

2005 Annual Oklahoma Department of Transportation Herbicide Program Report

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1.0 Introduction

The purpose of this annual report was to document the successes, failures and challenges of ODOT's chemical weed control program in 2005. In that each field division makes herbicide application decisions independent of other field divisions, we attempted to minimize comparisons among divisions in this report. However, it can be both interesting and useful to document trends in ODOT herbicide programs when similarities in field division programs are surveyed. We attempted to document the progress of each field division on its own merit, considering the different attitudes and unique management goals within each field division. When appropriate, recommendations and comments were made to assist divisions in solving issues that became apparent after reviewing this year's herbicide use surveys (Appendix A). It was our intent that the comments and criticisms included in this report would be of benefit to each field division's herbicide program. We are aware that each field division, in the development of its herbicide program, will have considerations unknown to Oklahoma State University Roadside Vegetation Management Program personnel. If there is disagreement by any division personnel to comments or recommendations, we ask that we have the opportunity to clarify recommendations.

Finally, we would like to thank the divisions for their participation in this year's survey. Without the survey data from each division, this report will not reflect the entire ODOT herbicide program effort. We encourage suggestions as to how this report can be made more informative and useful and we always welcome input from all levels within ODOT.

2.0 Survey of the Division One Herbicide Program

2.1 Herbicide Program Survey Results

A total of 10 out of 10 maintenance facilities in Division One responded to the survey this year. In response to survey questions 2-11 no apparent concerns arose. A meeting was held at Division One headquarters on September 7, 2005 to solicit comments and opinions from division administrative personnel. The following observations and comments are made based on the surveys and meeting.

Division One herbicide usage is summarized in Table 1. The winter annual weed control program in Division One this year consisted of a Campaign + AMS broadcast treatment. Acreages treated increased slightly from the previous year and the weed control results were very good. Division headquarters personnel, along with county personnel, are still experiencing very positive results from the Campaign + AMS treatment. Campaign + AMS application rates and timings were good. For their summer weed control program, Division One ran into some problems for a second consecutive year. Mainly they did not have a broadcast summer weed control program. Information from Jim Dixon indicated this was mainly due to budgeting problems similar to last year. Division One did buy some generic glyphosate (Credit Extra) and Outrider mid-summer to facilitate spot treating with good results. However, only a small amount of acreage was treated. After leaving the Sept. 9 Division One herbicide meeting, OSU personnel traveled southbound on US-69 through Muskogee and McIntosh counties. It was apparent that the lack of a summer broadcast herbicide program for the past two years has allowed the clear zone to re-infest with johnsongrass, marehail, silver bluestem, along with several other summer annual weeds. This became painfully clear when OSU personnel hit the Pittsburg/McIntosh county line at which point the roadsides had been treated earlier in the summer with Roundup Pro Concentrate + Oust XP. The Pittsburg county roadsides have been treated annually each summer and looked very good even though it had been a while since they had been mowed. It is scenarios like this that all ODOT personnel should see for themselves from time to time to reassure what the summer broadcast herbicide programs bring to the table. While the summer herbicide treatments are harder to finance, administrate, and implement, they are highly beneficial to both short term and long term roadside vegetation management goals. Lastly, a few treatments of selective rates of Credit Extra were used alone to treat selected roadsides with good to fair results. Garlon 4 was used as a cut-stump and foliar treatment to control brush with fair success.

2.2 Comments and Recommendations from OSU Personnel

From both the survey and division comments, it appears Division One had a successful 2005 roadside vegetation management program for the spring and early summer months. Results from their Campaign + AMS treatments have proven to be very successful in producing the desired results early in the season. It is important to remember that the summer herbicide treatment has also produced successful results in Division One in the past. A return to the summer treatments would be beneficial. Staying the course with both spring and summer weed control programs will provide long-term benefits to Division One roadsides as with other divisions. A well-timed, properly designed herbicide program should produce good quality

manageable stands of desirable roadside grasses. A sustained mowing and herbicide program approach will ultimately result in a reduction of vegetation management operations. A reduction would be noticed in mowing cycles because you would only be mowing shorter growing desirable grasses and not tall growing weeds, eventually leading to the use of lower use rates or maybe even spot applications of herbicide treatments. We highly recommend a return to a broadcast summer herbicide treatment in 2006 before roadsides start losing bermudagrass stands due to weed competition. Obviously it is always helpful if there is a budget increase or reprioritization of funds to help make this happen. OSU personnel are always available to help field divisions create roadside vegetation management programs based on their specific set of priorities, goals, and budgets.

Table 1. Summary of Division One Herbicide Survey Results¹.

Herbicide Treatments	Herbicide Rate/A ²	Targeted Weed	Date Started	Date Ended	Acreages Treated		Overall Success (good, fair, poor)
					Average/Facility	Total Division	
Campaign + AMS	2 pt + 4.3 lb (5) 2 pt + 5.3 lb (1) 2 pt + 3.4 lb (1) 1.9 pt + ??? (1) 2 pt + 4.6 lb (1) 2 pt + 2.4 lb (1)	winter annuals brome cheat hairy vetch	2-23-05	3-31-05	589	5,892	good (9) ??? (1)
Roundup Pro Concentrate + Oust XP	2.5 oz + 1 oz (1)	johnsongrass broadleaf weeds	7-6-05	7-15-05	64	64	good (1)
Credit Extra + Outrider	5.5 oz + 1 oz (1) 1 pt + 0.6 oz (1) 2 qt + 1.5 oz (1) 0.7 pt + 1 oz (1)	johnsongrass broadleaf weeds	7-7-05	8-5-05	77+	309+	good (3) ??? (1)
Credit Extra	2 qt handgun (1) ??? (2)	weeds & grasses johnsongrass broadleaf weeds	7-8-05	8-12-05	14+	42+	good (2) fair (1)
Garlon 4 + surfactant	2 qt handgun (1) ??? (1)	brush woody plants	5-27-05	6-14-05	-----	-----	good (1) fair (1)
Garlon 4 + oil carrier	1 qt + 2 gal oil (1)	cut stumps	-----	-----	-----	-----	good (1)

¹Total number of responses to survey: 10 of 10.

²Numbers in parenthesis refer to the number of county/interstate facilities. A '???' indicates that information was not provided for the production of this report.

3.0 Survey of the Division Two Herbicide Program

3.1 Herbicide Program Survey Results

A total of 10 out of 10 maintenance facilities in Division Two responded to the survey this year. In response to survey questions 2-11 only a single concern arose. In response to Survey Questions 3 and 4, which asks how many personnel are involved in the mixing/loading of herbicides (Question 3) and involved in herbicide applications (Question 4), a few maintenance units responded that only one person is involved in each of these procedures. From time to time an ODOT crew might find themselves shorthanded and have to complete an herbicide application with only a single employee. It is not a safe practice to routinely put all of the responsibilities of herbicide applications on one person. There may even be ODOT personnel whom request to work alone but the area of herbicide applications is not an area for ODOT personnel to work by themselves. For personal safety and environmental concerns ODOT should always try and have a minimum of two certified personnel involved in the mixing/loading of herbicides and their application. A meeting was held at Division Two headquarters on September 8, 2005 to solicit comments and opinions from division administrative personnel. The following observations and comments are made based on the surveys and meeting.

Division Two herbicide usage is summarized in Table 2. Division Two herbicide programs consisted mainly of atrazine for winter annual weed control and Roundup + Oust, Mirage + Oust or MSMA for summer weed control. Atrazine use increased significantly this year over 2004 and was applied over the majority of Division Two roadsides. Treatment times and rates were good and overall good control of winter annual weeds. The summer weed control program consisted of three main treatments. Roundup Pro Concentrate + Oust, Mirage + Oust, or MSMA were all used to successfully control johnsongrass and other summer weeds. Herbicide rates and application timings were good. Tordon K + Garlon 4 foliar treatments were applied by two maintenance units with good success in controlling brush. Garlon 3A was used by one maintenance unit to successfully control brush in early summer.

3.2 Comments and Recommendations from OSU Personnel

Division Two maintenance crews have successfully used atrazine to control early spring weeds for the past couple of decades. The reason they have had this option is because manufacturers were maintaining, at their cost, the special state labeling which allowed its legal use on roadsides. This labeling is no longer being maintained by the manufacturers and it is unlikely this situation will change. Because of these actions, and others, atrazine is no longer a recommended herbicide treatment for ODOT. The problem Division Two will now have is they will still have the winter annual weeds infesting their roadsides in March and April. Without some type of weed control program they will have to mow at least once before roadside bermudagrass even greens up. We have talked with Division Two administration as well as county supervisors and we recommend moving to the atrazine alternative treatment of Campaign + AMS which should produce excellent control of winter annual weeds. If Division Two transitions to this new treatment, their personnel should get the same positive results that many other field divisions are currently experiencing. The new Campaign + AMS treatment will be applied at different timings and product rates so there is critical new information for Division

Two county personnel to learn before this treatment is implemented. The new Campaign + AMS treatment should be easier to apply (no more white residues) and is much more environmentally sound (no more no-spray buffer zones next to all surface waters). The new treatment can be safely sprayed up to, but not into, surface water sources. If Division Two does plan on transitioning to the Campaign + AMS treatment, it will be important to let OSU personnel know so that the herbicide training program can be adjusted to supply their personnel with the necessary information for a quick and easy implementation. The biggest change will be instead of spraying in December, January and into February, you would be making application in late February through March.

We would like to encourage Division Two to continue their current summer weed control program efforts. Most summer applications this year included mixtures of Roundup Pro Concentrate (or generic equivalent) and Oust. While this may be the best overall summer treatment on the market, there is some interest in looking into switching from Oust to Outrider mixed with the Roundup. This is also a recommended treatment and would provide a little better control of johnsongrass while producing a little less control of some of the summer broadleaf weeds. The Outrider treatment would also cause less yellowing of roadside bermudagrass. Both treatments are very good so this is a win-win decision.

Table 2. Summary of Division Two Herbicide Survey Results¹.

Herbicide Treatments	Herbicide Rate/A ²	Targeted Weed	Date Started	Date Ended	Acreages Treated		Overall Success (good, fair, poor)
					Average/Facility	Total Division	
atrazine	2 qt (5) 2.25 lb (1)	winter annual weeds	12-4-04	2-28-05	977+	5,862+	good (5) fair (1)
MSMA	2 qt (4)	johnsongrass	5-12-05	7-28-05	163+	650+	good (3) ??? (1)
Roundup Pro Concentrate + Oust XP	1 pt + 1 oz (3) 1 pt + 0.7 oz (1) 1.2 pt + 0.48 oz (1) 0.9 pt + 1 oz (1) 1 pt + 4.5 oz (1)	johnsongrass weeds brush	4-14-05	8-4-05	875	5,250	good (6)
Mirage + Oust XP	1 pt + 1 oz (3)	annuals perennials johnsongrass	4-8-05	6-18-05	344	1,032	good (3)
Mirage	1 pt (1)	grasses weeds	7-20-04	4-15-05	113	113	good (1)
Mirage + Garlon + Overdrive	??? (1)	johnsongrass annual grasses	7-20-05	7-21-05	6	6	good (1)
Roundup Pro Concentrate + Oust XP	??? (1)	guardrail grass control	7-19-05	7-20-05	128	128	good (1)
Tordon K + Garlon 4	1 qt + 3 qt (1) ??? (1)	brush	5-13-05	7-11-05	155	310	good (2)
Garlon 3A	??? (1)	brush	6-20-05	6-20-05	50	50	good (1)

¹Total number of responses to survey: 10 of 10.

²Numbers in parenthesis refer to the number of county/interstate facilities. A '???' indicates that information was not provided for the production of this report.

4.0 Survey of the Division Three Herbicide Program

4.1 Herbicide Program Survey Results

A total of 12 out of 12 maintenance facilities in Division Three responded to the survey this year. In response to survey questions 2-11 no apparent concerns arose. A meeting was held at Division Three headquarters on September 8, 2005 to solicit comments and opinions from division administrative personnel. The following observations and comments are made based on the surveys and meeting.

Division Three herbicide usage is summarized in Table 3. Division Three continued with its traditional Campaign + AMS (March) followed by Ranger Pro or Mirage + Outrider (May/June) treatments to successfully control roadside weeds. Campaign + AMS treatments continue to provide good weed control as both rate and timing criteria are being met. This past year Division Three used one of two generic glyphosates (Mirage or Ranger Pro) to mix with Outrider. No major differences between the generic glyphosate products were documented through the surveys from the past few years. Ranger Pro was also successfully used as a handgun treatment for total vegetation control. Aquaneat (glyphosate) was used to successfully control cattails and willows in aquatic areas.

4.2 Comments and Recommendations from OSU Personnel

Division Three continues to obtain good results with current Campaign + AMS treatments for winter annual weed control. The addition of more glyphosate (for annual ryegrass control) and/or Overdrive (for musk thistle control) could be of benefit if these particular weeds become a maintenance problem. Campaign + AMS application rates are very consistent and if there is any glitch it might be a couple of the maintenance units were finishing up treatments in mid-April. Considering the location of Division Three being mostly in the southern half of the state and considering an average year in Oklahoma it would be a benefit to finish up this treatment by the end of March if possible. Doing this will optimize weed control and minimize any injury to bermudagrass in early spring. This past year Division Three, along with other field divisions, used a generic glyphosate (Mirage and/or Ranger Pro) in their summer weed control program. Using the generic glyphosates, when compared to name brand products, continues to save Division Three maintenance dollars. With the implementation of ODOT's new Approved Herbicide and Adjuvant List (AHAL) program, an official procedure is now in place to make sure those field divisions that choose to use generic herbicide products can feel confident that they will receive a quality generic. While we will always applaud the efficient use of taxpayer's money, the use of the generic product does come at a cost to ODOT. It is our task to make sure that ODOT personnel are aware of these so they can continue to make informed purchasing decisions. The cost in purchasing generics is there will be little if any product support from the company marketing the generic material. Typically companies stand behind their products in drift claims, environmental issues, and personnel exposures issues, etc. ODOT will always have OSU personnel to support their proper use of herbicides.

Division Three currently has one of the more consistent herbicide programs in the state. We encourage Division Three to continue to invest in both the Campaign + AMS program and

the glyphosate + Outrider programs as these two major efforts, combined with a quality safety and contour mowing program, are the most efficient and effective way of managing today's roadside vegetation. If budgeting issues become a problem we encourage Division Three to examine a possible reduction in both mowing and herbicides to absorb funding losses and resist the temptation to cut only the herbicide program.

Table 3. Summary of Division Three Herbicide Survey Results¹.

Herbicide Treatments	Herbicide Rate/A ²	Targeted Weed	Date Started	Date Ended	Acreages Treated		Overall Success (good, fair, poor)
					Average/Facility	Total Division	
Campaign + AMS	2 pt + 3 lb (5) 2 pt + 3.4 lb (3) 2 pt + 2.7 lb (1) 2 pt + 2.4 lb (1) ??? (1)	winter annuals broadleaf weeds	2-25-05	4-16-05	702+	7,724+	good (6) fair (2) ??? (3)
Ranger Pro + Outrider	1 pt + 1 oz (9) 0.8 pt + 1 oz (1)	broadleaf weeds johnsongrass	5-31-05	6-28-05	642+	6,418+	good (6) fair (2) ??? (2)
Mirage + Outrider	1 pt + 0.88 oz (1) 0.8 pt + 1 oz (1)	broadleaf weeds johnsongrass	6-13-05	6-25-05	562	1,124	good (1) fair (1)
Ranger Pro	1.5% solution	total vegetation control	8-26-05	9-9-05	65	65	good (1)
Aquaneat + surfactant (handgun)	??? (1)	cattail willow broadleaf weeds	6-24-05	8-11-05	-----	-----	good (1)

¹Total number of responses to survey: 12 of 12.

²Numbers in parenthesis refer to the number of county/interstate facilities. A '???' indicates that information was not provided for the production of this report.

5.0 Survey of the Division Four Herbicide Program

5.1 Herbicide Program Survey Results

A total of 9 out of 10 maintenance facilities in Division Four responded to the survey this year. In response to survey questions 2-11 no apparent concerns arose. On September 9, 2005 a Division Four Herbicide Program meeting was held at the Best Western in Stillwater. The meeting was attended by county superintendents, field clerks and field division administrative personnel. The comments and recommendations in this report are based on the surveys and meeting.

Division Four herbicide usage is summarized in Table 4. This year Division Four herbicide programs remained fairly consistent with 2004 programs. Campaign + AMS is being used successfully to control winter annual weeds. Campaign + AMS rates and timings used were very good this year with only a few tank loads being applied in mid to late April. In the northern Division Four counties they can probably get by with April 15 Campaign applications but this is at the very end of the season to safely spray Campaign on bermudagrass that is breaking dormancy. This year Division Four used a summer broadcast treatment of Roundup Pro Concentrate + Oust XP for most of the division with the remainder being treated with Roundup Pro or Honcho Plus + Oust XP. In the past years Division Four has gotten off to a late start with their summer treatments, but this year they started 3 to 5 weeks earlier. Many of the treatments were sprayed at the optimum time (mid to late May) but a few were actually sprayed a little early. With this type of treatment ODOT should be looking for the point where you have 100% green-up of bermudagrass and johnsongrass that is also 100% green and actively growing. The actively growing part of johnsongrass is where its get tricky. Environmental conditions in late April and early May that can reduce the effectiveness of Roundup + Oust type treatments are droughty conditions and cool temperatures. Both of these conditions are usually temporary. Waiting a few days after a good rain will pull drought stressed plants back into an active growing mode. Waiting for warmer nighttime temperature will pull johnsongrass out of cool temperature stresses. The best way to tell if johnsongrass is under cool temperature stresses is to watch for the signs of purple leaves and stems that result from 40-55 degree nights. The johnsongrass becomes stressed from the cool temperatures and will not translocate the Roundup or Oust herbicides very well to the root system. Usually if you wait a few days or a week or so and watch for the nighttime temperatures to get back up into the 50-60 degree range the johnsongrass plants will begin to loose the purple color and replace it with the typical lime-green color. This will tell you its prime time to treat the johnsongrass assuming you are not under droughty conditions. Krovar IDH appears to be gaining popularity with Division Four crews and was used successfully as a shoulder and guardrail encroachment treatment by six facilities. Division Four used Transline + surfactant to successfully control musk thistle in several counties.

5.2 Comments and Recommendations from OSU Personnel

Division Four administrative personnel have recently expressed an interest in raising the bar of expectations for its herbicide program. There is no doubt they have the commitment, personnel and products in place to have a very good herbicide program. But like they say the devil is in the details. We recommend that Division Four, because of the severity of annual

ryegrass problems, look at an alternative treatment to their otherwise very successful Campaign + AMS. In those counties that have annual ryegrass problems we recommend that they switch to a glyphosate only treatment. The rate of application would be 1 quart per acre of generic glyphosates or 26 fluid ounces per acre of Roundup Pro Concentrate. It would not be necessary to add AMS to this treatment, however, the small increase in treatment cost from adding AMS would likely help in controlling some perennial cool-season broadleaf weeds. The treatment costs compared to the traditional Campaign + AMS will actually be slightly less. The most important thing to consider about this switch is that this new treatment must be completed by the end of March in the northern half of the division and by the third week of March in the southern half of this division. Do not use this higher rate of glyphosate during the month of April. This treatment should provide very good control of annual ryegrass and all other cool-season annual weeds. It will also suppress musk thistle to the point where it will struggle to produce flowers. We would like to encourage Division Four to continue with their summer Roundup Pro Concentrate + Oust XP program keeping in mind the optimum time to apply the treatments. It is very difficult to put calendar dates on when a person should start or stop spraying a summer treatment because of the variation from year to year in growing conditions. We encourage Division Four personnel to obtain their summer herbicides early and have them ready to spray in early May but realize they may have to wait until growing conditions are ideal to get the best control. OSU personnel are always available for phone consultations during this treatment time as to the current growing conditions. Comments were made at the recent Division Four Herbicide Program meeting about the amount of johnsongrass regrowth that occurred in August and into September. As much of Oklahoma experienced, Division Four had from 3 to 8 inches of rain in August and several big rains in September. This large amount of water late in the summer, coupled with the fact that ODOT herbicide treatment rates are designed for 3 months of typical weed control and suppression opened the door for the late season flush of weed growth. August growing conditions are typically dryer and ODOT summer herbicide treatments are designed around this fact. We expect good suppression during May, June, July into early August and expect the hot dry weather to suppress weed growth for the remainder of the growing season. This year growing conditions favored the johnsongrass in the late summer. We encourage the continued use of Krovar IDH herbicide as a bareground total vegetation control treatment, but Division Four crews need to remember to accurately apply this product and be very cautious when applying near sloped areas and trees. This product contains bromacil which is very mobile in runoff water and can damage sloped areas for several months as well as severely damaging trees.

Table 4. Summary of Division Four Herbicide Survey Results¹.

Herbicide Treatments	Herbicide Rate/A ²	Targeted Weed	Date Started	Date Ended	Acreages Treated		Overall Success (good, fair, poor)
					Average/Facility	Total Division	
Campaign + AMS	2 pt + 4.7 lb (2) 1.85 pt + 4.7 lb (2) 2 pt + 5.2 lb (2) 2 pt + 3.4 lb (1) ??? (1)	winter annuals brome, vetch cheat, rye clover musk thistle	2-25-05	4-16-05	654	5,234	good (6) ??? (2)
Roundup Pro Concentrate + Oust XP	18 oz + 1 oz (1) 12 oz + 0.75 oz (1) 16 oz + 1 oz (3) 13 oz + 1 oz (1) 19 oz + 1.5 oz (1)	johnsongrass broadleaf weeds	4-27-05	5-27-05	640	4,483	good (3) fair (1) poor (1) ??? (2)
Roundup Pro + Oust XP	22.17 oz + 1.11 oz (1)	annuals broadleaf weeds grasses	6-13-05	6-14-05	260	260	good (1)
Honcho Plus + Oust XP	22.17 oz + 1.11 oz (1) ??? (1)	annuals broadleaf weeds grasses	6-13-05	6-13-05	435	869	good (1) ??? (1)
Krovar DF	9 lb (2) 6 lb (1) 18 lb/100 gal (1) 4.5 lb/55 gal (1) 6 lb/55 gal (1)	grass, weeds johnsongrass sunflower all weeds guardrail signs	4-14-05	6-15-05	4.7+	28+	good (4) fair (1) ??? (1)
Roundup Pro + Oust XP	2.5 qt + 5 oz/55 gal (1)	broadleaf weeds guardrail treatment signs	6-21-05	7-6-05	3.8+	7.5+	fair (2)
Transline + surfactant	14 oz + 12 oz (1) 12 oz (1) 4 oz + 16 oz (1) ??? (1) 2 qt + 19.2 oz (1)	musk thistle	3-5-05	6-6-06	14.4	72	good (4) ??? (1)

¹Total number of responses to survey: 9 of 10.

²Numbers in parenthesis refer to the number of county/interstate facilities. A '???' indicates that information was not provided for the production of this report.

6.0 Survey of the Division Five Herbicide Program

6.1 Herbicide Program Survey Results

A total of 13 out of 13 maintenance facilities in Division Five responded to the survey this year. In response to survey questions 2-11 no apparent concerns arose. A meeting was held at Division Five headquarters on September 13, 2005 to solicit comments and opinions from division administrative personnel. Comments and recommendations in this report are based on the surveys and meeting.

Division Five herbicide usage is summarized in Table 5. Division Five continues to have a very consistent winter annual weed control program. Campaign + AMS continues to provide good winter annual weed control as proper rates and timings are being achieved. As in the past there are a few tank loads that are going out in mid-April. Division Five facilities that are finding themselves finishing their Campaign treatments at that time should start one to two weeks earlier next year. The Division Five summer herbicide treatments this year totaled nearly 11,000 acres, a significant increase over the past few years. Most of the acreage was treated with Roundup Pro Concentrate + Oust XP with the remainder being treated with combinations of MSMA, Vanquish, Plateau and/or Roundup Pro Concentrate. This adds up to 5 distinctly different treatments that are designed to control summer broadleaf and grassy weeds. Overall these treatments continue to provide good control of johnsongrass and other troublesome weeds and no apparent problems arose from the variability in treatments. Each of these summer treatments, depending on the combination used, would provide slight differences in control of johnsongrass, broadleaf weeds, crabgrass and sandbur. Bareground guardrail and shoulder treatments used included Roundup Pro Concentrate + Arsenal, Roundup Pro Concentrate + Arsenal + Oust, and Arsenal + Oust. Good control was achieved from each of these treatments. The treatment of Roundup Pro Concentrate + Arsenal + Oust was applied this year using the Patchen roadside shoulder sprayer with good results. Aqua Star was used to control cattails and vegetation around guardrails with good success.

6.2 Comments and Recommendations from OSU Personnel

We would like to encourage Division Five personnel to continue with their basic winter annual weed control program of Campaign + AMS followed by the various summer herbicide treatments used. Continuing to use the proper rates and timings will achieve the best control possible with the selected treatments. One of the problems that will happen to a consistent herbicide program is that there is always the chance that weed escapes will occur. Treatment modifications for escapes can usually be made to remedy any new weed problems. There is no doubt that some of the various treatments being used in the summer, in Division Five, are a result of treatment modifications. Once the modifications have been made and a particular weed problem has been remedied, it would likely be best to revert back to the original summer treatment or alternate between two treatments. OSU personnel did have the opportunity to see some of the results from the Patchen sprayer this past summer and they looked very good. The roadside shoulders that had been treated showed a strip of 6 inches or so next to the shoulder edge had been treated along with all of the cracks and seams that had vegetation growing in them. The level of control looked very good.

Table 5. Summary of Division Five Herbicide Survey Results¹.

Herbicide Treatments	Herbicide Rate/A ²	Targeted Weed	Date Started	Date Ended	Acreages Treated		Overall Success (good, fair, poor)
					Average/Facility	Total Division	
Campaign + AMS	40 oz + 3.56 lb (1) 39 oz + 3.2 lb (8) 40 oz + 3.84 lb (1) 42 oz + 4 lb (1) 40 oz + 2.72 lb (1)	annuals broadleaf weeds winter annuals grasses	2-28-05	4-13-05	728	8,733	good (10) fair (2)
Campaign + Pendulum	7 qt + 10 qt/load Rate/A?	annuals broadleaf weeds	3-9-05	3-23-05	42	42	good (1)
Roundup Pro Concentrate + Oust XP	10.4 oz + 0.7 oz (1) 12 oz + 0.5 oz (1) 10 oz + 0.5 oz (7) 10 oz + 0.25 oz (1) ??? (1)	annuals broadleaf weeds johnsongrass	5-11-05	6-22-05	610	7,317	good (6) fair (5) ??? (1)
MSMA + Vanquish	32 oz + 8 oz (1) 40 oz + 32 oz (1)	grasses broadleaf weeds	4-26-05	7-5-05	706	1,412	good (2)
MSMA	4 pt (2) 3 pt (2) 3.5 pt (1) 2 pt (1)	johnsongrass crabgrass broadleaf weeds	5-6-05	7-28-05	172	1,032	good (5) ??? (1)
Roundup Pro Concentrate + Plateau	12 oz + 4 oz (1) ??? (1)	broadleaf weeds johnsongrass	5-23-05	6-13-05	267	533	good (1) fair (1)
Plateau + Vanquish	4 oz + 12 oz (1)	broadleaf weeds johnsongrass	5-21-05	5-30-05	520	520	fair (1)
Vanquish + surfactant	1.5 pt (1) ??? (1)	spot thistles kochia broadleaf weeds	6-20-05	6-21-05	50	99	good (2)
Roundup Pro Concentrate	10 oz (2) 12 oz (1)	broadleaf weeds silver bluestem	4-6-05	6-20-05	84	253	good (2) fair (1)
Arsenal + Oust XP + Roundup Pro Concentrate	1.5 qt + 1 oz + 3 qt (1) 0.5 qt + 0.75 oz + 0.75 qt (1)	bareground	5-23-05	8-2-05	88	175	good (2)
Arsenal + Oust XP + Roundup Pro (Patchen sprayer)	1 gal + 12 oz + 3 gal/ tank	all vegetation	4-19-05	4-19-05	-----	-----	good (1)
Arsenal + Roundup Pro Concentrate	??? (1)	all vegetation	6-20-05	6-21-05	14	14	good (1)
Roundup Pro Concentrate + Oust XP	2 qt + 0.5 oz (1)	guardrail and post treatment	6-1-05	6-22-05	30	30	good (1)
Arsenal + Oust	??? (1)	all vegetation encroachment	6-13-05	6-15-05	50	50	good (1)
Roundup Pro Concentrate + Vanquish + Oust XP	17.6 oz + 15.4 oz + 0.7 oz (1)	all vegetation	6-23-05	6-30-05	87	87	fair (1)
Aqua Star	1 qt (1) 1% solution (1) ??? (1)	guardrail cattails	4-8-05	6-14-05	8.3	25	good (2) fair (1)

¹Total number of responses to survey: 13 of 13.

²Numbers in parenthesis refer to the number of county/interstate facilities. A "???" indicates that information was not provided for the production of this report.

7.0 Survey of the Division Six Herbicide Program

7.1 Herbicide Program Survey Results

A total of 9 out of 9 maintenance facilities in Division Six responded to the survey this year. In response to survey questions 2-11 only a single concern arose. In response to Survey Question 4, which asks how many personnel are involved in the herbicide applications, it appears three counties (Major, Texas, Ellis) always use one person and five of nine use one or two personnel to make herbicide applications. From time to time an ODOT crew might find themselves shorthanded and have to complete a herbicide application with only a single employee. However, it is not a safe practice to routinely put all of the responsibilities of herbicide applications on one person. For personal and environmental safety concerns, ODOT should always try and have a minimum of two certified personnel involved in the mixing, loading and application of herbicides. A meeting was held at Division Six headquarters on September 14, 2005 to solicit comments and opinions from division administrative personnel. Comments and recommendations in this report are based on the surveys and meeting.

Division Six herbicide usage is summarized in Table 6. Division Six applied the last of its atrazine this past winter and will transition into the alternative treatment of Campaign + AMS in the future. This year Division Six did not have the funds to keep both the winter Campaign + AMS and summer Roundup + Oust programs going so they let the individual county superintendents choose between the two treatments. Most county superintendents chose the summer spray program. The two counties that chose the Campaign achieved good results but should consider using the AMS product with their Campaign herbicide in the future. The Campaign rate used this past year was 4 pts/A. With the use of AMS, this rate can be cut in half while maintaining very good control of winter annual broadleaf and grassy weeds. Five out of nine county superintendents opted for a summer weed control program of Oust XP + Roundup Pro Concentrate or Ranger Pro. The rate of application of these treatments was good but there was a wide range of treatment timings. Applications within Division Six began as early as March 17 and ended as late as July 13. Considering the location of Division Six a good time frame to shoot for with their summer weed control program would be from mid to late May as a starting point and ending up in mid to late June. Weed control achieved from these treatments was mostly good with a couple of counties obtaining fair (lesser) weed control. Banvel was used to successfully control musk thistle in early summer. Also, Roundup Pro + Arsenal was applied to produce total vegetation control on roadside shoulders with good success. Division Six personnel have had to return to the use of traditional boom sprayers to make their total vegetation control treatments since the loss of the Patchen sprayer several years ago. Division Six has expressed interest in getting the Patchen sprayer replaced so they can return to the former level of shoulder treatments thus reducing encroachment damage from vegetation.

7.2 Comments and Recommendations from OSU Personnel

Division Six, like a few other field divisions, continues to struggle with funding both a winter annual (Campaign + AMS) and summer weed control program (Roundup Pro + Oust/Outrider). In the opinion of OSU personnel, both of these basic treatments bring unique and beneficial results to ODOT roadside vegetation management programs. With the loss of either or

both of these treatments will come a definite change in the mowing requirements and aesthetic level of the roadsides over the course of the year. Hopefully, Division Six can incorporate both winter and summer broadcast treatments in the future so they can gain the maximum long term benefits.

OSU personnel would like to reassure Division Six personnel about the benefits of the winter annual weed control treatment of Campaign + AMS. Division Six personnel had a long history of using atrazine to control winter annual weeds and as this treatment was discontinued in 2004 we are now a little concerned there may be apprehension towards the alternative Campaign + AMS treatment. We want to reassure Division Six personnel that many other ODOT field divisions made the transition from atrazine to Campaign + AMS with flying colors. As a matter of fact most ODOT folks are getting much better results with the Campaign + AMS treatment than they did with atrazine. We realize this transition may simply be a matter of funding and that is something that will hopefully get better in the near future.

We would also recommend, if at all possible, that the state Maintenance Division office replace the Division Six Patchen roadside shoulder sprayer that was destroyed two years ago in an accident. The loss of this specialized sprayer has resulted in a return back to less efficient equipment that may indirectly cause the premature loss of roadside shoulders due to difficulties in making the traditional herbicide treatments needed to control encroaching vegetation.

Table 6. Summary of Division Six Herbicide Survey Results¹.

Herbicide Treatments	Herbicide Rate/A ²	Targeted Weed	Date Started	Date Ended	Acreages Treated		Overall Success (good, fair, poor)
					Average/Facility	Total Division	
atrazine	2 qt (3)	annuals broadleaf weeds	3-16-05	5-12-05	272	817	good (1) fair (2)
Campaign	4.16 pt (2)	winter annuals broadleaf weeds	3-21-05	4-14-05	725	1,450	good (2)
Ranger Pro + Oust XP	1 pt + 1 oz (2)	johnsongrass broadleaf weeds	5-13-05	7-13-05	683	2,050	good (2) fair (1)
Roundup Pro + Oust XP	1 pt + 1 oz (3) 0.9 pt + 1.1 oz (1)	annuals broadleaf weeds johnsongrass	3-17-05	7-13-05	858	3,431	good (3) fair (1)
Banvel	1 pt (1) 10 oz (1)	broadleaf weeds musk thistle	4-15-05	7-1-05	27.5	55	good (1–musk) fair (1)
Arsenal + Roundup Pro	1% Arsenal + 2% Roundup Pro (1) ??? (1)	cracks in shoulder bermudagrass all vegetation	6-10-05	7-14-05	7.5+	15+	good (1) fair (1)
Roundup Pro + Oust XP	??? (1)	all vegetation	4-15-05	5-5-05	-----	-----	fair (1)

¹Total number of responses to survey: 9 of 9.

²Numbers in parenthesis refer to the number of county/interstate facilities. A '???' indicates that information was not provided for the production of this report.

8.0 Survey of the Division Seven Herbicide Program

8.1 Herbicide Program Survey Results

A total of 10 out of 10 maintenance facilities in Division Seven responded to the survey this year. In response to survey questions 2-11 no concerns arose. A meeting was held at Division Seven headquarters on September 13, 2005 to solicit comments and opinions from division administrative personnel and field superintendents. Comments and recommendations in this report will be based on the surveys and meeting.

Division Seven herbicide usage is summarized in Table 7. Division Seven applied the last of its atrazine this past winter and continued its transition into the alternative treatment of Campaign + AMS. Most of Division Seven roadsides were treated this past winter with Campaign + AMS which provided good control of winter annual weeds. This year the Campaign herbicide was ordered very late and not delivered until late March. However, Division Seven applicators proved that when motivated they can make things happen. About 90% of the nearly 7,000 acres treated with Campaign + AMS were treated in about 15 working days. Division Seven used MSMA alone and combined with Outrider to control johnsongrass and summer annual weeds with good success this past summer. MSMA rates continue to be high for a few of the counties. The maximum use rate for MSMA is 2 qt/A (3 lb active ingredient per acre). There is no benefit in using MSMA rates higher than this only added expense. Overdrive and Transline herbicides were used by five facilities to control musk thistle successfully this past year. Aquamaster was used with fair success to control cattails. Garlon 3A + surfactant was used at a rate of a 2% solution to successfully control willows. Garlon 3A recently received an aquatic label and should be a superior product for tree control around bridges, creeks and other surface water. Roundup Pro Concentrate (alone), Arsenal + Oust and Roundup Pro Concentrate + Arsenal were all used on shoulders and guardrails to control all vegetation successfully.

8.2 Comments and Recommendations from OSU Personnel

With the recent transition from atrazine to Campaign + AMS for winter annual weed control and considering current summer weed control programs, consisting mainly of MSMA alone or mixed with Oust/Outrider, the Division Seven roadsides are very sound. We would recommend staying the course with this years efforts and work towards making treatment timings as optimum as possible and make some minor adjustment to some of the herbicide rates. This should continue to provide very good results when combined with timely mowings. Division Seven should continue to watch for specific weed escapes as herbicide treatments would require temporary adjustments to address those concerns.

As far as optimum treatment timings in an average year the southern counties in Division Seven should be ready for Campaign + AMS applications as early as the last week in February. This may sound early to some folks but as long as the air temperatures are getting into the 50 degree range, the winter annual weeds will be susceptible and equipment should function just fine. Division Seven counties in the northern part of the division would normally start their Campaign applications one to two weeks later than those along the Red River. These timings should give Div. 7 about 3 to 4 weeks to apply all Campaign + AMS treatments and achieve the

best weed control possible while minimizing injury to bermudagrass that has greened up early. Remember that applying Campaign under these cooler air temperatures will require 3 to 4 weeks to actually control weeds. Optimum timing for summer applications is more difficult based on the timing of spring and droughty conditions that can present themselves in early summer. Under average conditions MSMA applications could be made as early as the last week of April in the southern part of the division and one to two weeks later in the northern part of Division Seven. Remember, if MSMA is sprayed by itself, it will take 2 to 3 applications about 3 weeks apart to actually control johnsongrass. The addition of Oust or Outrider to the first application will eliminate at least one follow-up MSMA application and under ideal conditions can eliminate the need for any MSMA retreatments. Division Seven should also remember that the cost of MSMA programs is increasing slightly each year and that the very good and safe Roundup Pro Concentrate + Outrider program is very cost competitive.

Table 7. Summary of Division Seven Herbicide Survey Results¹.

Herbicide Treatments	Herbicide Rate/A ²	Targeted Weed	Date Started	Date Ended	Acreages Treated		Overall Success (good, fair, poor)
					Average/Facility	Total Division	
Campaign + AMS	2.5 pt + 3.4 lb (2) 2 pt + ??? (5) 3.3 pt + ??? (1) 2.3 pt + ??? (1)	winter annuals broadleaf weeds	2-24-05	4-15-05	632	6,324	good (9) fair (1)
atrazine	2 qt (1)	winter annuals	1-19-05	1-20-05	109	109	poor (1)
Campaign + Roundup Pro + AMS (Cotton Co.)	2 pt + 10 oz + 5.1 lb (1)	winter annuals broadleaf weeds ryegrass	3-21-05	3-31-05	750	750	good (1)
MSMA	3.5 lb (2) 3 lb (3) 4.3 (1) ??? (1)	johnsongrass broadleaf weeds sandbur	5-20-05	8-31-05+	792	5,541	good (7)
MSMA + Oust or Outrider	2.4 lb + 1 oz (1) 3 lb + 1 oz (1)	johnsongrass	5-5-05	6-28-05	862	2,585	good (3)
Roundup Pro Concentrate (handgun)	1.5 pt (1) ??? (1)	johnsongrass guardrail	4-25-05	8-4-05	25.5	51	good (2)
Roundup Pro Concentrate + Arsenal	6 qt + 2.5 qt (1) 3.6 qt + 1.2 qt (1) 3% solution + 0.5% solution (1)	all vegetation bermudagrass broadleaf weeds shoulder cracks	5-6-05	6-29-05	21.7	65	good (2) fair (1)
Arsenal	1.2 qt (1)	all vegetation	11-5-04	11-5-04	33	33	good (1)
Arsenal + Oust (handgun)	??? (1)	bareground signs guardrails	6-5-04	7-5-04	----	----	good (1)
Overdrive	1.5 oz (1) 4 oz (1)	musk thistle	4-8-05	5-12-05	2.5	5	good (2)
Transline + surfactant	16 oz (1) 6 oz (1) ??? (1)	musk thistle	4-22-05	5-19-05	23.7	71	good (3)
Garlon 4 + oil carrier	5% solution (1) ??? (1)	cut stump treatment	2-1-05	8-31-05+	----	----	good (2)
Aquamaster + surfactant	1.5% solution + 0.5% solution (1)	cattails	6-21-05	6-21-05	0.5	0.5	fair (1)
Garlon 3A + surfactant	2% solution + 0.5% solution (1)	willows	5-18-05	5-18-05	0.5	0.5	good (1)

¹Total number of responses to survey: 10 of 10.

²Numbers in parenthesis refer to the number of county/interstate facilities. A '???' indicates that information was not provided for the production of this report.

9.0 Survey of the Division Eight Herbicide Program

9.1 Herbicide Program Survey Results

A total of 10 out of 10 maintenance facilities in Division Eight responded to the survey this year. In response to survey questions 2-11 no concerns arose. A meeting was held at Division Eight headquarters on September 7, 2005 to solicit comments and opinions from division administrative personnel. Comments and recommendations in this report are based on the surveys and meeting.

Division Eight herbicide usage is summarized in Table 8. Campaign + AMS treatments increased in acreage this year as all but one county used this treatment to successfully control winter annual weeds. Campaign rates were very good and most treatment timings were close to optimum, however there were a few applications beginning in mid-February. Considering that Division Eight is a northern field division it would be best to shoot for a late February or March 1 starting date to ensure that targeted winter annual weeds are large enough and actively growing to achieve our desired level of control. There were a few applications being completed in mid-April at which point common bermudagrass will likely be at 30-50% green-up. Applying Campaign at this time will cause temporary injury to the bermudagrass so caution should be used. Division Eight used a Roundup Pro Concentrate + Oust XP or SFM 75 summer herbicide treatment with good success this year. Herbicide rates were good for most of the counties but application timing was late by about 2 to 3 weeks for much of the Division. Considering the location of Division Eight the summer weed control program should be started in mid-May with final treatments being made in mid-June assuming there are no drought conditions. Transline was used successfully by four facilities to control musk thistle. Garlon 4 + surfactant was used to provide good brush control when applied as a foliar treatment in late spring through mid-summer. Aquastar + surfactant was used in an attempt to control brush in early summer with poor success. After review of the Aquastar and surfactant rates they were on the very low end which likely resulted in the poor control. Remember to call OSU personnel for recommendations on product rates.

9.2 Comments and Recommendations from OSU Personnel

With a new Division Engineer starting in the fall of 2005 it will be important to reestablish or verify the goals and priorities with regards to the Division Eight roadside vegetation management programs. Hopefully the new Division Engineer can see the benefits of a quality mowing program integrated with a quality herbicide program and continue to support the integrated approach in the years ahead. This past year Division Eight had a very sound herbicide program with Campaign + AMS applied in late winter followed by Roundup Pro Concentrate + Oust XP or SFM 75 applied in early summer. We would like to encourage Division Eight to continue this effort as this program will continue to supply both short-term benefits (weed control and mowing reductions) and long-term benefits (release of bermudagrass and other beneficial grasses). If Division Eight crews need to work on anything it would be to try and optimize the application timings a little better. OSU publication E-958 has the optimum dates published for reference but like any reference material these application dates need to fit within the activities and priorities within each Field Division and maintenance facility. Herbicide product and rate recommendations from OSU are based on applying the specific treatments within specific dates each year. During these dates the targeted weeds should

be at a susceptible stage of growth to obtain the highest level of weed control. It is a statewide goal of all ODOT herbicide programs to try and use the lowest herbicide rates possible to achieve acceptable levels of weed control. To be able to successfully use lower rates the timing of the application becomes very critical.

Table 8. Summary of Division Eight Herbicide Survey Results¹.

Herbicide Treatments	Herbicide Rate/A ²	Targeted Weed	Date Started	Date Ended	Acreages Treated		Overall Success (good, fair, poor)
					Average/Facility	Total Division	
Campaign + AMS	2 pt + 5 lb (3) 2 pt + 3.4 lb (5) 2 pt + 6 lb (1) ??? (1)	winter annuals fescue cheat clover	2-14-05	4-18-05	625	6,254	good (8) fair (1) ??? (1)
Roundup Pro Concentrate + Oust XP/SFM 75	13 oz + 0.75 oz (1) 13 oz + 1 oz (4) 19 oz + ??? (1) 17.7 oz + 1.3 oz (1) 48 oz + 1 oz (1)	johnsongrass weeds broadleaf weeds	5-16-05	8-3-05	529	4,230	good (6) fair (2)
Roundup Pro Concentrate	??? (1)	johnsongrass	6-23-05	6-27-05	100	100	good (1)
Transline + surfactant	8 oz (1) 0.33 oz /3gal (1) ??? (2)	musk thistle	2-14-05	7-20-05	43.8+	175+	good (4)
Roundup Pro Concentrate + Oust XP (handgun)	1.5 gal + 0.5 oz/ 100 gal	guardrail treatment	7-1-05	7-10-05	-----	-----	good (1)
Aquastar + surfactant	6 pt + 6 pt	brush weeds	6-22-05	6-22-05	15	15	poor (1)
Garlon 4 + surfactant	4 qt + 2 qt/100 gal (1) ??? (1)	brush	4-1-05	7-22-05	-----	-----	good (2)

¹Total number of responses to survey: 10 of 10.

²Numbers in parenthesis refer to the number of county/interstate facilities. A '???' indicates that information was not provided for the production of this report.

10.0 Statewide Summary of ODOT Herbicide Programs

All-in-all 2005 appeared to be a good year for ODOT herbicide programs. The acres treated is up significantly and 6 of 8 field divisions had both a winter annual weed control program and summer weed control program. Those of you who have worked with OSU roadside vegetation management personnel know we have a lot of different herbicide treatments that are recommended for the various ODOT vegetation problems statewide. This is mainly because there are a lot of small, medium and large vegetation problems across Oklahoma highway rights-of-way. We could make things simple by only recommending the use of 3 or 4 different herbicides but that wouldn't come close to addressing all of the problems effectively. Of all the ODOT vegetation problems it can be said that most of them (90%) can be successfully managed by maintaining a quality broadcast winter annual weed control program (Campaign + AMS) followed by a quality summer weed control program (glyphosate/MSMA mixed with Oust, Outrider or Plateau). These two basic broadcast treatments bring a great deal to the table with respect to managing weeds and the mowing requirements of our roadsides. Maintaining these two basic broadcast treatments while paying close attention to the details of treatment timing and accurate applications will produce a good looking roadside.

This year 6 of 8 field divisions (1,3,4,5,7,8) had good winter annual weed control programs and are experiencing the benefits of controlling these particular weeds in early spring/summer thus reducing mowing requirements. Division Two applied atrazine this past winter with good success and is aware of the loss of atrazine use in the future. Division Two has expressed an interest in the Campaign + AMS program. We would like to encourage Division Two personnel to incorporate the Campaign + AMS treatment into their roadside vegetation management program for 2006. Division Six, due primarily to budget constraints, has had difficulty in maintaining a winter annual weed control program. We would also like to encourage Division Six personnel to incorporate the Campaign + AMS treatment into their roadside vegetation management program for 2006 if budgeting would allow. Again, we feel like the Campaign + AMS program is a basic program that brings more to the table than it removes. This past year ODOT field divisions increased the number of acres treated with summer weed control programs by nearly 20%. Most of the increase was from an increased use of either glyphosate + Oust treatments or MSMA treatments. Field Divisions Two and Eight reinstalled a summer weed control program; Field Divisions Four and Six maintained a summer weed control program; and Field Divisions Three, Five, and Seven increased current summer weed control program efforts. For the past two years Division One has struggled, primarily due to budget constraints, to maintain a summer weed control program. We would like to encourage Division One personnel to incorporate one of the summer weed control treatments into their roadside vegetation management program for 2006 if budgeting would allow. Again, we feel like the various suggested summer weed control treatments are a part of a basic program that produce long-term benefits that are very cost efficient. As mentioned 2005 saw an increased effort in Field Division herbicide programs, especially with respect to the basic winter annual weed control and summer weed control treatments. We feel this is a sound investment of maintenance funds as these basic treatments minimize mowing requirements, make mowing more efficient and provide for better looking roadside clear zones. In all likelihood the soaring oil and gasoline prices of 2005 will be something to contend with during the 2006 maintenance season. It should be noted that ODOT herbicide prices continued to decline as indicated in the recent 2005/2006 ODOT Herbicide

Contract. The herbicide costs next year for a winter annual weed control program (Campaign 2 pt/A + AMS 4.0 lb/A) followed by a summer weed control program (generic glyphosate 16 fl oz/A + generic sulfometuron (SFM 75) 1 oz prod/A) should be close to \$14.00/acre for both. These two treatments will remove at least two and maybe even three clear zone mowing cycles. With increasing gas/diesel prices one mowing cycle would likely cost more than both of the aforementioned herbicide treatments. We encourage all field divisions to consult with OSU personnel on herbicide program suggestions at their discretion.

This year the ODOT Maintenance Division office in Oklahoma City, in conjunction with OSU personnel, produced and implemented the Approved Herbicide and Adjuvant List (AHAL) Program. When ODOT field divisions look at buying next years herbicides they will no doubt see a different, smaller state-wide herbicide contract that will hopefully be easier to understand. The AHAL program criteria has also been distributed to all manufacturers and distributors who may choose to sell roadside products to ODOT in the future. Our industry representatives will be required to send in a completed product registration form to ODOT at which point inclusion in the current AHAL will be considered if all approval criteria are met. If approved the new product may be bid on in future ODOT herbicide contracts if it meets bid specifications. At field divisions meetings this past September OSU personnel met with field division administrators and most division warehouse superintendents to discuss this new program. The ODOT warehouse superintendents (or other designated personnel) will be the final person to check and make sure that distributors are delivering the exact products that were bid. In this day and age of “generic herbicides” some distributors are delivering generic products other than what they bid. These new generics may or may not be approved (approved products will be on the AHAL) and ODOT should never accept a product that is different than what the original paperwork says. If someone is not 100% sure a quick phone call can verify whether or not it would be prudent to accept a shipment of herbicide that has a name discrepancy. This scenario has been discussed with all distributors and they have been told that ODOT will be watching for this with all future deliveries. The main area to watch for closely is the delivery of generic glyphosate products (Honcho, Mirage, Ranger Pro, Credit Extra, etc.).

Last year the Oklahoma Department of Agriculture, Food, and Forestry (ODAFF) removed the “hormone no-spray laws” from the Oklahoma Pesticide Laws and Regulations. These were the laws that regulated the use of certain types of herbicides, such as 2,4-D, around sensitive crops such as cotton or soybeans. They have since put a very trimmed down version back into the Law. However, the way that ODAFF is managing drift complaints of herbicides has changed quite a bit. ODAFF currently relies heavily on the language from the herbicide label to determine drift violations as opposed to relying on the Oklahoma Pesticide Laws and Regulations. By the letter of the Law ODOT was exempt from hormone no-spray laws in the past because they make non-commercial applications instead of commercial applications. The newest version of the Law encompasses all applications (commercial, non-commercial (ODOT), and private). Changes to the current ODAFF Pesticide Laws and Regulations will more than likely continue in the near future, especially with respect to drift management, liability and violations. This past summer there was a large increase in drift damage complaints in Southwest and North Central Oklahoma (mainly on cotton). This resulted in an unprecedented ODAFF effort to look into what may have caused such a dramatic increase. ODAFF administrative and field personnel went into these areas and made spot inspections of commercial, non-commercial

and private application records from a wide assortment of applicators (some of these included ODOT county spray records). ODAFF has had a chance to review these records and has begun to share some of the results at statewide meetings. The first thing they noticed was application spray records were not filled out very well (information was lacking or could not be understood). The poorly written application records turned into ODAFF made their investigation into the increase in drift problems very difficult if not impossible. Who exactly was doing well or not doing well with their recordkeeping was not shared, but it goes without saying that ODOT spray crews need to keep good records of all applications. With some new attention being placed on cotton and grape (vineyards) production areas in Oklahoma, next year it will be important to be extra cautious around these crops. The ODAFF Pesticide Laws and Regulations will likely change again in the near future and to minimize any negative affects to ODOT herbicide programs everyone will need to pay closer attention to drift management and recordkeeping. Both ODAFF and the OSU Pesticide Coordinator will likely be having a series of meetings with agriculture leaders during the fall of 2005 and 2006 to address drift management issues in Oklahoma (these meetings started in summer of 2005). OSU roadside vegetation management personnel will try and monitor these meetings closely. OSU personnel have requested an invitation to future ODAFF drift management meetings.

Once again, congratulations to ODOT spray crews statewide because, as indicated by your surveys ODOT had only three formal drift complaints filed against them this past year. ODOT treated 99,650 plus acres along the state highway system this year and this small amount of formal complaints is remarkable. Keep up the good work! Of the three drift complaints, two were found to be as a result of someone else's herbicide use, and the final drift complaint was from ODOT herbicide use.

Across the state most ODOT field divisions have a few roadside ditches or drainages that are filled with cattails. Cattails are there because it's wet and unless you remove the water you will always have cattails reinfesting and clogging these areas. Some of the time these areas are wet because the ditch or drainage is part of the roadside design to carry water off site. Other times it may be a seeping water table or drainage from a nearby pond. In other words you will have to live with the water source most of the time. In areas where you need to control cattails to keep water flowing properly we would like to encourage ODOT to look at the newly labeled herbicide Habitat. It is produced by BASF and at low rates it has proven this year across the country to provide very high levels of cattail control (95% or greater) from a single application. ODOT has typically used Rodeo, Aquamaster or Aquaneat with a surfactant and is lucky to get 50 to 75% cattail control. Habitat results from this first year are very good with consistent high levels of control and no major problems with any of the applications. The use rate for Habitat (applied with using a small pump-up sprayer, 12-volt sprayer or powered handgun) would be a 0.5 to 0.75% solution combined with a non-ionic aquatic approved surfactant at 0.25 to 0.5% solution. At these rates ODOT needs to cover at least 70% of the above ground cattails leaves and stems. Do not spray to the point of runoff as this will not increase control and will waste the herbicide. This treatment will not control cattails that have not emerged from the water. Do not spray this treatment in areas that have desirable tree roots growing among the cattails as it will damage or control many tree species. This treatment will also control willow and cottonwood saplings.

Table 9. Summary of 2005 ODOT herbicide treatments, target weeds and total acres treated with herbicides in Oklahoma.

Herbicide Treatment	Target Weed	Divisions Using Treatment(s)	Total Acreage Treated
atrazine	winter annual weeds	2, 6, 7	6,788
Campaign +/- AMS +/- Others	winter annual weeds	1, 3, 4, 5, 6, 7, 8	41,653
glyphosate + Oust	johnsongrass and summer annual weeds	1, 2, 4, 5, 6, 8	28,986
glyphosate + Outrider	johnsongrass and summer annual weeds	1, 3	7,851
glyphosate + Plateau	johnsongrass and summer annual weeds	5	1,053
MSMA +/- Oust, Outrider, Other	johnsongrass and summer annual weeds	2, 5, 7	11,220
glyphosate (alone)	johnsongrass and summer annual weeds	1, 2, 8	466
glyphosate Krovar DF glyphosate + Arsenal glyphosate + Arsenal + Oust glyphosate + Karmex	total vegetation control bare ground sign-posts guardrails shoulders, cracks	2, 3, 4, 5, 6, 7, 8	749
Garlon 4 Vanquish	general broadleaf weed control	5, 6	154
Overdrive +/- Others	musk thistle	2, 7	11
Transline +/- Others	musk thistle	4, 7, 8	318
Garlon 4 + diesel	basal brush control	1, 7	----
Tordon K + Garlon 4	foliar brush control	2	310
Garlon 4 or 3A	foliar brush control	1, 2, 8	50
Roundup Pro	cut stump treatment	----	----
Aquamaster/Aquaneat	aquatic vegetation control	3, 5	40.5
Garlon 3A	aquatic vegetation control	7	0.5
Total			99,650

Table 10. Comparison of herbicide acreages treated in 2002, 2003, 2004 and 2005 for the more common broadcast treatments and total acres treated by division.

ODOT Field Division	Year	Herbicide Treatments						Total Acres Treated with Selected Herbicide Applications
		atrazine (winter annual weed control)	Campaign +/- AMS (winter annual weed control)	glyphosate + Oust (johnsongrass control)	glyphosate + Outrider (johnsongrass control)	MSMA +/- Oust/Outrider (johnsongrass control)	glyphosate (johnsongrass control)	
1	2002	0	5,140	4,573	0	0	18	9,731
	2003	170	5,356	862	4,794	0	222	11,404
	2004	0	5,662	0	16	0	168	5,846
	2005	0	5,892	64	309	0	42	6,307
2	2002	2,240	0	3,018	0	20	0	5,278
	2003	5,197	0	4,666	0	1,372	1,500	12,735
	2004	1,558	0	2,183	0	216	0	3,957
	2005	5,862	0	6,282	0	650	113	12,907
3	2002	0	8,724	0	2,955	1,070	1,158	13,907
	2003	0	8,089	0	6,691	0	0	14,780
	2004	0	6,983	0	6,924	0	0	13,907
	2005	0	7,724	0	7,542	0	0	15,266
4	2002	616	4,956	5,211	260	70	0	11,113
	2003	606	562	915	0	80	1	2,164
	2004	0	5,682	4,023	0	838	0	10,543
	2005	0	5,234	5,612	0	0	0	10,846
5	2002	0	9,359	6,271	0	913	497	17,040
	2003	0	9,851	6,356	0	510	1,646	18,363
	2004	0	9,795	3,246	0	687	1,450	15,176
	2005	0	8,775	7,317	0	2,444	1,053	19,589
6	2002	7,300+	0	0	6,795	0	0	14,095
	2003	2,273	0	7,541	0	0	0	9,814
	2004	4,158	0	2,945	250	0	0	7,353
	2005	817	1,450	5,481	0	0	0	7,748
7	2002	2,565	4,136	0	9	6,269	486	13,465
	2003	3,611	3,830	0	0	4,147	488	12,076
	2004	3,405	4,206	0	1,230	3,710	282	12,833
	2005	109	7,074	0	0	8,126	0	15,309
8	2002	0	422	1,637	0	0	149	2,208
	2003	0	4,693	3,700	0	0	0	8,393
	2004	0	5,124	600	0	0	0	5,724
	2005	0	6,254	4,230	0	0	100	10,584
All Divisions	2002	12,721	32,737	20,710	10,019	8,342	2,308	86,837
	2003	11,857	32,381	24,040	11,485	6,109	3,857	89,729
	2004	9,121	37,450	12,997	8,420	5,451	1,900	75,339
	2005	6,788	42,403	28,986	7,851	11,220	1,308	98,556

APPENDIX A

2005 ODOT/OSU HERBICIDE PROGRAM SURVEY

2005 ODOT/OSU Herbicide Program Survey (2 pages)

Please return to your Division Headquarters on or before Aug. 19, 2005, then forward to Doug Montgomery ASAP.

ODOT Division: _____ **County/Interstate Maintenance Facility:** _____
Superintendent: _____

1. How many lane miles of state highway are in your maintenance area? _____
2. Was an application record filled out for each tankload? **yes** _____ **no** _____
3. How many personnel do you use when mixing and loading herbicides into spray trucks?
 always 1 _____ **1 or 2** _____
 always at least 2 _____ **3 or more** _____
4. How many personnel do you use on a spray truck when applications are being made?
 always 1 _____ **1 or 2** _____
 always at least 2 _____ **3 or more** _____
5. How often is the spray truck calibrated?
 once each year _____ **once for each different herbicide treatment** _____
 once a week _____ **once a day** _____ **other:** _____
6. Who decides on whether to spray on a day-to-day basis?
 division personnel _____ **superintendent** _____
 TMW I or II _____ **other:** _____
7. What was the brand name of your glyphosate product that you used this year (check all that apply)?
 Roundup Pro ___ **Roundup Pro Concentrate** ___ **Mirage** ___ **Glystar Pro** ___ **other** ___
8. Who decides on what herbicides and rates are applied at your maintenance facility?
 div. personnel _____ **superintendent** _____
 TMW I or II _____ **other:** _____
9. How many informal landowner complaints/concerns (phone calls, personal visits, etc...) did you have this year as a result of your herbicide program?

10. How many, if any, formal complaints were filed against your herbicide program with the Okla. Dept. of Agriculture? If yes, please include a brief description of complaint(s).

11. Did you have any contract herbicide applications performed in your maintenance area? If yes, please include a brief description. **yes** _____ **no** _____

Summary of 2004/2005 Herbicide Applications

(Please fill in the data for every block as precisely as possible, if you do not know then please estimate)

Herbicide Treatment	Herbicide product/Acre	Target Weed(s)	Date Started	Date Ended	Number of Loads	Acres/ Load	Total Acres	Overall Success		
								Good	Fair	Poor
<i>Example:</i> Campaign + AMS	2 pts. + 3.4 lbs.	brome, cheat, hairy vetch	3-15-02	4-7-02	15	43.3	649.5	xxx		
atrazine										
Campaign + AMS										
Roundup Pro + Oust										
Roundup Pro + Outrider										
Roundup Pro + Oasis										
MSMA + _____										
Roundup Pro (alone)										
Rodeo + surfactant										
Arsenal + _____										
Vanquish + surfactant										
Transline + surfactant										
Distinct + surfactant										
Tordon K + Garlon 4										
Garlon 4 + oil carrier (basal)										

**** Please include any additional treatment comments on an attached page ****

Thank you for all of your roadside vegetation management efforts this year.