

# ROADSIDE VEGETATION MANAGEMENT EQUIPMENT AND TECHNOLOGY

**Annual Report For FFY 2012**  
ODOT SP&R ITEM NUMBER 2156

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## MODERN METRIC CONVERSION FACTORS\*

APPROXIMATE CONVERSIONS TO SI UNITS				
SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
<b>LENGTH</b>				
<b>in</b>	inches	25.4	millimeters	mm
<b>ft</b>	feet	0.305	meters	m
<b>yd</b>	yards	0.914	meters	m
<b>mi</b>	miles	1.61	kilometers	km
<b>AREA</b>				
<b>in<sup>2</sup></b>	square inches	645.2	square millimeters	mm <sup>2</sup>
<b>ft<sup>2</sup></b>	square feet	0.093	square meters	m <sup>2</sup>
<b>yd<sup>2</sup></b>	square yard	0.836	square meters	m <sup>2</sup>
<b>A</b>	acres	0.405	hectares	ha
<b>mi<sup>2</sup></b>	square miles	2.59	square kilometers	km <sup>2</sup>
<b>VOLUME</b>				
<b>fl oz</b>	fluid ounces	29.57	milliliters	mL
<b>gal</b>	gallons	3.785	liters	L
<b>ft<sup>3</sup></b>	cubic feet	0.028	cubic meters	m <sup>3</sup>
<b>yd<sup>3</sup></b>	cubic yards	0.765	cubic meters	m <sup>3</sup>
NOTE: volumes greater than 1000 L shall be shown in m <sup>3</sup>				
<b>MASS</b>				
<b>oz</b>	ounces	28.35	grams	g
<b>lb</b>	pounds	0.454	kilograms	kg
<b>T</b>	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
<b>TEMPERATURE (exact degrees)</b>				
<b>°F</b>	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C
<b>ILLUMINATION</b>				
<b>fc</b>	foot-candles	10.76	lux	lx
<b>fl</b>	foot-Lamberts	3.426	candela/m <sup>2</sup>	cd/m <sup>2</sup>
<b>FORCE and PRESSURE or STRESS</b>				
<b>lbf</b>	poundforce	4.45	newtons	N
<b>lbf/in<sup>2</sup></b>	poundforce per square inch	6.89	kilopascals	kPa

APPROXIMATE CONVERSIONS FROM SI UNITS				
SYMBOL	WHEN YOU KNOW	MULTIPLY BY	TO FIND	SYMBOL
<b>LENGTH</b>				
<b>mm</b>	millimeters	0.039	inches	in
<b>m</b>	meters	3.28	feet	ft
<b>m</b>	meters	1.09	yards	yd
<b>km</b>	kilometers	0.621	miles	mi
<b>AREA</b>				
<b>mm<sup>2</sup></b>	square millimeters	0.0016	square inches	in <sup>2</sup>
<b>m<sup>2</sup></b>	square meters	10.764	square feet	ft <sup>2</sup>
<b>m<sup>2</sup></b>	square meters	1.195	square yards	yd <sup>2</sup>
<b>ha</b>	hectares	2.47	acres	A
<b>km<sup>2</sup></b>	square kilometers	0.386	square miles	mi <sup>2</sup>
<b>VOLUME</b>				
<b>mL</b>	milliliters	0.034	fluid ounces	fl oz
<b>L</b>	liters	0.264	gallons	gal
<b>m<sup>3</sup></b>	cubic meters	35.314	cubic feet	ft <sup>3</sup>
<b>m<sup>3</sup></b>	cubic meters	1.307	cubic yards	yd <sup>3</sup>
<b>MASS</b>				
<b>g</b>	grams	0.035	ounces	oz
<b>kg</b>	kilograms	2.202	pounds	lb
<b>Mg (or "t")</b>	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
<b>TEMPERATURE (exact degrees)</b>				
<b>°C</b>	Celsius	1.8C+32	Fahrenheit	°F
<b>ILLUMINATION</b>				
<b>lx</b>	lux	0.0929	foot-candles	fc
<b>cd/m<sup>2</sup></b>	candela/m <sup>2</sup>	0.2919	foot-Lamberts	fl
<b>FORCE and PRESSURE or STRESS</b>				
<b>N</b>	newtons	0.225	poundforce	lbf
<b>kPa</b>	kilopascals	0.145	poundforce per square inch	lbf/in <sup>2</sup>

\*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380.

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## **1.0 INTRODUCTION**

As in the past, the focus of this report continues to be the conveyance of information on new or previously underutilized technologies and resources that have application to the Oklahoma Department of Transportation's (ODOT) Roadside Vegetation Management program. ODOT administrators and superintendants deal with many highway maintenance challenges. They have opportunities to use new technologies that can increase efficiency or effectiveness of vegetation management programs. As part of ODOT's contract with the Oklahoma State University Roadside Vegetation Management (OSU RVM) program, OSU personnel participate in the annual Southern Weed Science Society, National Roadside Vegetation Management Association (NRVMA), and semi-annual Oklahoma Vegetation Management Association meetings. Additionally, OSU RVM personnel make many personal contacts with EPA and industry representatives each year in order to gather information on RVM issues and stay abreast of industry and regulatory happenings. OSU personnel also continually review many online and hard copy trade journals, magazines, and news releases that may have information about old and new roadside vegetation management items. The OSU RVM Program and its connection to the land-grant university system allow a unique opportunity for recommendations to ODOT regarding new applicable resources generated by other universities.

## **2.0 UPDATE ON THE REGISTRATION STATUS OF MSMA HERBICIDE PRODUCTS AND THEIR USE ON OKLAHOMA ROADSIDES**

MSMA herbicide has been and continues to be an effective, selective herbicide for ODOT weed control programs. MSMA is primarily used by ODOT for control of johnsongrass and field sandbur. It is also used by many states in the southern half of the country. MSMA offers reduced risk of injury to desired bermudagrass vegetation on roadsides. ODOT was notified in 2009 that MSMA, and other organic arsenical herbicides were being denied reregistration. A scheduled voluntary phase out of MSMA was made available to the public, beginning in 2009 (1). This phase out affected most traditional use sites for the product, including turf, sod farms, and roadsides. As a part of this planned phase out, the legal use of MSMA on roadsides would have ended on December 31, 2013 (1). We made recommendations to ODOT in the fall of 2011 to begin the phase out of MSMA in their warehouses and within their herbicide programs such that all inventory would be used up by the end of the 2013 growing season.

As sometimes occurs with voluntary or involuntary cancellations, the phase out time line appears to have been altered over time. This is due to herbicide end-users filing support statements for the continued registration of MSMA. It appears that an MSMA use option on roadside rights of way will remain for at least 3 additional years (2). In recent communications with Michal Eldan of Organic Arsenicals Products (OAP) Task Force, it was brought to our attention that the National Academy of Science (NAS) must complete a review of data and science that was used to deny the reregistration of organic arsenical herbicides. During the period of this review, MSMA should remain

labeled for use on roadsides. However, the USEPA will need to post this update at their Organic Arsenicals website (1), provide notice in the Federal Register and alert State enforcement agencies such as the Oklahoma Department of Agriculture, Food and Forestry concerning this change in phaseout time line. A question and answer sheet has been created concerning this issue by the OAP Task Force and is available online (3) within the OAP Task Force website.

In summary, based on current information, it appears that MSMA will likely be available to ODOT through the summers of 2013, 2014, and 2015 as the NAS completes their review of the reregistration evidence. Provided that legal use of MSMA during this time remains an option for ODOT, we will continue to suggest the use of MSMA alone, or in combination with other herbicides for those vegetation managers wishing to utilize this option. MSMA has been used by ODOT for control or suppression of johnsongrass, field sandbur, crabgrass, and other troublesome roadside weeds. MSMA has some unique qualities that continue to make it a product that has a fit on ODOT roadsides and it can offer reduced risk of injury to desirable vegetation on roadsides. Contact the OSU RVM program if more specific information is needed concerning MSMA use along Oklahoma roadsides. We will keep ODOT leaders apprised of updates as soon as we learn more on this developing situation.

### **3.0 NEW OSU ROADSIDE VEGETATION MANAGEMENT WEBSITE**

In an effort to make the information generated by the ODOT SPR 2156 (Training & Consultation) & 2157 (Research) Programs more accessible to all vegetation management personnel, the OSU Turfgrass Science website was expanded to include a new Roadside Vegetation Management section. The OSU Turfgrass Science homepage web address is [www.turf.okstate.edu](http://www.turf.okstate.edu) and the *Roadside Vegetation Management* (RVM) section can be found on the left side of the homepage (Figure 1). The direct address to the new RVM section is [www.turf.okstate.edu/roadside-vegetation-management](http://www.turf.okstate.edu/roadside-vegetation-management). The new section includes most of the annual reports that the OSU RVM Program generates each fall. However, reports such as the Annual ODOT Herbicide Program Report and Spray Equipment Calibration & Inspection Reports will not be posted at that site. These two reports may include sensitive information that ODOT may wish to evaluate in-house. Many of the Annual OSU RVM Program Reports have been posted for several years on ODOT's web site. The new OSU site will include many additional useful documents generated by the OSU RVM team developed as a part of the ODOT Joint Projects. Documents such as calibration forms, equipment inspection forms, ODAFF Pesticide Complaint forms, Noxious Weed Compliancy forms, along with other documents can now be easily accessed, reviewed, downloaded, and printed from the new OSU website. The new website will also include links to access the home pages of our industry herbicide manufacturers and distributors as well as sites to download current herbicide labels and MSDS sheets. The new website will also be a quick way of posting new information for vegetation managers to access on a timely basis. Plans are being made to expand the website to include herbicide applicator

**Figure 1. New OSU Roadside Vegetation Management Website located at [www.turf.okstate.edu/roadside-vegetation-management](http://www.turf.okstate.edu/roadside-vegetation-management).**

certification and continuing education training materials. We encourage ODOT personnel to contact OSU RVM personnel with recommendations on how to make the new site more useful or user friendly. Most of the documents on the new site will be in a PDF format and will require the use of the software Adobe Reader to download, review, and or print. Adobe Reader can be downloaded for free at the following web address: [www.get.adobe.com/reader/](http://www.get.adobe.com/reader/).

## **4.0 NEW PERSPECTIVE® HERBICIDE RECOMMENATIONS FOR USE IN SELECTIVE WEED CONTROL PROGRAMS FOR ODOT**

The OSU RVM Research team has worked closely with Dupont during 2008-2011 to evaluate the new herbicide active ingredient aminocyclopyrachlor. Trials concentrated



on evaluating aminocyclopyrachlor formulations, rates of applications, timing of applications, susceptible species, and blends with specific sulfonyl urea herbicides. By 2010 Dupont had selected the specific herbicide blends and ratios that would eventually become their new labeled herbicides Perspective® [blend of aminocyclopyrachlor and chlorsulfuron] (4) and Streamline® [blend of aminocyclopyrachlor and metsulfuron] (5). Because of the unique nature of the aminocyclopyrachlor molecule it became evident the new herbicides would have a wide range of use. Both rate of use and timing of application will determine the selective weed control spectrum of a given Perspective® or Streamline® application. Both Perspective® and Streamline® are very active on a wide spectrum of annual, biennial, and perennial broadleaf weeds. Perspective® and Streamline® have both preemergence (residual soil) and postemergence (foliar) activity. Both herbicides also will provide short-term postemergence control of some annual grassy weeds but they will primarily be used for their broadleaf and brush control characteristics.

Depending on the time and rate of application, these herbicides can provide weed control for many species for several months following application (6). It has been documented that better control can be achieved on perennial species and hard-to-control species such as Palmer amaranth, if applications are made as an early postemergence (May) application as opposed to early preemergence applications (late February - March). Perspective® will likely be slightly less expensive per acre than Streamline®. The contract cost per acre of both herbicides should be available during the winter of 2012/2013 when we anticipate that Perspective® will be added to the statewide herbicide contract. Retail price of Perspective® at the time of this report was approximately \$4.25 per ounce of product. This translates to approximately \$12.75 – \$20.19 per acre, based on the following recommended rates of use by OSU.

Some of the advantages of Perspective® and Streamline® over existing herbicides (Milestone®, Diruon, Oust®, Escort®) is their ability to provide excellent control of both kochia and field bindweed. Through research studies and demonstrations it has also been found that combining Perspective® with a summer treatment of glyphosate + Oust Extra®, and timed as an early postemergence treatment, can provide good (80%+) to excellent (90%+) control of Palmer amaranth. We encourage ODOT personnel to contact OSU RVM personnel as to how to implement Perspective® or Streamline® herbicides into existing herbicide programs. Specific training will be conducted during the Federal FY2013 Project 2156 Feb – March 2013 ODOT CEU Herbicide Workshops concerning the implementation of both Perspective® and Streamline®. Perspective labels can be found online at the following address:

[www2.dupont.com/Production\\_Agriculture/en\\_US/label\\_msds\\_info/labels/SL-1709.pdf](http://www2.dupont.com/Production_Agriculture/en_US/label_msds_info/labels/SL-1709.pdf).

Please read and follow all Perspective® and Streamline® label directions, as well as the OSU recommendations listed below when implementing these new herbicides. The new recommendations have been included in the current September 2012 edition of OSU publication E-958 (Table 1), *Suggested Maintenance Practices for Roadside Weed and Brush Problems* (7).

**Table 1. New OSU Recommendations on the use of Perspective® herbicide in selective weed control programs.**

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**Early Preemergence and Postemergence Control of Winter and Summer Broadleaf Weeds**

**Herbicide(s) and Rate(s) of Application per Acre:** Perspective® + non-ionic surfactant. Apply 3.0 to 4.75 ounces of product + 0.25 percent solution, respectively in 20 to 40 gallons of water per acre.

**Time of Application:** Zone 1: February 20 – May 31; Zone 2: March 1 - June 15; Zone 3: March 10 - June 30.

**Comments:**

1. Perspective®, when applied as a preemergence treatment will primarily control annual broadleaf weeds. Refer to label for specific rates and susceptible weed species or consult with OSU personnel.
  2. Perspective®, when applied as a postemergence treatment will control annual, biennial, and perennial broadleaf weed species along with some annual grassy weeds. Refer to label for specific rates and susceptible weed species or consult with OSU personnel.
  3. Perspective® can be mixed with both Landmaster BW and summer johnsongrass control treatments to increase their level of broadleaf weed control.
  4. Perspective® has been shown to be injurious on some tree species that have roots growing within treated areas, or in areas where the herbicide may move into tree root zones. For details refer to Dupont Land Management Publication: *Use of Dupont Perspective, Streamline, and Viewpoint herbicides near trees and shrubs*, or consult with OSU personnel.
  5. A quality non-ionic surfactant should be used that has a minimum of 80 percent active ingredient unless this product is tank-mixed with herbicides already formulated with surfactants.
  6. Do not mow roadsides prior to treatment. Wait at least 10 days after treatment before mowing or weed control may be reduced.
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## 5.0 REFERENCES

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