

FINAL REPORT ~ FHWA-OK-16-10

IMPLEMENTATION OF PESTICIDE APPLICATOR CERTIFICATION SCHOOLS AND CONTINUING EDUCATION WORKSHOPS

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IMPLEMENTATION OF PESTICIDE APPLICATOR CERTIFICATION SCHOOLS AND CONTINUING EDUCATION WORKSHOPS

FINAL REPORT ~ FHWA-OK-16-10
ODOT SP&R ITEM NUMBER 2156 TASK 1

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16. ABSTRACT The Oklahoma Department of Transportation's (ODOT) herbicide applicator training program consists of initial pesticide applicator training schools, independent certification testing, sprayer calibration workshops and on-going yearly continuing education sessions. In support of this on-going effort, four pesticide applicator certification schools were conducted by Oklahoma State University (OSU) extension staff in fall of 2015 to train a total of 100 ODOT participants. Ninety-nine of the attendees at these workshops took the Core as well as Right-of-Way Certification exams administered by the Oklahoma Department of Agriculture, Food & Forestry (ODAFF). Sixty-nine percent (68 participants) passed the Core and Category 6 (Right-of-Way) examinations to become Oklahoma Certified Pesticide Applicators. Fifteen Pesticide Applicator Continuing Education (CEU) Workshops were conducted in eight ODOT Field Divisions in 2016 to provide 656 Certified Applicators with continuing education training. Records of participation in ODAFF approved CEU programs by ODOT personnel were furnished to ODAFF as well as the ODOT Field Divisions, the Maintenance Division Headquarters and the Materials and Research Division. Participants gained CEU credits and knowledge on various Integrated Pest Management (IPM) and Integrated Vegetation Management (IVM) products, topics and techniques. This increase or maintained operational knowledge of the participants should insure continued effective vegetation management skills.			
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SI* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

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

APPROXIMATE CONVERSIONS FROM SI UNITS

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

*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380.
(Revised March 2003)

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1.0 INTRODUCTION

The Oklahoma Department of Transportation (ODOT) continues use of an integrated roadside vegetation management (IRVM) program to provide cost-effective management of vegetation on roadside right-of-way (6). This effort involves proper vegetation selection, installation and post-installation management. After vegetation installment, management involves selective mowing and weed control (6) and occasional re-establishment on a limited basis. The ability to properly select and apply herbicides for right-of-way weed control is a technical skill that is not taught in primary or secondary school. This specialized training is not otherwise available to ODOT through any current in-house training, nor through the normal non-contractual services provided by the Oklahoma Cooperative Extension Service.

In 1995 ODOT developed the Herbicide Program Policy Directive D-504-1 (8). The Directive includes requirements that all personnel applying herbicides must be Certified Pesticide Applicators under the requirements administered by the Oklahoma Department of Agriculture, Food and Forestry (ODAFF). The Directive (8) also requires anyone involved in herbicide application attend an annual training program pertinent to vegetation management.

Because of Directive D-504-1 and the fact that there is some turnover in ODOT roadside vegetation management field staff each year, an on-going pesticide applicator training and certification effort is necessary for new applicators. The annual continuing education workshops are necessary not only due to this directive but also due to changes in state and federal rules/regulations, new herbicide product development, new pesticide application equipment, product patent expiration and subsequent generic product offerings, changes in industry product marketing agreements, changes in products being awarded the state competitive bid contract, and lastly, evolving weed problems.

2.0 OBJECTIVES

1. To conduct yearly herbicide applicator certification schools that will help prepare new ODOT personnel for subsequent pesticide applicator testing and certification.
2. To incorporate a testing date by ODAFF at the end of each certification school.
3. To provide each of the eight ODOT Field Divisions with yearly herbicide applicator continuing education (CEU) workshops.

3.0 BACKGROUND AND SIGNIFICANCE OF WORK

For the past 30 years, annual pesticide applicator certification schools have been conducted on an “as-needed” basis as a part of the joint roadside vegetation management and training projects between ODOT and Oklahoma State University (OSU). These schools provide timely initial training of ODOT personnel attempting to become Oklahoma Certified Pesticide Applicators.

Under Task 1 in our FY2016 Joint Project Proposal covering *Roadside Vegetation Management Training and Consultation*, we proposed to continue to offer these schools which help prepare ODOT personnel for the rigors of two 100 question exams that must be passed for ODOT personnel to become certified in Oklahoma Category 6 (Right-of-Way). Certification in Category 6 (Right-of-Way) qualifies the applicator for use of pesticides for public road maintenance, power line maintenance, railroad right-of-way, storage tank areas, and other similar areas [7]. Certification in Category 5 (Aquatic) qualifies the applicator for treatment of weeds in standing or running water in man-made and/or natural impoundments, streams, etc. [7]. Category 6 certification excludes public health activities (e.g. mosquito control) and water in totally closed systems.

ODOT Field Divisions have hosted yearly CEU workshops in Category 6 (Right-of-Way) for the last 30 years. We proposed and were contracted to conduct these continuing education (CEU) workshops under Task 1 in our FY2016 Joint Project Proposal covering *Roadside Vegetation Management Training and Consultation*. These workshops have annually supplied current and vital information to approximately 656 Certified Applicators in ODOT each year. There may continue to be a need for some applicators to also obtain training in Oklahoma Category 5 (Aquatic Pest Control). This is due to the fact that some applicators need to treat aquatic sites located on lands managed by ODOT.

4.0 PURPOSE

The purpose of the Pesticide Applicator Certification schools was to train participants to understand the basics of integrated pest management (IPM) as well as to become Certified Applicators by passing the designated tests. After gaining a fundamental understanding of IPM and becoming a Certified Applicator, the individual is usually ready to be given specific assignments by in-house ODOT mentors. Trainees are prepared to be successful at managing weeds on Oklahoma roadsides. The initial Pesticide Applicator Certification prepares the new Certified Applicators for participation in annual pesticide applicator continuing education (CEU Workshops) so that they can comply with ODOT policy as well as maintain their certification in Oklahoma. Also, the initial training prepares the new applicator for training in the herbicide application equipment calibration workshops offered by the OSU RVM program under Task 4 of the Project 2156 proposal.

5.0 IMPLEMENTATION OF PESTICIDE APPLICATOR CERTIFICATION SCHOOLS AND TESTING

5.1 PREPARATIONS FOR FEDERAL FY2016 CERTIFIED APPLICATOR SCHOOLS

Division and Maintenance Engineers were contacted by phone and email in spring through fall of 2015 to estimate i) the number of participants for fall 2015 certification schools as well as ii) determine suitability of proposed specific training dates and locations of training. During this same time period ODAFF was contacted to determine the availability of personnel to administer the Oklahoma Certified Pesticide Applicator core and category specific applicator exams. Upon obtaining this information from all parties, the dates, times and locations of the four certification schools were set and the necessary information was provided in emails sent in August and September of 2015 to ODOT Division and Maintenance Engineers and ODAFF. Additionally, in those emails the Division and Maintenance leaders were asked to secure two training documents for their participants using the order form for Pesticide Applicator Certification Manuals from Oklahoma State University Central Mailing Services via the internet at: <http://pested.okstate.edu/order.pdf>. The email also contained information explaining that the *Oklahoma Pesticide Laws & Rules* manual is no longer available for order and must now be downloaded and printed from the following website <http://www.oda.state.ok.us/forms/cps/cpl.pdf> or picked up at the ODAFF Headquarters in Oklahoma City. The specific training materials to be acquired by the Divisions for their personnel were i) *Applying Pesticides Correctly* (Revised 2012), ii) the Category 6: *Right-of-Way Study Guide* (Revised 2009) and iii) the *Oklahoma Pesticide Laws & Rules* (Revised 2014).

5.2 PESTICIDE APPLICATOR CERTIFICATION SCHOOLS

Four Pesticide Applicator Certification Schools were presented to ODOT staff in fall of 2015. These Federal FY 2016 Schools were conducted on October 13 -15 at the High Plains Technology Center (Woodward); November 3 -5 at ODOT Division 7 Headquarters (Duncan); November 17-19 at the Kiamichi Technology Center (McAlester) and December 8 – 10 at ODOT Division 8 Headquarters (Tulsa). The number of participating ODOT staff at the certification school locations were 20, 26, 12, and 42, respectively, for a total of 100 participants. The 100 ODOT staff trained in the initial certification schools in FY2016 compares with a total of 128 ODOT participants in Federal FY2013 [3], 103 in FY2014 [4] and 79 in FY2015 [5].

The first and second day of each of the three schools were conducted from 8:45 a.m. to 3:30 p.m. The schools were held using a classroom-style set up. Presentation of information was via an oral lecture using Smart Board peripheral display technology (SMART Technologies, Calgary, AB T2L 1Y1, Canada), Microsoft Power Point visual aids, and printed handouts. Participants were encouraged to ask questions during the lecture. A question and answer segment was provided immediately following each topic lecture. Instructors for the schools were Mr. Clayton Hurst, B.S., Extension Associate, and Mrs. Lydia Calhoun, B.S., Extension Assistant.

5.3 SPECIFIC TOPICS OF PESTICIDE APPLICATOR CERTIFICATION SCHOOLS

Topics included in each of the three ODOT Certified Applicator Schools were: integrated pest management (IPM), IPM terminology, state and federal rules and regulations, pest identification, mechanical and cultural pest management strategies, understanding pesticide labels and safety data sheets (SDS), personal protective equipment (PPE), pesticide selection, pesticide application techniques, spray system technologies, environmental protection, application recordkeeping, proper pesticide storage and disposal and how to obtain pesticide applicator continuing education. These topics were drawn from the three key training manuals that Division and/or Maintenance Engineers had acquired for their employees in advance of the training. The training included and was consistent with the information in the three training manuals discussed under section 5.1 of this report. OSU personnel also handed out copies of supplemental information that would be useful to ODOT personnel as they assumed their roll in ODOT vegetation management activities following initial certification as Oklahoma Pesticide Applicators.

5.4 APPLICATOR TESTING AND ACHIEVEMENT OF CERTIFICATION

On the third day of each of three FY2016 schools, pesticide applicator testing was conducted from 9:00 a.m. - 12:00 p.m. by representatives of the Oklahoma Department of Agriculture, Food and Forestry (ODAFF). ODOT personnel first took the core exam which consisted of a multiple choice written exam containing 100 questions. ODAFF representatives then scored the participants' core exam. Personnel that passed the core exam were next allowed to take the 100 question multiple choice written category specific exam. The category specific exam of most interest to ODOT was the Category 6 (Right-of-Way) exam. However, in some years there are ODOT personnel that also take the Category 5 (Aquatic Weed Control) exam.

Passing the core exam and category specific exam was required in order to become a Certified Pesticide Applicator in Oklahoma. Of the 100 participants in the four certification schools, 99 people tested for certification and 68 of those that tested passed both the core and Category 6 (Right-of-Way) exam to become Oklahoma Certified Pesticide Applicators in Category 6. Thus, the FY2016 ODOT Certified Applicator School participants had an overall 69% pass rate in taking the certification exams compared with an overall pass rate of 86% for participants in FY2011 [1], 93% in FY2012 [2], 79% in FY2013 [3], 79% in FY2014 [4] and 68% in FY2015 [5].

5.5 POST-TESTING NOTICE OF CERTIFICATION OF PERSONNEL

Following the testing of ODOT employees, ODAFF provided the test scores and notification of achievement of certification in the Right-of-Way category to OSU RVM program Extension Associate Mr. Clayton Hurst. Mr. Hurst then sent the information on these 99 individuals to their respective ODOT Division Headquarters, to the ODOT Maintenance Division headquarters in Oklahoma City and to the ODOT Materials and Research Division.

5.6 POST-TESTING RECORDKEEPING AT OKLAHOMA STATE UNIVERSITY

Upon receiving the results of testing and certification from ODAFF for ODOT participants at the four certification schools, Mr. Clayton Hurst, Extension Associate and Mrs. Lydia Calhoun, Extension Assistant in our program, entered the applicator names, ODOT employee number, employee Certified Applicator number, Division of employment, date of testing, testing score and categories of certification into our certified pesticide applicator database. This database is maintained under the Task 2 Objective: *Maintain Pesticide Applicator Training Records for ODOT Certified Pesticide Applicators*, as a part of the Joint Project 2156: *Roadside Vegetation Management Training & Consultation*. Several times per year, ODOT administrative personnel request verification of applicator certification status and the number of CEUs earned by applicators participating in past OSU CEU programs.

6.0 IMPLEMENTATION OF PESTICIDE APPLICATOR CONTINUING EDUCATION (CEU) WORKSHOPS

6.1 PESTICIDE APPLICATOR CONTINUING EDUCATION WORKSHOPS

Fifteen Pesticide Applicator Continuing Education (CEU) Workshops were conducted in FY2016. The locations, dates and attendance at each of the workshops are shown in Table 1. The workshops were approved by ODAFF as program OK-16-012 and awarded up to five pesticide applicator CEUs in Category 6 (Right-of-way) and up to four CEU in Category 5 (Aquatic). The training agenda for the CEU programs is shown in Table 2. Our instructors for the CEU Workshops were Extension Associate, Mr. Clayton Hurst, B.S., and Extension Assistant, Mrs. Lydia Calhoun, B.S.

Participant numbers were high enough that two workshops were required in each Division with the exception of Division 6, in which only a single workshop was necessary. A total of 656 Certified Pesticide Applicators were trained in the FY2016 CEU workshops as compared to a total of 605 individuals in FY2011 [1], 610 in FY2012 [2], 640 in FY2013 [3], 637 in FY2014 (4) and 642 in FY2015 (5). The numbers of applicators receiving continuing education in FFY2016 represents a 2% increase in attendance from 2015.

6.2 CEU AWARDING AND POST WORKSHOP RECORDKEEPING

Attendance records of participants in the ODAFF approved CEU programs were supplied to ODAFF so that attendees could be awarded CEUs by ODAFF. Attendance records were also supplied to ODOT Division and Maintenance Engineers, the Maintenance Division Headquarters and the Materials and Research Division. Our records of attendance maintained under Task 2 of Joint Project 2156 were updated to reflect the participation of the 656 applicators in the 2016 CEU workshops.

7.0 SUMMARY AND CONCLUSIONS

Four pesticide applicator certification schools were conducted during October through December 2015 in order to train a total of 100 participants. Ninety-nine of the attendees at these workshops took the certification exams administered by the Oklahoma Department of Agriculture, Food & Forestry (ODAFF). Of these 99 people, 68 participants passed both the Core and Category 6 (Right-of-Way) exam to become Oklahoma Certified Pesticide Applicators in Category 6 (a 69% pass rate). Division and Maintenance Engineers as well as Oklahoma Department of Transportation (ODOT) Maintenance Division Headquarters and the State materials and Research Division were furnished with applicator's

Fifteen Pesticide Applicator Continuing Education (CEU) Workshops were conducted across a total of eight ODOT Field Divisions in the months of February, March and April of 2016. A total of 656 Certified Applicators received continuing education training. Records of participation in ODAFF approved CEU programs by ODOT personnel were furnished to ODAFF on May 27. Records were then furnished to the ODOT Field Divisions, the Maintenance Division Headquarters and the Materials and Research Division on June 30. CEU credits were granted to ODOT employees that participated in the 2016 CEU Workshops. ODOT participants also gained knowledge on various Integrated Pest Management and Integrated Vegetation Management products, topics and techniques. This increased or maintained operational knowledge of attendees should insure continued effective vegetation management skills. This training is believed to be essential in delivery of cost-effective vegetation management on Oklahoma roadsides.

As of the close of FY2016, the OSU-RVM program maintained records of pesticide applicator certification status and educational session participation for ODOT Certified Pesticide Applicators. These records will be carried forward into Federal FY2017 under the terms of the current Joint 2156 ODOT/OSU Project.

Table 1. 2016 ODOT Herbicide Applicator Continuing Education (CEU) Workshop Schedule and Attendance.¹

CEU Workshop Dates	Day of Week	ODOT Division	Location	Attendance by Division
February 16 - 17	Tuesday - Wednesday	Div. 2	Antlers HQ	Div. 2 - 77
February 23 - 24	Tuesday - Wednesday	Div. 3	Ada HQ	Div. 3 - 91
March 1 and 3	Tuesday and Thursday	Div. 7	Duncan HQ	Div. 7 - 90
March 15 - 16	Tuesday - Wednesday	Div. 5	Clinton HQ	Div. 5 - 103
March 17	Thursday	Div. 6	Woodward High Plains Technology Center	Div. 6 - 36
March 22 - 23	Tuesday - Wednesday	Div. 8	Tulsa HQ	Div. 8 - 86
March 29 - 30	Tuesday - Wednesday	Div. 1	Muskogee HQ	Div. 1 - 90
April 5 - 6	Tuesday - Wednesday	Div. 4	Perry HQ	Div. 4 - 83
			Total ¹	656

¹ Total attendance represents the total number of ODOT employees who participated in 15 pesticide applicator continuing education workshops and that were also Certified Oklahoma Pesticide Applicators.

Table 2. Agenda for the 2016 Annual Oklahoma Department of Transportation Herbicide Applicator Continuing Education Workshops.

Time	Topic	Presenter
8:30–9:00 a.m.	Registration	
9:00 - 9:50 a.m.	Pesticide Spill Cleanup and Proper Pesticide Waste and Container Disposal / Lydia Calhoun	
	This presentation will discuss important procedures for handling pesticide spills. The presentation will also focus on appropriate ways to dispose of old unwanted pesticide or waste pesticide materials following a spill cleanup. Proper container rinsing and disposal methods will be covered and pesticide container recycling programs will also be discussed.	
9:50-10:40 a.m.	Strategies to Minimize Spray Drift / Clayton Hurst	
	This presentation will discuss the importance of drift prevention illustrating the harmful effects drift can have on sensitive areas. Strategies to reduce the production of particle drift and vapor drift will be stressed. Several factors that influence the potential for drift to occur will be discussed including: pressure settings, nozzle sizes, weather conditions and pesticide characteristics.	
10:40-10:55 a.m.	Break	
10:55 to 11:50 a.m.	Pollinator Health Consideration for Applicators / Lydia Calhoun	
	This presentation will discuss a few different insect pollinator species that utilize plants that can be found growing along roadsides. Some pesticide examples that have been found to negatively affect pollinator health will be discussed. Discussion will also include some applicator tips and strategies that can help reduce impacts to pollinator health. Also a brief introduction and overview of the 2016 ODOT/OSU RVM Monarch Butterfly and Milkweed Initiative will be given. Discussion will include the concerns leading to action and planned research efforts.	
Lunch 11:50 a.m. to 12:50 p.m.		
12:50 to 1:40 p.m.	Late Winter Early Spring ODOT Herbicide Application Programs / Lydia Calhoun.	
	This presentation will discuss important factors dealing with ODOT's late winter/early spring herbicide application programs. The importance of proper application timing to insure successful weed control and to avoid bermudagrass injury will be stressed. Some common cool season broadleaf and grass weeds that are typically targeted during the late winter/early spring time frame will be described. Discussion will include physical growth characteristics and life cycles to help applicators enhance their plant identification skill. Control options will be discussed with emphasis on proper application rates, use precautions, application techniques and application timing.	
1:40 to 1:55 p.m.	Break	

Table 2. (Continued) Agenda for the 2016 Annual Oklahoma Department of Transportation Herbicide Applicator Continuing Education Workshops.

Time	Topic	Presenter
1:55 to 2:50 p.m.	Summer ODOT Herbicide Application Programs / Clayton Hurst	
This presentation will discuss ODOT summer herbicide application programs. Several common warm season broadleaf and grass weeds that are targeted during the earlier summer time frame will be described. Plant descriptions will include physical growth characteristics and life cycles to help applicators enhance their plant identification skill. Control options for several of the more common problematic weed species will be discussed with emphasis on proper application rates, use precautions, application techniques and application timing. A portion of the presentation will also discuss management decisions that could affect how well herbicide and mowing programs are integrated.		

8.0 REFERENCES

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