied		UOM			
		Herbicide Common Name: Sulfosulfuron Brand Name: Manufacturer: EPA Reg No.: LOT NO.:											
	N/A	Carrier: Water											
		Surfactant:											
		Dye (OPTIONAL):											
		Anti-Drift:											
		Anti-Foam (OPTIONAL):											
COMMENTS													
SPRAY HEIGHT = _____ feet													
Time (AM/PM):	Temperature (°F):	Weather: Sunny Cloudy Pt. Cloudy Clear	Wind Speed (mph): (must be ≤ 7 mph)	Method: Broadcast Spot	Calibration Date (MM/DD/YY):	Spray Width (ft):							
Operating Pressure (psi):	Operating Speed (mph):	Herbicide Rate Amt/acre: _____ Amt/100 gals spray: _____				Spray Output (gpa): (from calibration)							
NAME		SIGNATURE						LICENSE NO.					

HERBICIDE APPLICATION REPORT – WD 600 TURF (Imazapic)													
OrgUnit:		Approved Months for Application										Date:	
						May	Jun	Jul	Aug	Sep	Nov		
Activity: 402 - HERBICIDE APPLICATION					Work Description: 600 –TURF, Seedhead Suppression / Conversion					Work County:			
Proj#		Asset Group			Asset			Special Event					
Type	Route	Aux	BMP	EMP	Length	Direct	Pos	AccpUnit (Ac)	TIME	TEMP	WS		
LABOR													
OrgUnit		Employee #		Employee Name							Hrs Worked		
EQUIPMENT													
OrgUnit			Equipment			Equipment Description					Hours		
MATERIAL													
OrgUnit		Material Code		Material Description				(Total) Quantity Applied			UOM		
				Herbicide Common Name: Imazapic Brand Name: Manufacturer: EPA Reg No.: LOT NO.:									
		N/A		Carrier: Water									
				Surfactant:									
				Dye (OPTIONAL):									
				Anti-Drift:									
				Anti-Foam (OPTIONAL):									
COMMENTS													
SPRAY HEIGHT = _____ feet													
Time (AM/PM):		Temperature (°F):		Weather: Sunny Cloudy Pt. Cloudy Clear		Wind Speed (mph): (must be ≤ 7 mph)		Method: Broadcast		Calibration Date (MM/DD/YY):		Spray Width (ft):	
Operating Pressure (psi):		Operating Speed (mph):		Herbicide Rate Amt/acre: _____					Spray Output (gpa): (from calibration)				
NAME				SIGNATURE					LICENSE NO.				

HERBICIDE APPLICATION REPORT DETAILS

OrgUnit: Enter the Organization Unit of the employee performing the application.

District: Enter (circle) the respective SCDOT District (i.e., 1, 2, 3, 4, 5, 6, 7).

Approved Months: Months approved for the particular Work Description are indicated in GREEN. Months in RED are not approved months for application.

Date: Enter the date that the herbicide application is performed.

Activity: Select 402-HERBICIDE APPLICATION. Do not change this activity code.

Work Description: Select the appropriate Herbicide Application Report for the Work Description used.

Work County: Enter the respective county where the herbicide application is performed.

Proj#: The default project number is the Home Allotment Code.

Asset Group: If treating as an asset, select an appropriate asset group (Rest Areas, Welcome Centers, Bridges, DOT facilities, IRVM plots, Single Span Bridges). If asset not selected, leave blank and use Type, Route, Aux to record location.

Asset: If an Asset Group is selected, then select the appropriate asset.

Special Event: Indicate if the herbicide application is being performed for a special event.

Type: Indicate the route type (i.e., I-Interstate, U-US Highway, etc.).

Route: Indicate the route number.

Aux: Indicate the route auxiliary.

BMP: Enter the Beginning Mile Point (where the herbicide application begins).

EMP: Enter the Ending Mile Point (where the herbicide application ends).

Length: Input the length of the route (where the application occurred).

Direct: Enter the Direction of the route where the herbicide application is being performed.

Pos: Enter the Position of the route (i.e., MEDIAN, RIGHTWY, ROADWY, SHD-MED, SHOULDR).

AccpUnit (Ac): Enter the Accomplishment Unit amount (in acres).

TIME: For each route, enter the time of the herbicide application.

TEMP: For each route, enter the temperature during the start of the herbicide application.

WS: For each route, enter the Wind Speed during the start of the herbicide application.

LABOR Org Unit: Input the Organization Unit of the applicator.

LABOR Employee #: Input the Employee ID number of the applicator.

LABOR Employee Name: Input the Employee Name of the applicator.

LABOR Hrs Worked: Input the number of hours worked during the herbicide application activity.

EQUIPMENT OrgUnit: Input the Organization Unit that the equipment used is assigned to.

EQUIPMENT Equipment: Input the Equipment number of the equipment used.

EQUIPMENT Equipment Description: Enter the Description of the equipment used.

EQUIPMENT Hours: Enter the number of hours the equipment was used to perform the activity.

MATERIAL OrgUnit: Enter the Organization Unit where the products were acquired.

MATERIAL Material Code: Enter (circle) the correct HMMS Material ID Code for EACH PRODUCT applied.

MATERIAL Material Description: Enter (circle) the correct brand name of EACH PRODUCT applied.

MATERIAL (Total) Quantity Applied: Enter the TOTAL quantity (amount) of EACH PRODUCT applied.

MATERIAL UOM: Enter the Unit of Measure for EACH PRODUCT applied (e.g., ounces, gallons).

COMMENTS Time (AM/PM): Indicate the time that the herbicide application activity was performed.

COMMENTS Temperature (°F): Enter the average temperature (degrees Fahrenheit) during the application.

COMMENTS Weather: Indicate the general weather condition during the herbicide application.

COMMENTS Wind Speed: Indicate the wind speed (in miles per hours) during the herbicide application.

COMMENTS Method: Indicate whether the herbicide application method was Broadcast or Spot.

COMMENTS Calibration Date: Indicate the date that the herbicide application equipment was calibrated.

COMMENTS Spray Width: Indicate the spray width (in feet) of the herbicide application.

COMMENTS Operating Pressure: Indicate the equipment operating pressure during the application.

COMMENTS Operating Speed: Indicate the equipment operating speed during the application.

COMMENTS Herbicide Rate: Indicate the herbicide rate applied in amount per acre OR amount per 1,000 square feet OR percent solution.

COMMENTS Spray Output: Indicate the total volume spray output in gallons per acre.

COMMENTS Other Comments: Input any other significant comments regarding the herbicide application.

Signature: The applicator should sign the completed herbicide application report.

LicenseNo: Indicate the herbicide applicator's license number.

9. GLOSSARY

Acid Equivalent (a.e.)	The amount of active ingredient expressed in terms of the parent acid.
Active Ingredient (a.i.)	The chemical compound in a product responsible for its herbicidal action.
Acute Oral LD50	The dose required to kill 50% of test animals when given as a single dose by mouth. Expressed as the amount of chemical in milligrams (mg.) per kilogram (kg.) of body weight of the test animal.
Adjuvant	Any material added to a spray solution to increase herbicide activity, prevent foaming or drift, or to aid in dispersion.
Adsorption	The adhesion of a substance (such as water) to the surface of a solid (commonly a soil particle).
Amine	A water-soluble salt in liquid form made by reacting a herbicide acid with an amine solvent.
Annual	A plant that completes its life cycle in one year (i.e., germinates from seed, produces seed and dies).
Aquatic Plant	A plant that grows in water. They may be: submersed (underwater), emersed or emergent (growing out of the water).
Bare Ground Herbicide	A non-selective herbicide that is applied to the soil. Also called a soil sterilant.
Bark	In woody stems, all of the tissues outside the vascular cambium.
Basal Treatment	Herbicidal treatment applied to the root collar of woody plants at and just above the ground line.
Biennial	A plant that completes its life cycle in two years and then dies.
Blade	The expanded or flattened part of the leaf.
Broadcast Application	An application of spray over an entire area rather than only on individual plants.
Broadleaf Plant	Plants that have broad leaves as compared to grass-like plants and conifers.
Burn Down (Top Kill)	That which destroys plant top growth and most often roots remain alive.
Carrier	The liquid or solid material added as a diluent to a chemical to facilitate its application.
Chlorosis	Loss of green color in foliage.
Compatible	Formulations which can be mixed and applied together.
Concentration	The amount of active ingredient or acid equivalent in a given volume of liquid or a given weight of dry material.
Contact Herbicide	A herbicide that kills primarily by contact with plant tissue.
Conifer	Cone bearing woody plants with needle-like leaves, usually evergreen.
Cuticle	A waxy layer formed on the outer, tangential walls of epidermal cells.
Deciduous	Plants, which lose their leaves during winter.
Dermal	The absorption of a substance through the skin.
Detergent	Surface-active agent primarily used for cleansing. Also has sticking and spreading properties.
Diluent	Any liquid or solid material used to dilute or extend an active ingredient.
Dormant Stem Treatment	Applying a herbicide to woody plant stems during dormant or leafless period.
Dormant Spray	Herbicide applied in winter before treated plants have started active growth.
Drift	The movement of herbicide particles/vapor away from the intended target area of application.
Emergence	The act of the germinating seedling breaking through the soil surface.
Emulsifying Agent	A material, which helps to suspend globules of one liquid in another (oil in water).
Emulsifiable Concentrate	A concentrated solution of a herbicide and an emulsifier in an organic solvent, which will form an emulsion spontaneously when added to water with agitation.
Emulsion	A mixture in which very small droplets of one liquid are suspended in another liquid such as oil in water.
Ester	A herbicide produced by re-acting an active ingredient with an alcohol (very volatile).
Germination	Process of beginning growth. Often refers to the beginning of growth from a seed.
Granular	A type of formulation for dry application consisting of granules.
Grass	Any of various plants with long and narrow blade-like leaves, jointed stems, etc.
Ground Application	Using sprayers mounted on trucks or other equipment that operates along the soil surface.
Growing Season	Period of time between last killing frost at the start of the plant growth to the first killing frost at the end of the growth cycle.
Growth Regulator	A substance active in controlling growth and development of plants. It may be either synthetic or a naturally occurring compound.

Herbaceous	Plant parts with little or no woody tissue.
Herbicide	A chemical used for killing plants or interrupting their normal growth.
Humidity	Refers to moisture or dampness in the air.
Inhibit	Hold in check or stop plant growth.
Invert Emulsion	One in which water is dispersed in oil rather than oil in water. Usually, a thick mayonnaise-like mixture.
Label	The information printed on or attached to the pesticide container.
Labeling	Includes the label itself, plus all other information from the manufacturer about the product. It may include brochures, leaflets, and other information that accompanies the product.
Leaching	Usually refers to movement of water through the soil.
Leaf	The flattened, vegetative organ of a plant concerned primarily with photosynthesis.
Metabolism	The sum, total of all chemical activities of a living organism (synthesis and breakdown of a substance needed for plant growth through chemical reactions).
Miscible	Two or more liquids capable of being mixed and remaining mixed under normal conditions.
Non-Selective	Pesticides which destroy or prevent plant growth in general without regard to species.
Noxious Weed	A weed defined by law as being especially undesirable, troublesome or difficult to control.
Oral	The taking of a substance by mouth.
Penetrant	Chemical agent that helps a formulation to penetrate bark or leaf surface.
Perennial	A plant that lives more than 2 years.
Pesticide	Any substance or mixture of substances intended for controlling insects, rodents, fungi, undesirable plants or animal life considered pests.
Phloem	The conducting tissue that primarily moves manufactured food materials in the plant.
Photosynthesis	The conversion, in the presence of chlorophyll, of light energy, carbon dioxide, water and a certain mineral (such as nitrogen) to carbohydrates, amino acids.
Phytotoxic	Poisonous or injurious to plants.
Plant Growth Regulator	A synthetic or natural substance active in controlling growth/development of plants.
Post-Emergence	A herbicide applied after emergence of the weed.
PPM	Parts per million.
Pre-Emergence	A herbicide application before the seeds germinate and seedlings emerge.
Rainfast	The time required between application and rain for the product to perform effectively.
Rate	The amount of active ingredient (a.i.) applied to a unit area.
Residual	To have continued killing effect over a period of time.
Resistant	Plants showing little or no herbicidal effect.
Rhizome	An underground stem usually horizontally oriented and sometimes specialized for food storage.
Root	The subterranean (underground) plant organ.
Selective	A chemical that is more toxic to some plant species than to others.
Sensitive	Not capable of withstanding effects.
Soil Applied	Application of herbicide made primarily to the soil surface than to vegetation.
Solution	A solvent containing molecules or ions of one or more solutes homogeneously dispersed in it.
Spot Treatment	Application of sprays to selected areas as differentiated from overall, broadcast or complete coverage.
Stem	Those parts of plants above the ground, which support leaves, flowers or fruit.
Surfactant	A material used in formulations to impart emulsifiability, spreadability, wettability, or dispersibility.
Synergistic	The action when two herbicides applied together produce more effective results than would be obtained from similar rates of each applied alone.
Systemic	A herbicide that moves throughout the plant system.
Tolerance	The amount of herbicide allowed by law to be in or on a plant produced for human consumption.
Tolerant	Capable of withstanding effects.
Toxic	Poisonous or injurious to animals and/or plants through contact or systemic action.
Translocation	The movement of dissolved substances within plants.
Transpiration	The evaporation of water from plants.
Volatile	Evaporates or vaporizes (changes from liquid to gas).
Weed	Any plant growing where it is not desired.
Woody Plant	Any plant that develops woody tissue.
Xylem	A complex tissue, that primarily moves water in the plant body.