

**2007 Report on
Roadside Vegetation Management
Equipment & Technology**

Produced Under Project 2156 Section 8

A Joint Project Between
the Oklahoma State University and the
Oklahoma Department of Transportation

By

Craig Evans
Extension Associate

Doug Montgomery
Extension Associate

and

Dennis Martin
Extension Turfgrass Specialist

Oklahoma State University
358 Agriculture Hall
Stillwater, OK 74078-6027

The contents of this report reflect the views of the authors who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the views of the Oklahoma Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification or regulation.

Oklahoma State University, U. S. Department of Agriculture, State and Local governments cooperating. Oklahoma State University in compliance with Title VI and VII of the Civil Rights Act of 1964, Executive Order 11246 as amended, Title IX of the Education Amendments of 1972, Americans with Disabilities Act of 1990, and other federal and state laws and regulations, does not discriminate on the basis of race, color, national origin, gender, age, religion, disability, or status as a veteran in any of its policies, practices, or procedures. This includes but is not limited to admissions, employment, financial aid, and educational services.

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Director of Oklahoma Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Dean of the Division of Agricultural Sciences and Natural Resources. 12/2007.

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 Introduction.....	1
2.0 <i>Watchdog Sprayer Station</i>	2
3.0 <i>Watchdog Sprayer Station</i> Summary with Recommendations	2
<u>List of Figures</u>	
Figure 1. Image of Dwyer Hand-held Wind Speed Meter.....	4
Figure 2. Image of Typical ODOT Herbicide Application Record Sheet.	5
Figure 3. Images of Spectrum Technologies, Inc. <i>WatchDog Sprayer Station</i> Components.	6

1.0 Introduction

The objective of this report is to provide Oklahoma Department of Transportation (ODOT) personnel with recommendations concerning the utilization of new technologies and/or adaptations of existing technology that will enable vegetation managers to comply with ODOT's need to provide safe travel corridors for Oklahoma's motoring public. The year 2007 was a banner one for Oklahoma in that the state celebrated its one-hundredth year of statehood. ODOT was heavily involved in an "elevated level of service" that increased the level of maintenance on both rural roadsides and heavily traveled corridors funneling visitors into Oklahoma. The term "elevated level of service" was introduced by the Director of The Department of Transportation, Mr. Gary Ridley. The centennial celebration involved increases in the number of roadside acres treated with herbicides (see **2007 Annual ODOT Herbicide Program Report**) so as to improve the aesthetic appearance of travel corridors and staging areas for major celebration events.

In meetings across the state, several divisions with high populations and state highways traversing major Oklahoma metropolitan areas (Tulsa Co. and Oklahoma Co.) expressed interest in making herbicide applications from "fence to fence". This would mean a broadcast herbicide application extending from the hard highway surface edge to the adjoining non-ODOT property (covering both the safety zone and transition zone). Traditionally, ODOT has counted on the untreated transition zone as a buffer to catch any herbicide particle drift before it reaches and is deposited on adjacent property. Additionally, the transition zone has served as a repository for herbicide-sensitive native forbs that do not have a good fit in the safety zone but are considered suitable and desirable outside of the safety zone. Forbs are annual or perennial non-woody broadleaf plants that are not sedges, grasses or rushes. Many of these forbs including what the public would call "native Oklahoma wildflowers." While this broadcast herbicide treatment approach to the transition zone may be viewed as a way to increase aesthetic appearances and decrease the amount of weed pressure, the close proximity to adjacent property means that applicators need to pay special attention to wind speed and temperature inversion conditions. On-site and instantaneous measurement of wind speed, wind direction and air temperature can serve as a means of dispelling claims against ODOT if complainants argue that ODOT's application drifted onto their property. Currently, the Oklahoma Department of Agriculture, Food and Forestry (ODAFF) does not require that records reflect wind speeds at the time of herbicide application. However, it has been the practice of ODOT to keep these records so as to provide confirmation that wind conditions were within spray application parameters set by the herbicide manufacturer.

Currently, most ODOT's spray crews utilize a hand-held Dwyer wind meter (Dwyer Interments, Inc., Michigan City, Ind. 46360, Pat. No. 2993374) that is very economical (Forestry Supply, Inc.) costing approximately \$14.00 per unit (**Figure 1.**). While this device is accurate, they require the spray rig operator to manually measure wind speeds

by exiting the vehicle and exposing the device to wind currents, then physically recording the measured wind speed on hand-written spray record sheets (**Figure 2.**). One of the drawbacks to the hand-held unit is that the spray rig operator may not be aware of wind speed changes as well as wind direction changes.

As part of ODOT's contract with the Oklahoma State University Roadside Vegetation Management (OSU RVM) program, OSU personnel are contracted to attend the annual National Roadside Vegetation Management Association (NRVMA) meetings to gather information on technology that may have application to ODOT's IRVM (Integrated Roadside Vegetation Management) program. This year (October 2-4, 2007) the meetings were held in Charlotte, N.C., and contact was made with Nathan Cross, Technology Representative for Spectrum Technologies, Inc. This company manufactures and distributes leading-edge measurement information technology to the agricultural markets worldwide.

One of Spectrum Technologies, Inc. products that may have application to ODOT's spray program is the *WatchDog Sprayer Station* (**Figure 3.**).

2.0 Spectrum Technologies, Inc., *WatchDog Sprayer Station*

The *WatchDog Sprayer Station* is a compact, removable weather station that affixes to the top of the metal truck cab by means of a heavy duty magnet. It has a UV stabilized housing, no moving parts and is chemical resistant. When connected to a PDA (Personal Digital Assistant, handheld computer) it has the capability to measure wind speed and direction, air temperature, humidity, dew point, wind chill, barometric pressure, vehicle speed and direction, wind gusts, and vehicle GPS longitude and latitude location. It has the ability to continuously log weather parameters at a user selectable rate. Data collected on the PDA can be stored on the PDA itself, on Secure Digital memory cards (SD card) or Compact Flash memory cards (CF card) that can both be removed from the PDA and data (files) can be transferred to personal computers (PC's).

Data is displayed on the PDA screen and is updated every 5 seconds. With GPS position fixes, records collected will include true wind direction, true wind speed, true wind gust, satellite count (at least three satellite positions are required to function accurately), latitude, longitude, course and speed. At the time of this writing, Spectrum Technologies lists purchase price as \$1395 per unit. This cost does not include a PDA that is required to store data. Spectrum Technologies indicates several Hewlett Packard PDAs will work with the *WatchDog Sprayer Station*. These PDA's can cost up to \$600 per unit. Spectrum Technologies, Inc., representatives (Nathan Cross, Oct. 2007) encouraged inquires to be directed to them regarding PDA model selection before purchasing any PDA units.

3.0 Spectrum Technologies, Inc., *WatchDog Sprayer Station* Summary with Recommendations

ODOT maintenance programs should continue to utilize herbicide applications in its IRVM program to reduce maintenance costs through suppression of undesirable

vegetation. With increasing regulation and ODOT's desire to minimize damages claims, technologies that give ODOT roadside managers a tool to support their contention of proper herbicide application, according to herbicide manufactures labeled instructions regarding "application windows", may be enhanced by utilizing Spectrum Technologies *WatchDog Sprayer Station*. This technology can provide quantitative proof of environmental conditions at the time of herbicide application. Utilization of this technology would have increased importance in areas where there are large areas of herbicide sensitive crop production and in those areas where ODOT wants to explore "fence-to-fence" herbicide applications. The OSU RVM program would willingly work with select ODOT units to implement installation and evaluation of this technology if ODOT maintenance administrators wish to study the feasibility and integration of this technology into their spray programs. Additional information regarding the Spectrum Technologies, Inc. WatchDog Sprayer Station can be accessed by contacting:

Spectrum Technologies, Inc.
12360 South Industrial Dr., East - Plainfield, Illinois 60585
(800) 248-8873 / (815) 436-4440 Fax: (815) 436-4460
info@specmeters.com

Figure 1. Dwyer Hand-held Wind Speed Meter Images.



Figure 2. Image of ODOT Spray Application Records Form.

OKLAHOMA DEPARTMENT OF TRANSPORTATION – PESTICIDE APPLICATION RECORD					
Date:		Beg. Time:		End Time:	
County/Location:					
Acres Treated / <u>Tankload</u> :			Gallons of Mixture / <u>Tankload</u> :		
Pesticide(s) Applied (<i>Trade Name</i>):					
Total Amount of Pesticide(s) / <u>Tankload</u> :					
Pesticide(s) Rate / Acre (<i>Volume or Weight</i>):					
Manufacturer(s):					
Application Equipment:					
	<i>(Tank Size)</i>	<i>(Boomless, Boom-type, Handgun, etc.)</i>	<i>(Nozzle Type)</i>		
Calibrated Spray Pattern Width (<i>Feet</i>):			Rate of Carrier (<i>GPA</i>):		
Drift Control Used and Amount / <u>Tankload</u> :					
Weather:		Air Temperature:			
Wind Velocity:		Wind Direction:	<i>(From:)</i>	<i>(To:)</i>	
Target Specie(s):					
EPA Reg. No.(s):					
Restricted Entry Interval (<i>REI</i>):					
Applicator (<i>Printed name and Signature</i>)				Date	
Supervisor (<i>Printed name and Signature</i>)				Date	
ODOT Address:					
Notes:					

Division Copy – 1 Copy
 File – 1 Copy
 Form M-51
 Rev. 2-26-2007

Figure 3. Spectrum Technologies, Inc. WatchDog Sprayer Station.



COMPONENTS

Your WatchDog Sprayer Station package should contain the following components:

- Sensor Unit
- Mounting Post
- Cable Assembly
- Vehicle Power Adapter
- Hook & Loop Fastener Strips (2)
- SpecWare Mobile CD
- User Guide