

## **STRUCTURAL PESTICIDE USE IN NEW JERSEY: 2017 SURVEY**

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### Introduction

The Pesticide Evaluation & Monitoring Section (PEMS) began a series of pesticide use surveys in 1985. These surveys address pesticide use by licensed applicators in the state of New Jersey for agriculture, golf courses, termite control, right-of-way, mosquito control, and lawn care. The structural use survey is conducted every three years and targets pesticides used for structural pest control purposes. This report focuses on the sixth survey completed in the structural use series (2017).

All statewide pesticide use surveys are performed under the authority of the New Jersey Pesticide Control Code (NJPCP), N.J.A.C. 7:30-1 et.seq., requiring licensed applicators to maintain pesticide records for three years and to submit use records to the state when requested. This regulative authority provides an accuracy and level of response that is difficult to duplicate in a voluntary, nationwide survey. In fact, these New Jersey surveys could represent a pesticide usage census rather than a probabilistic survey.

The information collected from the PEMS pesticide use surveys is used by programs within the NJ Department of Environmental Protection along with other state agencies to aid in research, exposure management and monitoring efforts in areas such as ground water protection, farm worker protection and education, and residual pesticide sampling.

### Survey Methods

The NJDEP Bureau of Licensing and Registration's records were used to identify 3,495 licensed commercial applicators holding a 7A (general or household pest control), 7B (termite control) or 8A (General Public Health) category on his or her license. Survey forms were mailed along with instructional letters and return envelopes asking for only 2017 structural pesticide use. A total of three mailings (the first to structural pest control businesses, the second to individuals and the third to non-respondents) were sent during the first four months of 2018.

The survey requested information on each pesticide product used, including trade name, EPA registration number, percent active ingredient, amounts applied, and types of pests being controlled.

Survey information was entered into a database file. This information file was then merged with a second database that linked trade names with chemical names, and a subprogram converted reported amounts of formulated product to amounts of active ingredient (lbs. a.i.).

## Results & Discussion

Once all three mailings were completed, 2,627 out of 3,495 (75%) applicators had responded. This response rate is the lowest since the first survey in 2002. Many surveys were returned because applicators are not keeping their mailing address current with the Bureau of Licensing and Registration. PEMS forwarded “returned to sender” surveys to the Bureau of Licensing and Registration for follow-up. PEMS also forwarded a list of non-responders to the Bureau of Compliance for follow-up.

Pesticides used by the structural pest control industry in New Jersey for 2017 totaled 150,495 lbs. a.i. This total is a 60% decrease from the structural pesticide use reported in the 2014 survey. Table 1 lists all the compounds reported in the 2017 survey and the amounts (lbs. a.i.) applied. Of the amount of pesticides used that were reported during the survey, insecticides comprise 63% of the total pesticide use in the New Jersey structural pest control industry. Fumigants account for 26% of the total. Herbicides, growth regulators, rodenticides, avicides, fungicides and miscellaneous chemicals comprise the remaining 12% of pesticides applied for structural pest control.

**Table 1.** Compounds reported in the 2017 survey and the amounts (lbs. a.i.) applied.

<u>HERBICIDES</u>	<u>lbs. a.i.</u>	<u>MISCELLANEOUS</u>	<u>lbs. a.i.</u>
2,4-D	1,492	Ammonium chloride	258
2,4-DP	20	Eugenol	5
Dicamba	13	Isopropanol	3,901
Dithiopyr	48	Oil	197
Glyphosate	4,885	Piperonyl butoxide	3,362
MCPP	10	Sulfur	141
Mesotrione	1	Tetradecadienyl acetate	15
Quinclorac	5	Tricosene	2
Sulfentrazone	3	<b>Miscellaneous Total</b>	<b>7881</b>
Sulfosulfuron	7		
<b>Herbicides Total</b>	<b>6,484</b>	<u>FUNGICIDES</u>	<u>lbs. a.i.</u>
		Myclobutanil	39
<u>GROWTH</u>		Propiconazole	5
<u>REGULATORS</u>	<u>lbs. a.i.</u>	Thiram	151
Fenoxycarb	1	<b>Fungicides Total</b>	<b>195</b>
Novaluron	18		
<b>Growth Regulators Total</b>	<b>19</b>		

**Table 1. (cont.)**

<u>INSECTICIDES</u>	<u>lbs. a.i.</u>	<u>INSECTICIDES</u>	<u>lbs. a.i.</u>
Abamectin	10	Naphthalene	35
Acephate	3,609	OBD	391
Acetamiprid	624	Permethrin	840
Allethrin	5	Phenothrin	83
Bifenthrin	7,566	Phenylethyl propionate	7
Borate/Boric acid	13,184	Phosmet*	12
BTI	76	Prallethrin	1
Carbaryl	130	Propoxur	10
Chlorantraniliprole	58	Pyrethrins	376
Chlorfenapyr	926	Pyriproxyfen	1,304
Clothianidin*	73	Silica gel	223
Cyfluthrin	23,716	Silicon dioxide	814
Cyhalothrin	1,870	Tetramethrin	1
Cypermethrin	1,785	Thiamethoxam	172
DDVP	655	<b>Insecticide Total</b>	<b>94,984</b>
Deltamethrin	1,547		
Diatomaceous earth	485	<u>FUMIGANTS</u>	<u>lbs. a.i.</u>
Dinotefuran	1,029	Aluminum phosphide	56
Esfenvalerate	271	Magnesium phosphide	1
Ethofenprox	77	Methyl bromide	223
Fipronil	10,765	Sulfuryl fluoride	38,112
Fluvalinate	10,568	<b>Fumigants Total</b>	<b>38,392</b>
Hexaflumuron	44		
Hydramethylnon	112	<u>AVICIDES</u>	<u>lbs. a.i.</u>
Hydropene	901	Anthraquinone	2,416
Imidacloprid	9,409	Methyl athranilate	1
Indoxacarb	765	Polybutene	28
Methomyl	3	<b>Avicides Total</b>	<b>2,445</b>
Methoprene	47		
Metofluthrin*	3		
MGK 264	402		

**Table 1. (cont.)**

RODENTICIDES	lbs. a.i.
Brodifacoum	2
Bromadiolone	5
Chlorophacinone	1
Cholecalciferol	1
Difethialone	1
Diphacinone	3
Vitamin D3	1
Zinc phosphide	81
<b>Rodenticides Total</b>	<b>95</b>

\*Indicates a compound not reported in the 2014 survey.

^Miscellaneous compounds include pheromones, synthetic alternatives (naturally occurring elements/compounds), synergists, and disinfectants.

Table 2 lists the highest use compounds in the two main structural use pesticide categories (lbs. a.i.) as listed in Table 1. The most highly reported pesticide used in structural pest control was the fumigant sulfuryl fluoride. This fumigant accounted for approximately 25% of the reported total pesticides applied for structural pest control in New Jersey in 2017. Sulfuryl fluoride is a colorless and odorless gas that is used to fumigate buildings and some stored agricultural products. It is effective against a variety of pests including termites, mice, rats and bed bugs. The second most heavily used pest control chemical is the insecticide cyfluthrin (16% of NJ total). Cyfluthrin is a common household insecticide typically applied as a liquid to control ants, termites, cockroaches, flea and mosquitoes.

**Table 2.** Highest use compounds in the New Jersey 2017 Structural Pesticide Use Survey.

Compound	Total (lbs. a.i.)	% of Total Usage
<b>Fumigant</b>		
Sulfuryl fluoride	38,112	25
<b>Insecticides</b>		
Cyfluthrin	23,716	16
Borate/Boron/Boric Acid	13,184	9
Fipronil	10,765	7
Fluvalinate	10,568	7

Table 3 shows the type of pests and locations receiving applications during the 2017 survey period. Over 61% of the total structural pesticide usage is accounted for by indoor general pest control. Since 2011, general indoor pest control accounts for almost half of the total structural use in New Jersey during each survey period.

**Table 3.** Use totals by type of pest/location in the New Jersey 2017 Structural Use Survey.

Pest Type	Total (lbs. a.i.)	% of Total Usage
General Insect Pests-Indoors	92,420	61
General Insect Pests-Outdoors	39,046	26
Termites	16,449	11
Vertebrates (mice, bats, etc.)	2,580	2

Table 4 shows structural pesticide use by county. Camden county had the highest overall use, with an increase from 8,234 lbs. a.i. in 2014 to 50,902 lbs. a.i. in 2017. Structural pesticide use in Somerset county decreased by 50% from 2014. In Mercer and Cumberland counties, structural pesticide use decreased by 90% from 2014. It should be noted that county totals for structural pesticide use are approximate since many companies work in two or more counties and they do not report a total for each county, just total use over all for their application sites. PEMS requests they identify which county received most of their applications and that is the information entered into the database.

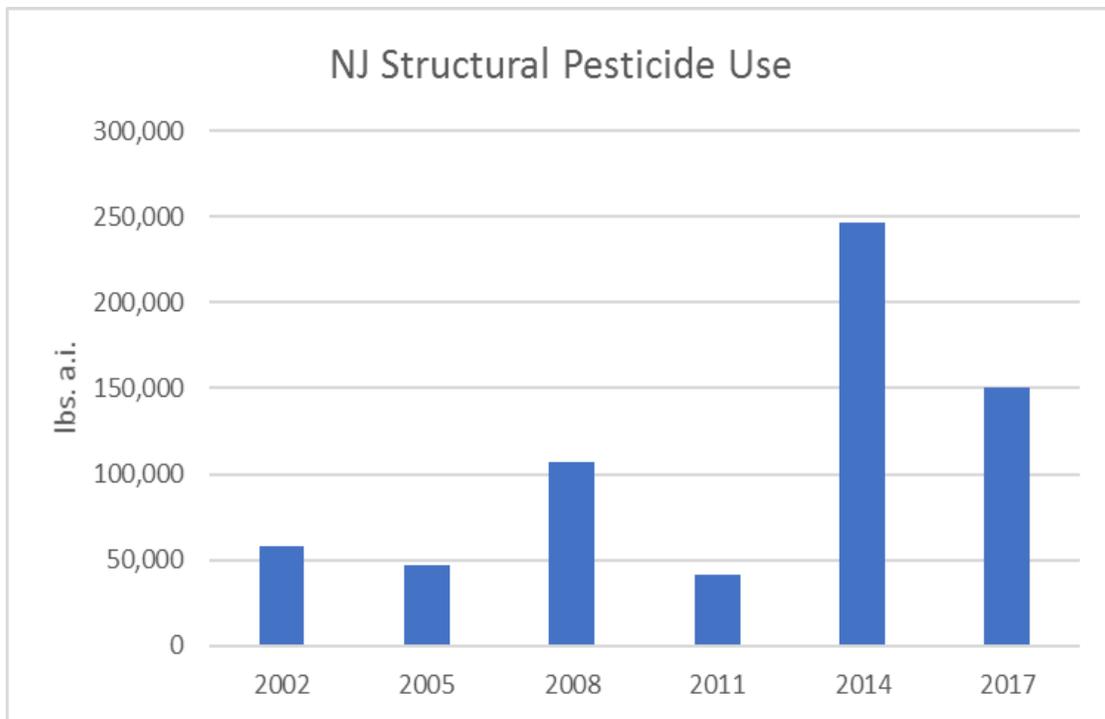
**Table 4.** Total pesticide amounts (lbs a.i.) by county in the New Jersey 2017 Structural Use Survey.

County	Amount (lbs. a.i.)	% of Total
Atlantic	10,038	7
Bergen	24,708	16
Burlington	1,443	1
Camden	50,902	34
Cape May	554	<1
Cumberland	834	1
Essex	2,414	2
Gloucester	1,765	1
Hudson	1,361	1
Hunterdon	226	<1
Mercer	2,119	1
Middlesex	6,403	4

County	Amount (lbs. a.i.)	% of Total
Monmouth	7,795	5
Morris	5,379	4
Ocean	3,208	2
Passaic	2,541	2
Salem	10	<1
Somerset	27,143	18
Sussex	247	<1
Union	995	1
Warren	410	<1
	150,495	100%

Figure 1 shows the total lbs. a.i. used in New Jersey for each structural use survey conducted. The reported pesticide usage for structural pest control decreased by approximately 60% between 2014 and 2017.

**Figure 1.** Total lbs. a.i. used in New Jersey for each structural use survey conducted (2002-2017).



## Summary & Conclusions

Only 75% of licensed structural applicators responded to the 2017 survey. This is the lowest response rate since the first structural survey in 2002. Structural use surveys are first sent to structural pest control businesses and then to any remaining licensed individuals not captured by the business responses. The business might not include all licensed individuals working for that business (as instructed in the letter), while the individual applicator assumes their response has been captured by the business and ignores the individual mailing. To ensure compliance and increase the response rate, PEMS will track repeat non-responders among businesses and individuals. PEMS will forward the names of these businesses and individuals to the Bureau of Compliance for follow-up.

Reported structural pesticide used decreased by approximately 60% between 2014 and 2017 (net decrease of approximately 96,000 lbs. a.i.). It should be noted that approximately 76,000 lbs. a.i. of the net decrease is attributed to cypermethrin and imidacloprid use. Cypermethrin use decreased from 49,149 to 1,785 lbs. a.i. and imidacloprid use decreased from 38,750 to 9,409 lbs. a.i. Both of these chemicals were heavily used for bed bug control. It is possible that the peak in cypermethrin and imidacloprid use in 2014 was an indicator of growing bed bug resistance to these chemicals, and the decrease seen between 2014 and 2017 is a result of a change in bed bug control strategies, including heat treatments.

Methyl bromide is a Class I Ozone-Depleting Substance as defined by the Montreal Protocol. The Clean Air Act mandated the phase out of methyl bromide for pest control by 2005, except for agricultural soil fumigation purposes. However, there were 18,860 lbs. a.i. and 223 lbs. a.i. of reported use in 2014 and 2017 respectively. One explanation is that many licensed pesticide applicators carry several different categories on their license, and the reported methyl bromide use could have been outside the 7A, 7B or 8A categories of the structural use survey. It is also possible that applicators are not aware of the phase out and are continuing to use products in their inventory. In the future, PEMS will monitor reported use for similar situations and work with the Bureau of Licensing and Registration and the Bureau of Compliance to provide applicators with resources to keep current with changes in pesticide product registrations.