

**New Hampshire Task Force to Review Rodenticide Impacts to Wildlife**

**Preliminary Report**

July 31, 2023

**New Hampshire Task Force to Review Rodenticide Impacts to Wildlife  
Preliminary Report – July 31, 2023**

**Rodenticide Review Task Force**

**Robert Bruleigh**, Environmentalist, New Hampshire Division of Pesticide Control, New Hampshire Department of Agriculture, Markets & Food

**Adam Carace**, Pesticide Applicator/Owner, Pest End Exterminators

**Sarah Conley**, Program Assistant, New Hampshire Division of Pesticide Control, New Hampshire Department of Agriculture, Markets & Food

**Michael Dionne**, Environmental Review Coordinator, New Hampshire Fish & Game Department

**Carol R. Foss, Ph.D.**, Senior Advisor for Science and Policy, New Hampshire Audubon

**Dallas Huggins**, New Hampshire Wildlife Rehabilitator, Nottingham Conservation Commission

**Abigail A. Mathewson, DVM, MPH**, Surveillance Epidemiology Program Manager, State Public Health Veterinarian, Infectious Disease Surveillance Section, New Hampshire Department of Health and Human Services, New Hampshire Pesticide Control Board Member

**David B. Needle, DVM DACVP**, Pathology Section Chief, New Hampshire Veterinary Diagnostic Laboratory, Clinical Associate Professor, College of Life Sciences and Agriculture (COLSA), University of New Hampshire

**David J. Rousseau**, Director, New Hampshire Division of Pesticide Control, New Hampshire Department of Agriculture, Markets & Food

**Jeff Taylor**, Commercial and Licensed Pesticide Applicator, New Hampshire Pesticide Control Board Member

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# **New Hampshire Task Force to Review Rodenticide Impacts to Wildlife Preliminary Report – July 31, 2023**

## **A. Introduction**

In response to the review of 2023 Legislative Session House Bill 326, “*An Act prohibiting the use of second-generation anticoagulant rodenticides*”, the New Hampshire Pesticide Control Board (Board) in its February 2023 meeting motioned to form a task force to review rodenticide impacts to wildlife. As a result, a task force of ten individuals convened to undertake the task of review.

From March to July of 2023 the Task Force held eight meetings. Charged with providing recommendations to the Board by August 2023, the Task Force recommends further research to address the concern, label considerations depending on imminent federal action, and better communication between relative agencies and organizations. More detailed information on recommendations can be found on page 10 of this report. This preliminary report provides background information and certain Task Force activity undertaken to date.

## **B. Background**

Rats and mice have posed problems for human societies ever since people began storing food. These rodents destroy crops and stored grains, and plagues caused by rodent-vectored diseases date back to the Roman Empire. Cats and ferrets provided the earliest attempts to control rodents, and traps were in use by the Medieval Period. While chemicals in some plants were used as rodent poisons in the late 1500s, it wasn't until the mid-twentieth century that chemical controls came into wide use. Rodenticides, the class of pesticides used to control rodents, fall into two categories, “anticoagulants” and “non-anticoagulants”.

Coagulation refers to normal blood clotting. Anticoagulant rodenticides control rodents by disrupting blood clotting. Anticoagulant rodenticides bind to the enzyme that allows for vitamin K recycling, which prevents the production of clotting factors. This leads to internal bleeding and ultimately death. Non-anticoagulant rodenticides cause mortality by other mechanisms.

The first anticoagulant rodenticides, now called “first-generation” or FGARs, were developed in the 1940s. As rodents developed resistance to these chemicals, “second-generation” anticoagulant rodenticides or SGARs were developed in the 1970s. Both non-anticoagulants and anticoagulants are presently used.

While an animal typically must consume multiple doses of an FGAR before succumbing to the poison, a single dose of an SGAR typically leads to death. These rodenticides do not cause death immediately and SGARs take a while to break down in the body, providing opportunities for predators and scavengers to eat poisoned rodents and experience secondary poisoning.

As background information the following list of rodenticides is provided:

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**Anticoagulants:**

**First-Generation Anticoagulants:**

Warfarin  
Chlorophacinone  
Diphacinone

**Second-Generation Anticoagulants:**

Brodifacoum  
Bromadiolone  
Difethialone  
Difenacoum

**Non-Anticoagulants:**

Bromethalin – affects the central nervous system, causing paralysis, swelling and eventual demise.  
Cholecalciferol – (Vitamin D3) overdose causes organ failure – most significantly heart failure.  
Zinc phosphide – Reacts with stomach acid to form poisonous phosphine gas.

**C. Rodenticide Residue in Wildlife Information**

Liver tissue can be tested for the presence of specific anticoagulant rodenticide residues and blood clotting tests can indicate the presence of anticoagulants. Such tests have documented anticoagulant residues in numerous wildlife species from North America and Europe. Some species that have been documented to be affected include hawks, falcons, eagles, owls, and mammals of the weasel, canid, and cat families.

Patrick Tate's article *Unintended Harm - Rodenticides In New Hampshire's Wildlife* in the New Hampshire Department of Fish and Game's September/October 2022 "*New Hampshire Wildlife Journal*" discusses rodenticide residues documented during a study of canine distemper virus (CDV) by the New Hampshire Veterinary Diagnostic Laboratory, University of New Hampshire.

Screening of liver tissue from an adult Bald Eagle found dead in Hopkinton on May 29, 2023, by the Pennsylvania Animal Diagnostic Laboratory System, documented the presence of brodifacoum.

Condition of an immature male Bald Eagle recovered in Epsom on June 6, 2023, strongly suggested rodenticide poisoning. Blood samples were sent for analysis, but results are not yet available. As of July 14<sup>th</sup>, this bird was still alive but showing neurological symptoms and receiving Vitamin K at a wildlife rehabilitation facility.

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### **D. Task Force Activity:**

In its inaugural meeting, the Task Force discussed a number of topics for review. A potential list is included with this report as Attachment 1. The following are certain topic areas covered by the Task Force:

#### **1. Rodent Biology Presentation**

A rodent biology presentation, “Rodent Biology and Behaviors”, was provided by Kelley Altland of Bell Laboratories, Inc., a leading manufacturer of rodent control products based in Wisconsin. Ms. Altland identified common New England rodents, detailing lifecycles, behavior tendencies and habitat ranges. This information is particularly useful for understanding how and when pest management professionals use rodenticides and potential of exposure to wildlife based on varying rodent habitats.

#### **2. Residue Study Presentation**

Jacqueline L. Frair, PhD of the Department of Environmental Forest Biology from the State University of New York College of Environmental Science and Forestry provided a presentation, “*Regional Geospatial Rodenticide Analysis*” on rodenticide residue in certain mammalian wildlife. Animals included in the study are fisher, bobcat, lynx, red fox, gray fox and river otter from a number of northeastern states including New Hampshire. The information identifies that residue is detected in wild mammal populations. Follow up studies are under consideration to research the potential impact of rodenticides on wildlife mammals. Bobcat study information “Bobcat AR exposure hotspot analysis” can be found in Attachment 6 to this report.

#### **3. Public Health Concerns**

The challenge of regulating rodenticides in consideration of public health concerns was discussed. A number of diseases spread directly and indirectly by rodents is listed and described in Attachment 2. A United States Centers for Disease Control summary was used as an outline with comparison to certain New Hampshire concerns.

#### **4. Regulations**

For description, regulations in this report refers to the Federal Insecticide, Fungicide, and Rodenticide Act (federal law), Code of Federal Regulations, New Hampshire Revised Statutes Annotated (state law) and New Hampshire Code of Administrative Rules (state rules).

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### **a. Federal Regulations**

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) is the United States law on pesticide registration, sale, distribution, and use. Unless exempt, pesticide manufacturers are required to register pesticides with the United States Environmental Protection Agency including providing supporting information relative to consideration of human health and the environment. By federal law and regulation, use of the class of “restricted use pesticides” requires a pesticide certification.

Under Section 3 of FIFIRA, except as provided by FIFRA, no person may distribute or sell any pesticide that is not registered with EPA. Manufacturers must register pesticides to allow their products to be sold. This includes an environmental review (analysis of how an active ingredient may impact the environment, people, animals, etc.). It also requires continuing review of any active ingredients.

Pesticide classification is provided to identify the level of restrictions on pesticides and can require heightened licensing requirements for purchase and use.

The class of “general use pesticides” is the most available type of pesticides, particularly given the lower level of toxicity. The availability and use of general use pesticides are generally less restrictive than restricted use pesticides.

The class of “restricted use pesticides” are typically more toxic than general use pesticides or are restricted based on application method or a particular concern. Restricted use pesticides require a restricted use license to purchase and use.

### **b. State Regulations**

New Hampshire Revised Statutes Annotated (RSA) 430:28-50 is “Pesticides Controls”, New Hampshire’s statute, or law, regarding the use, sale, and distribution of pesticides. The statute establishes the Pesticide Control Board and provides authority for the Board to regulate pesticides, particularly through rulemaking, including a pathway to restrict the use of certain pesticides as determined necessary.

The rules of the Pesticide Control Board are New Hampshire Code of Administrative Rules Pes 100-1100.

Pes 700 is specific to prohibited, prohibited-limited use, and restricted pesticides.

The statute allows for further restriction of pesticides through rulemaking by the Board in addition to federal registration requirements. For example, New Hampshire, beyond federal restriction, restricts all uses of Strychnine and Zinc Phosphide, two non-anticoagulants rodenticides.

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Restricted Use Pesticides can only be purchased and used by restricted use permit or license holders.

**5. Rodenticide Use Information**

**a. Licensed Pesticide Applicators**

Licensed pesticide applicators are required to submit an annual pesticide use report to the New Hampshire Division of Pesticide Control. The Task Force reviewed a state-wide tally of total pounds of active ingredient reported for use by licensed pesticide applicators for both first- and second-generation anticoagulant rodenticides for the years 2018 to 2022.

Typically, a rodenticide active ingredient makes up a small percentage of chemical within the total product. For example, common brodifacoum products contain 0.005% active ingredient of the total product.

The total amount, the sum of all reporting combined statewide, of rodenticide in pounds of active ingredient reported for use by licensed pesticide applicators in New Hampshire from 2018 to 2022 ranged from 3.68 pounds to 5.61 pounds per year statewide respectively. Of the total, from 2018 to 2022, first-generation anticoagulant rodenticides ranged from 1.00 pound to 0.67 pounds per year respectively. Of the total, from 2018 to 2022, second-generation anticoagulant rodenticides ranged from 2.68 pounds to 4.94 pounds. In 2022 first-generation anticoagulants represent approximately 12% of the total amount of rodenticide reported for use by licensed pesticide applicators with second-generation anticoagulants representing approximately 88% of the total.

First-generation anticoagulants reported for use by licensed pesticide applicators include warfarin, chlorophacinone, and diphacinone, with diphacinone being identified as the most used active ingredient.

Second-generation anticoagulants reported for use by licensed pesticide applicators include brodifacoum, bromadiolone, and difethialone, with brodifacoum being identified as the most used active ingredient.

Data on pesticide use is included in graphical and chart format as Attachment 4 of this report.

**b. General Consumer Use**

New Hampshire does not track the amount of rodenticide sold and used by general consumers, that is, individuals that can purchase and use certain rodenticide products without a pesticide license.



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### **6. Pest Control Operator Survey**

A survey of pesticide control companies was conducted to identify types of rodent control method used, rodent type, and potential changes from 2018 to 2022 based on clientele. Ten pesticide control companies participated.

The type of rodents noted included the house mouse, white-footed mouse, Norway Rat, chipmuck, squirrel and mole. The house mouse was identified as the most common request for control followed by the Norway Rat. The mole was the least noted request.

Control methods noted included second-generation anticoagulants, first-generation anticoagulants, exclusion, fumigation, tracking powders, live traps and kill traps.

Reasons for requesting professional rodent control included:

- Disease concern
- Meeting Health Codes or Standards
- Property damage concern
- Sleeping at night
- Public seeing a rodent at an establishment
- Not wanting to do the work (that is, not wanting to “Do It Yourself”)

In the comment section of the survey a number of companies noted the concern of homeowner use of rodenticide, particularly improper use and overuse, for example, ubiquitous placement of rodenticide around properties.

The survey can be found in Attachment 5 of this report.

### **7. Pesticide Certification (pesticide applicator license) Presentation**

The Division of Pesticide Control provided a presentation on the overview of pesticide certification requirements for New Hampshire. A copy of the presentation is included in Attachment 4 of this report.

### **8. United States Environmental Protection Agency (EPA) Proposed Interim Decision**

The United States Environmental Protection Agency (EPA) proposed interim mitigation decisions for certain rodenticides and expects a final decision to be released by years end in 2023. The proposed interim decision includes the following:

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- a. Overview of EPA's proposed interim decisions:
  - i. Second-generation anticoagulant rodenticides (brodifacoum, bromadiolone, difenacoum and difethialone) to be categorized as Restricted Use Pesticides (RUPs). This would require use by licensed pesticide applicators.
  - ii. Personal Protective Equipment (PPE) requirements, that is required equipment or clothing when applying rodenticides, to include chemical-resistant gloves for all rodenticide formulations and additionally respirators when using loose bait formulations.
  - iii. Application method prohibitions:
    1. Cancellation of certain consumer products such as bait station refills
    2. Cancellation of General Use Pesticide products for field species
    3. Prohibition of spot and broadcast applications of chlorophacinone and diphacinone in cropped areas, rangeland, pastureland, and fallow land
    4. Prohibition of spot and broadcast applications of first-generation anticoagulants and Zinc Phosphide in turf, lawns, parks, golf courses, campsites, and other recreation areas

**E. Recommendations:**

- Explore potential for further research on second-generation anticoagulant rodenticide residues in birds of prey and impacts of residues on wildlife health and survival.
- Consider product label revision to identify state-specific restriction of second-generation anticoagulant rodenticide contingent on EPA's final decision. For example, certain pesticide label instructions restrict use in particular states beyond EPA requirements. This may be considered for second-generation anticoagulants.
- Explore strategies for facilitating communication between agencies and organizations involved in documenting incidents of secondary rodenticide poisoning of native wildlife.

## ATTACHMENT 1

### Potential framework for report of NH rodenticide working group

Scope of current rodent problem in NH (Seasonal and geographic distribution, severity, characteristics)

Rodent control strategies

History and trends in rodent control in NH

Current status of second generation anticoagulant rodenticide (SGAR) applications by licensed applicators (frequency, duration, type, geographic distribution, site categories)

Availability of SGARs to general public

Mechanisms of non-target poisoning

Native wildlife species at greatest risk of secondary poisoning

Legal framework (state and federal) for SGAR application

New proposed EPA mitigation strategies

Assessment of likely effectiveness of EPA mitigation strategies in protecting New Hampshire's species of greatest conservation need (SGCN) and other species of interest

Any additional mitigation measures needed to minimize exposure of SGCN to SGARs

Prepared by:

Carol R. Foss, Ph.D., Senior Advisor for Science and Policy, New Hampshire Audubon

## ATTACHMENT 2

### Adapted from the Centers For Disease Control

#### 1) Diseases spread directly by rodents

Certain diseases can spread from rodents to people through direct contact with infected rodents (for example, breathing in contaminated air, touching contaminated materials and then touching eyes, nose, or mouth, being bitten or scratched by an infected rodent, or eating food contaminated by an infected rodent).

#### United States and NH

- Hantavirus/Hantavirus Pulmonary Syndrome
  - A virus spread through dry rodent droppings when they are disturbed sending dust into the air. This could happen through routine cleaning, moving objects around that have droppings on them, disturbing nests etc.
  - High mortality rate. No vaccine available.
  - There are no locally transmitted cases of Hanta in New Hampshire, but there are in Vermont and Maine.
- Leptospirosis
  - This is a bacterial infection spread through the urine of rodents, and other animals such as cattle, dogs, wildlife among others.
  - Leptospira infects the liver and kidneys and can cause serious life threatening organ failure.
  - This is a reportable condition, but we have not had any reports in recent years.
- Lymphocytic Choriomeningitis (LCMV)
  - This virus is spread primarily through exposure through the common house mouse's urine, feces, saliva, or nesting material. Other rodents can be infected with this virus and then also transmit disease.
  - Symptoms range from none to severe neurological involvement and death.
  - This condition is not explicitly reportable in New Hampshire, but we have had one recent fatal case.
- Mpox
  - It is still under investigation if Mpox has been established in the rodent population in the United States.
- Rat-Bite Fever (*Streptobacillus moniliformis*)
  - This is not a reportable condition in New Hampshire, but is known to happen. People become sick through bites or contact with urine/feces of rodents (to skin, mucous membranes, or through ingestion). Symptoms include, but are not limited to, fever, vomiting, rash, swollen joints, headache, and organ dysfunction/involvement.
- Salmonellosis
  - Gastrointestinal illness transmitted through fecal – oral routes.
- Tularemia
  - Tularemia can be transmitted through tick bites or direct contact with infected animals (such as rabbits), urine and feces (rodents), aerosolization of infectious material, or water. There has been a recently reported case of oropharyngeal tularemia related to rodent exposure in New Hampshire. Previously there was an outbreak among fur trappers in Vermont/New Hampshire that has been published. We do not currently have tularemia in our tick population.
- Sylvatic Typhus (rarely reported in the United States or elsewhere and required body lice and overcrowded conditions)

### **Not present/endemic in the United States**

- Hemorrhagic Fever with Renal Syndrome (although there was an outbreak of this in a rattery in the United States and Canada in 2017 – this was Seoul virus)
- Lassa Fever
- Lujo Hemorrhagic Fever
- Omsk Hemorrhagic Fever
- South American Arenaviruses (Argentine hemorrhagic fever, Bolivian hemorrhagic fever, Chapare Hemorrhagic Fever, Sabiá-associated hemorrhagic fever, and Venezuelan hemorrhagic fever)

### **2) Diseases spread indirectly by rodents**

Certain diseases can spread from rodents to people through indirect contact. This can occur when people are bitten by ticks, mites, fleas, and mosquitos that have fed on infected rodents. Diseases can also spread to people from rodents through the consumption of an intermediate host (for example, beetles or cockroaches).

**Diseases present in New Hampshire:** In New Hampshire the diseases we have that are indirectly spread by rodents are all transmitted by the tick *Ixodes scapularis* (the blacklegged tick).

- Anaplasmosis (white blood cell infecting rickettsial bacteria)
- Babesiosis (red blood cell parasitic infection similar to malaria)
- Borreliosis (inclusive of Lyme and others)
- Lyme disease
- Powassan virus (a virus causing encephalitis similar to Eastern Equine Encephalitis Virus or West Nile Virus)
- Tick-borne Relapsing Fever (In New Hampshire this is *Borrelia miyamotoi*, also called hard tick relapsing fever)

### **Not identified in New Hampshire:**

- Angiostrongylus (rat lung worm – tropical)
- Colorado tick fever
- Cutaneous leishmaniasis
- Flea-borne (Murine) Typhus (fleas from infected rats, cats, opossums - tropical)
- Hymenolepis diminuta (Tapeworm infection from exposure to rodent droppings – most commonly seen in children in institutional settings when it is identified in temperate/non-tropical areas. I am not aware of any cases in New Hampshire but is reported to have a worldwide distribution.)
- La Crosse virus
- Moniliformis moniliformis (more in the southeast United States)
- Plague
- Rickettsialpox
- Scrub typhus
- Tick-borne Relapsing Fever (there is a soft tick relapsing fever seen out west)
- Tularemia (tick-borne)

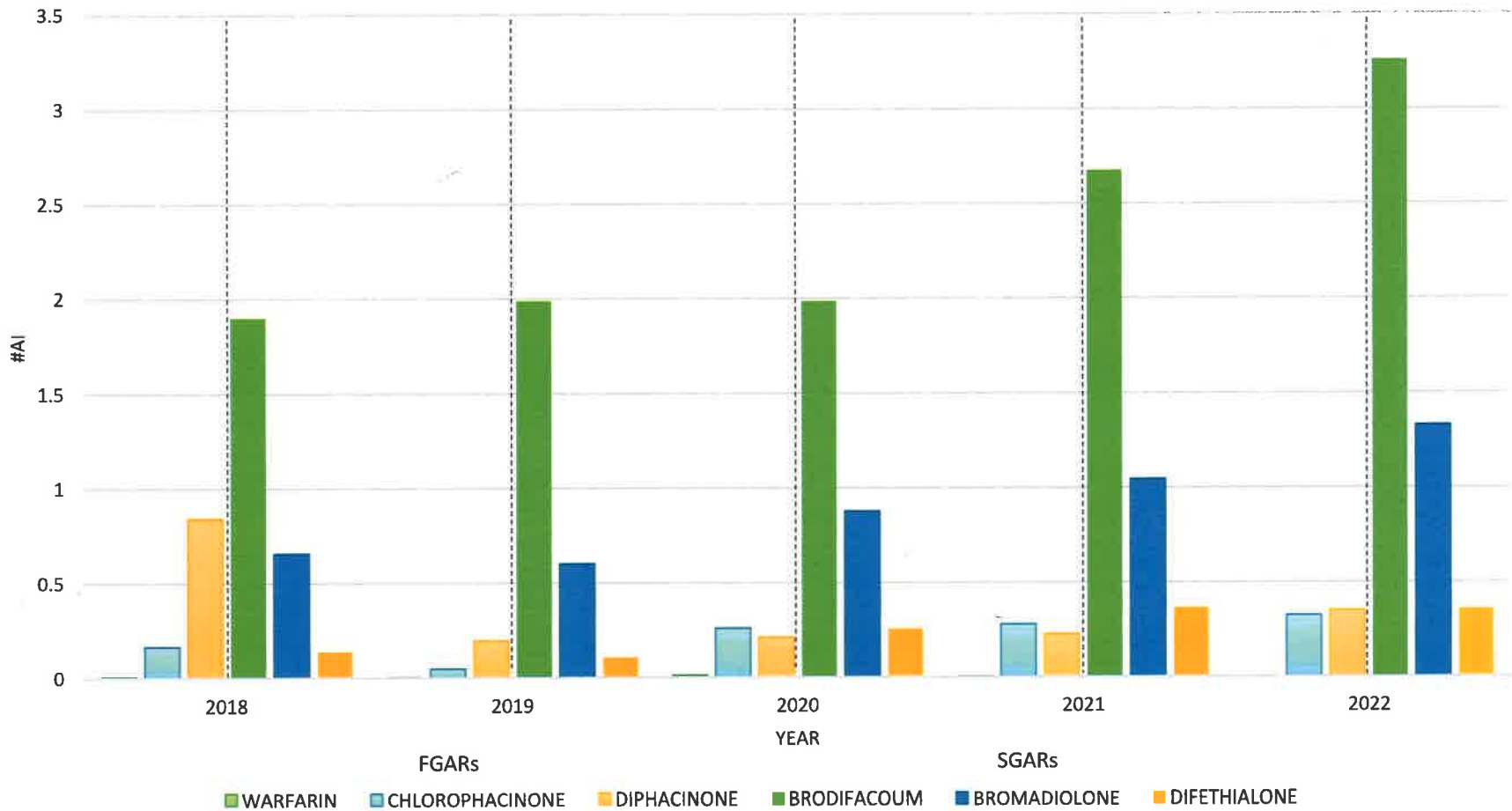
Compiled by: Abigail A. Mathewson, DVM, MPH, Surveillance Epidemiology Program Manager, State Public Health Veterinarian, Infectious Disease Surveillance Section, New Hampshire Department of Health and Human Services

ATTACHMENT 3

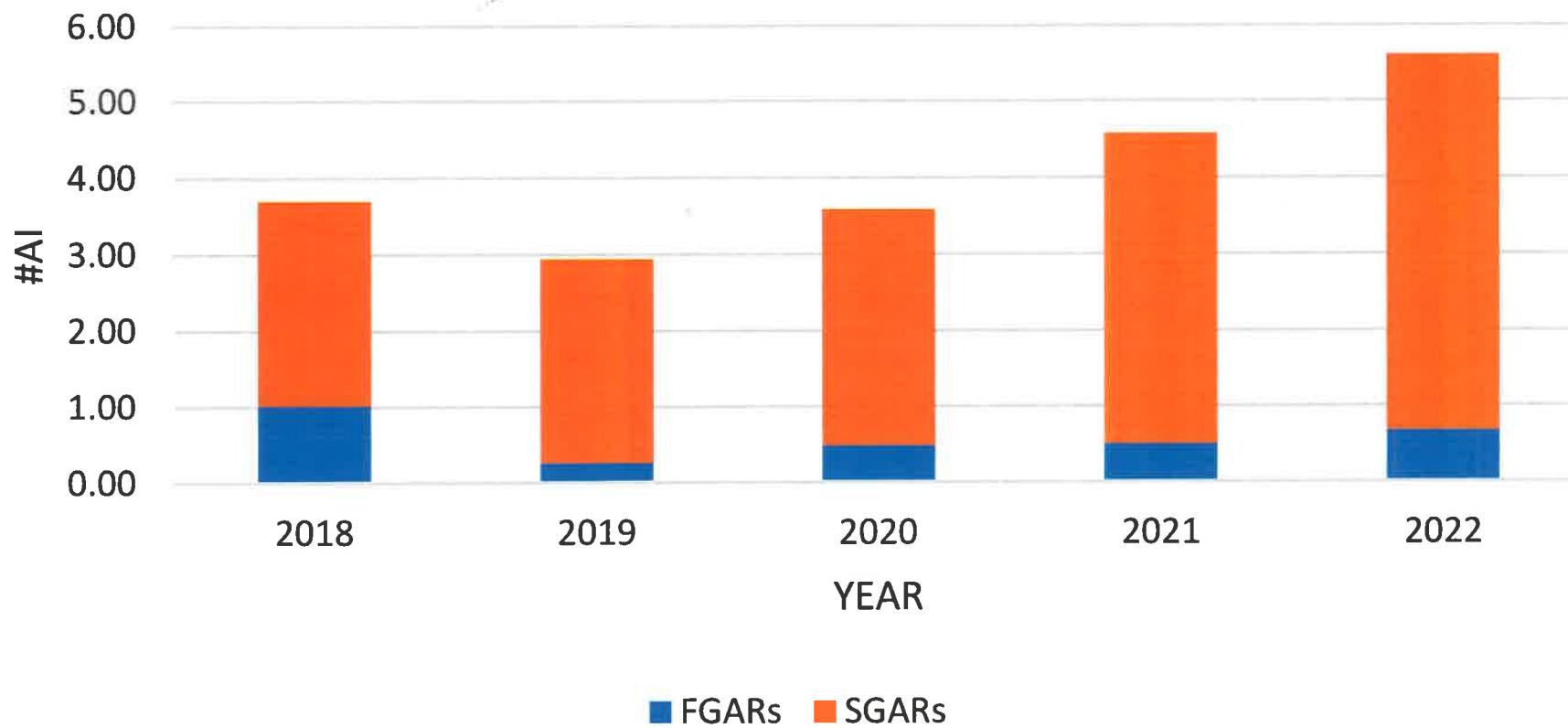
**Rodenticide Use Reported by Licensed Pesticide Applicators 2018-2023**

Prepared By:  
Robert H. Bruleigh  
Environmentalist  
New Hampshire Department of Agriculture, Markets & Food  
New Hampshire Division of Pesticide Control  
2023

### NH FGARs & SGARs 2018 - 2022

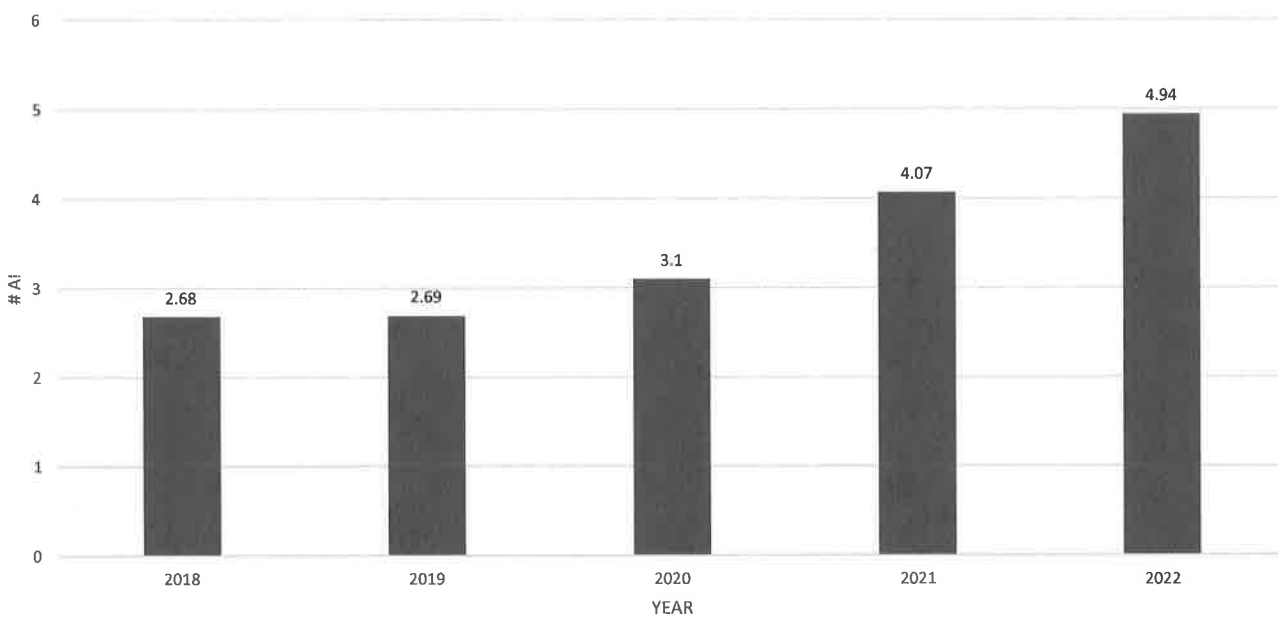


## NH FGARs & SGARs 2018-2022





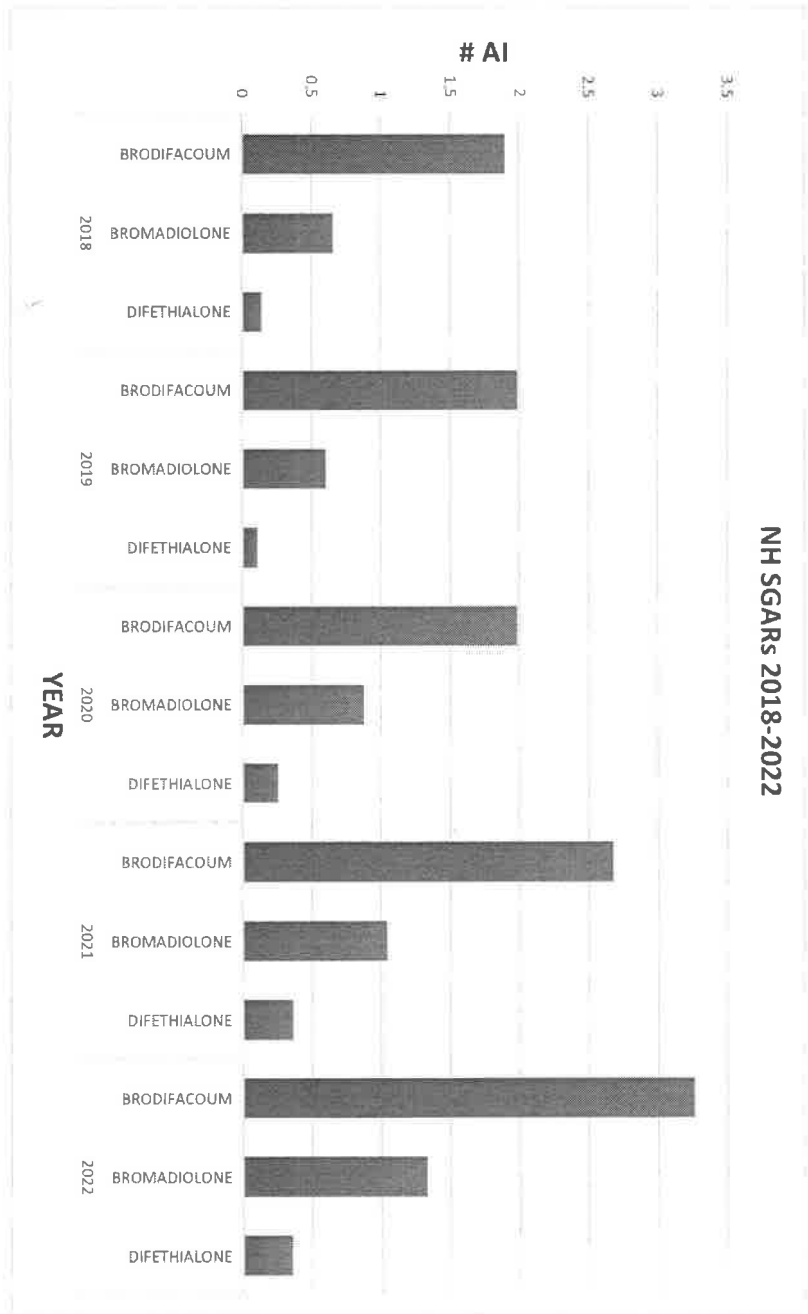
NH SGAR AI'S 2018-2022



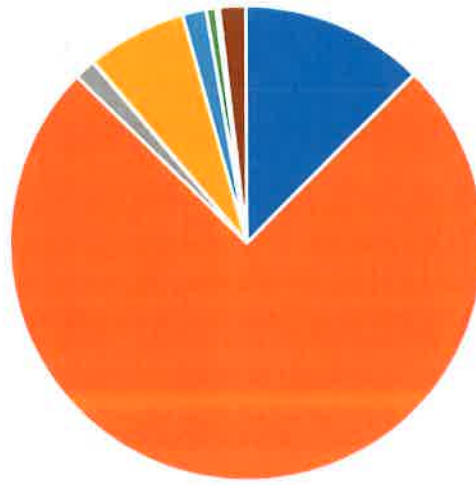
### NH SGARs BY AI 2018-2022

YEAR	AI	#
2018	BRODIFACOUM	1.896624063
	BROMADIOLONE	0.655166625
	DIFETHIALONE	0.13722605
		2.689016738
2019	BRODIFACOUM	1.985318688
	BROMADIOLONE	0.600480269
	DIFETHIALONE	0.104781928
		2.690580884
2020	BRODIFACOUM	1.979699983
	BROMADIOLONE	0.873779125
	DIFETHIALONE	0.252159063
		3.10563817
2021	BRODIFACOUM	2.672748629
	BROMADIOLONE	1.041659356
	DIFETHIALONE	0.360299766
		4.074707751
2022	BRODIFACOUM	3.257729356
	BROMADIOLONE	1.328721984
	DIFETHIALONE	0.353957238
		4.94

NH SGARs 2018-2022



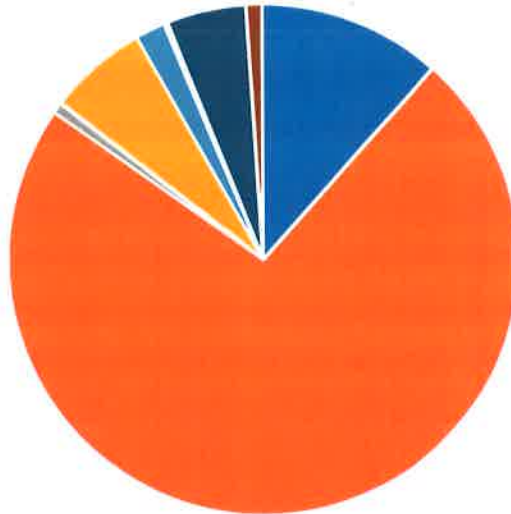
### NH SGARs COUNTY ASSIGNMENT #AI - 2018



0# REPORTED FOR  
CARROLL &  
GRAFTON  
COUNTIES

- ROCKINGHAM
- HILLSBOROUGH
- CHESHIRE
- STRAFFORD
- MERRIMACK
- SULLIVAN
- BELKNAP
- COOS

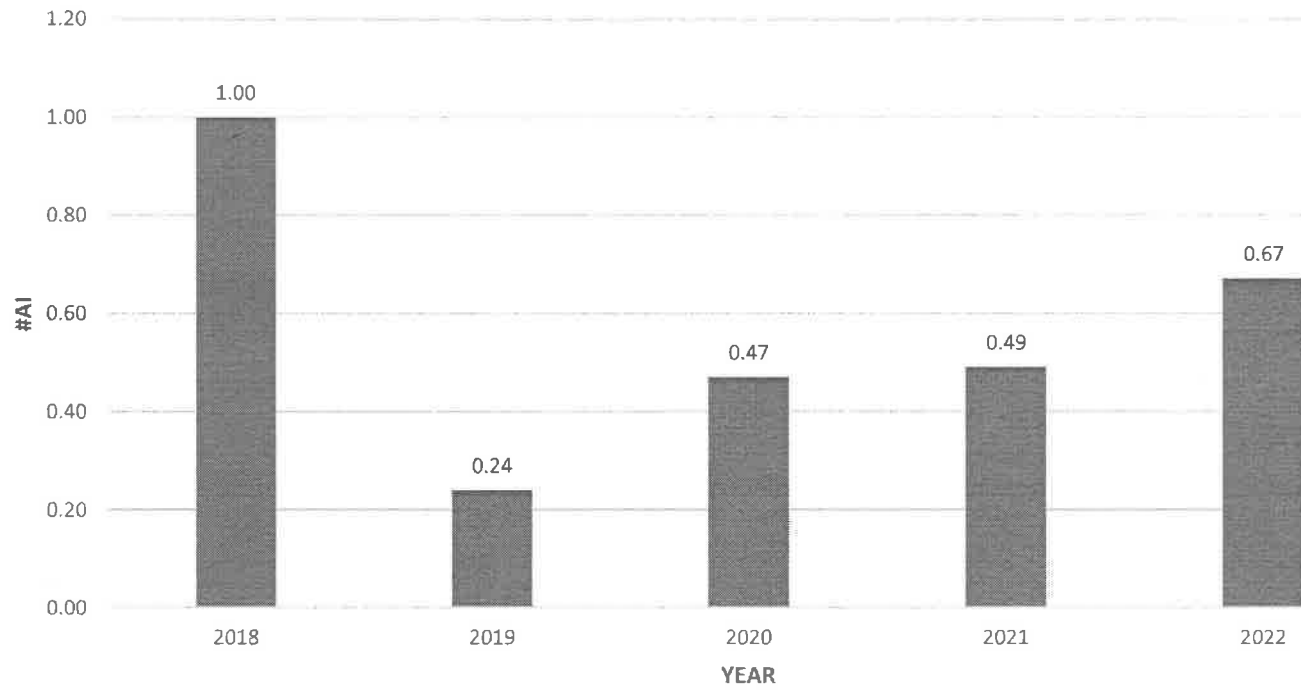
### NH SGARs COUNTY ASSIGNMENT #AI - 2022



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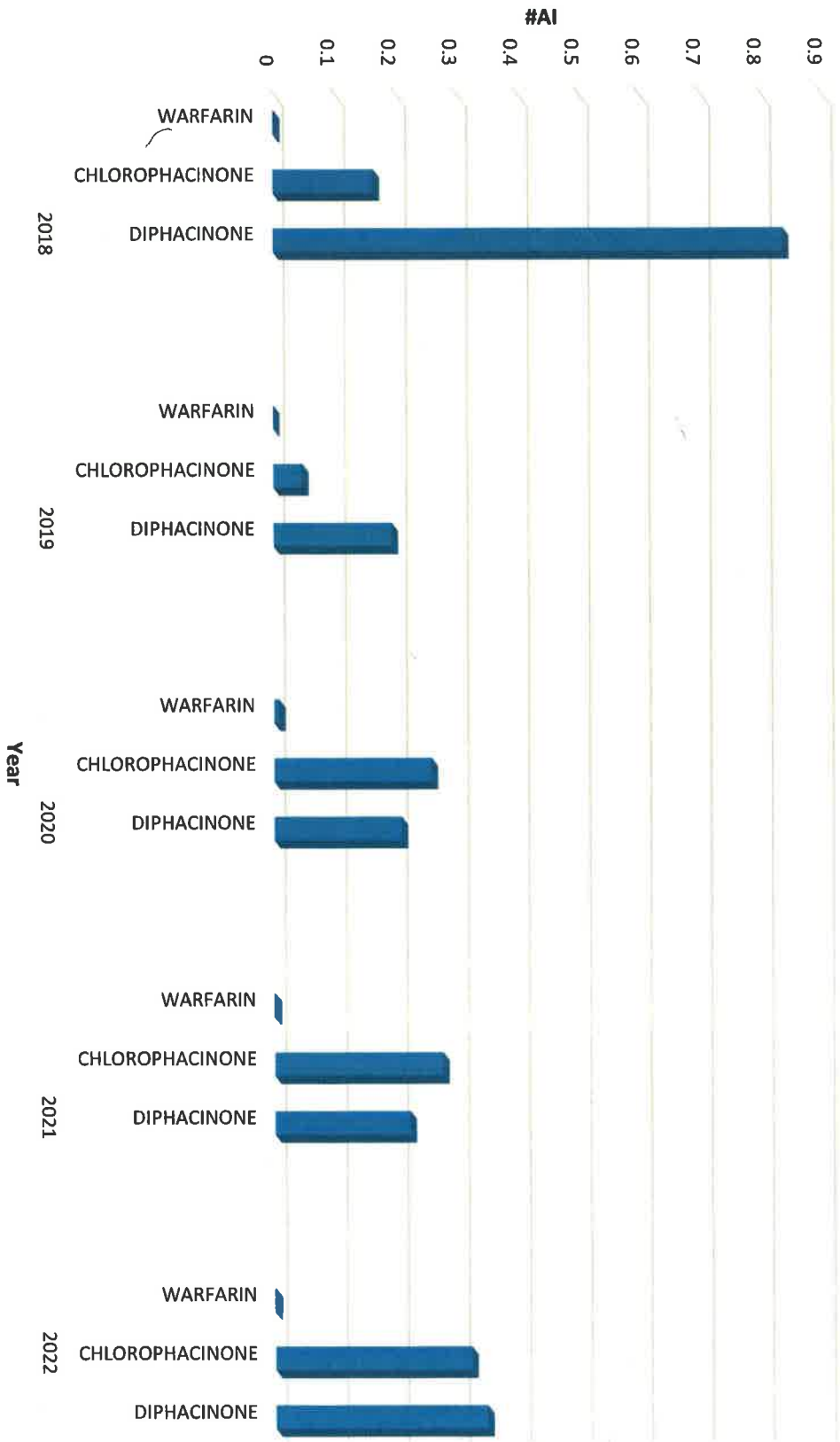
### NH FGAR AI'S 2018 - 2022



## NH FGARs BY AI 2018-2022

YEAR	AI	#
2018	WARFARIN	0.002
	CHLOROPHACINONE	0.1646325
	DIPHACINONE	0.836733156
		<u>1.003365656</u>
2019	WARFARIN	0.000375
	CHLOROPHACINONE	0.0477125
	DIPHACINONE	0.193658
		<u>0.2417455</u>
2020	WARFARIN	0.008375
	CHLOROPHACINONE	0.25831
	DIPHACINONE	0.20907475
		<u>0.47575975</u>
2021	WARFARIN	0.0005
	CHLOROPHACINONE	0.27585125
	DIPHACINONE	0.222020469
		<u>0.498371719</u>
2022	WARFARIN	0
	CHLOROPHACINONE	0.321905
	DIPHACINONE	0.347428188
		<u>0.669333188</u>

# NH FGARS AI'S 2018-2022



**New Hampshire Department  
of Agriculture, Markets &  
Food**

**Division of Pesticide Control**


**Certification Overview**

May 16, 2023

1

**Pesticide Regulations**

Federal Law  
Federal Insecticide, Fungicide, and Rodenticide  
Act: FIFRA



Follow the Label Instructions  
Pesticide Registration: Section 3  
Minimum Risk Pesticides: Section 25(b)


2

**Pesticide Regulations**

State Regulations

Revised Statutes Annotated (RSA)  
Pesticides Controls RSA 430:28-50


Code of Administrative Rules (Pes)  
Pes 100-1100



3

**Pesticide Regulations:  
Statutes (law) and Rules**


- License required: RSA 430:33
- RSA 430:28 "...recognize the benefits of chemical pesticides when applied in a safe, scientific, and proper manner, to safeguard public health and welfare and public assets in the soils, waters, forests, wildlife, and other natural resources of the state by insuring proper application of chemical pesticides..."



4

**Pesticide Classification**

- General Use
- Restricted Use
- Prohibited-Limited Use
- Prohibited



Label Signal Words: CAUTION - WARNING - DANGER

5

**Federal Requirement  
Restricted Use Pesticide**



Federal Insecticide, Fungicide & Rodenticide  
Act requires certification for individuals  
using restricted use pesticides

Key Highlights:

- Products must be classified
- Established private and commercial applicators
- Pesticides applied according to label
- Provides each state the authority to regulate pesticides

6



### Certification Figures\*

- Private Applicators 459  
373 RUP; 86 GUP
- Commercial Applicators 2,156  
2,038 RUP; 118 GUP  
Structural (General) Category 608
- Dealers 39

\*October 1, 2021 - September 30, 2022


7

### PRIVATE APPLICATORS

Use or Supervise the Use of Pesticides for the Purpose of Producing an Agricultural Commodity

#### Restricted Use

- Use and purchase RUP's
- Must pass written exam
- Attend recertification seminars
- Must renew each year
- Submit use report with renewal



8

### Commercial Applicators

Anyone applying pesticides on a commercial basis, on the property of another, must be licensed as a commercial applicator.

9

### Commercial Applicator (For Hire)

<h4 style="text-align: center;"><u>Supervisory</u></h4> <ul style="list-style-type: none"> <li>● Submit resume form</li> <li>● Examination-written and oral</li> <li>● Register firm</li> <li>● Proof of insurance</li> <li>● Recertification seminars</li> <li>● Renew yearly</li> <li>● Use report</li> </ul>	<h4 style="text-align: center;"><u>Operational</u></h4> <ul style="list-style-type: none"> <li>● Written examination</li> <li>● Recertification seminars</li> <li>● Renew yearly</li> <li>● Use report</li> </ul>
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10

### Commercial Applicator (Not For Hire)

PES 101.06 Applicators who apply pesticides to their own premises, or that of their immediate employers...

#### Supervisory / Operational

- Written examination
- Recertification seminars
- Yearly renewal
- Use report



11

### Pesticide Dealer

Any person, firm, corporation or dealership who is engaged in the business of:

- Distributing, selling, offering, or holding for sale:
  - Restricted use pesticides
  - Prohibited-limited use pesticides

12

## EXAMINATIONS

<p><u>COMMERCIAL*</u></p> <ul style="list-style-type: none"> <li>● General</li> <li>● Regulations</li> <li>● Category</li> </ul> <p>*All CFH Supervisory Applicants Must Pass Oral Exam</p>	<p><u>PRIVATE</u></p> <ul style="list-style-type: none"> <li>● General/Regs</li> <li>● Commodity</li> <li>● Worker Protection Standard (WPS)**</li> </ul> <p>**WPS Category Establishes Qualified Pesticide Safety Trainer</p>
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## CATEGORIES OF LICENSING

COMMERCIAL

<ul style="list-style-type: none"> <li>● Agricultural Pest Control</li> <li>● Right-of-Way</li> <li>● Forest/Timber Treatment</li> <li>● Christmas Tree</li> <li>● Aquatic</li> <li>● Public Health</li> <li>● <b>General Pest Control (F1)</b></li> <li>● Mosquito &amp; Black Fly</li> <li>● Termites and Wood Destroying Insects</li> <li>● Fumigation</li> </ul>	<ul style="list-style-type: none"> <li>● Pole Treating</li> <li>● Food Handlers</li> <li>● Sewer Root Control</li> <li>● Microbial Pest Control</li> <li>● Shade and Ornamental</li> <li>● Turf</li> <li>● Indoor Foliar</li> <li>● Demonstration &amp; Research</li> <li>● Regulatory</li> <li>● Aerial</li> </ul>
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## Private Commodity Groups

<ul style="list-style-type: none"> <li>● Christmas Tree</li> <li>● Nursery</li> <li>● Greenhouse</li> <li>● Small Fruit</li> <li>● Tree Fruit</li> </ul>	<ul style="list-style-type: none"> <li>● Beekeeping</li> <li>● Poultry</li> <li>● Dairy</li> <li>● Vegetable</li> <li>● Sod</li> <li>● Hemp</li> </ul>
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## RECERTIFICATION

Time frame = 5 years

Credits required:

Commercial applicator = 12 credits per category

Private applicator = 15 credits total

Applicators may also take exam

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## LICENSE RENEWAL

-Licenses Expire on December 31st of Each Year-

- Licenses must be renewed yearly
  - Submit application
  - Use report
  - Certificates of attendance
  - Insurance certificate (CFH only)

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## Important Certification Rules

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- Must renew your pesticide license yearly
- Recertification credits must be acquired within the five year cycle
- Use reports must be filled out and sent to the division
- Licenses are void when an applicator leaves a company

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## Important Certification Rules

- Any changes in company ownership or change in employees must be reported to the division immediately!
- All applicators must contact the division if there is a change of address

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## YEAR END RECORDS (Annual Use Report)

- ✓ Trade Name of Pesticide;
- ✓ Amount of A.I. In Concentrate (% or #/Gal);
- ✓ EPA Registration Number;
- ✓ Major Crop of Site Treated;
- ✓ Number of Acres;
- ✓ Total Amount of Concentrate Used (#, gal, or oz)

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## Questions?

- New Hampshire Division of Pesticide Control
- (603) 271-3550



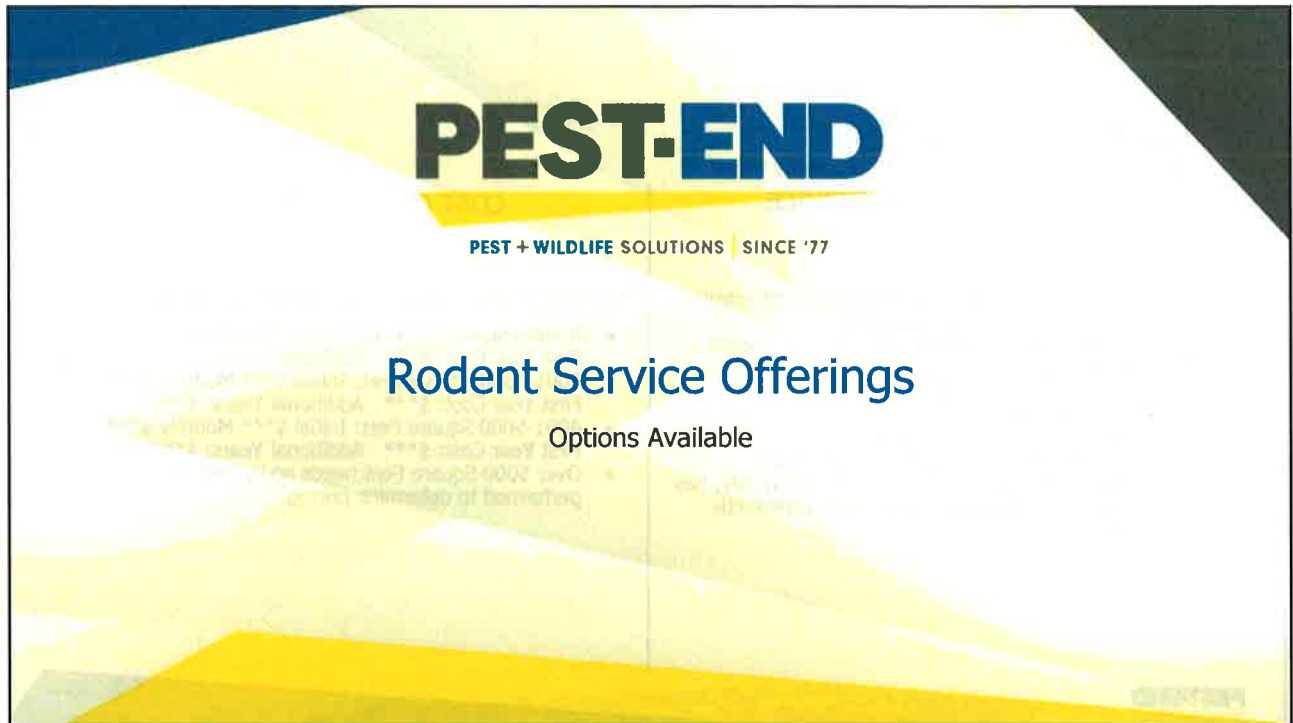
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ATTACHMENT 5

**Rodent Service Offerings  
And  
Pest Control Operator Survey**

Prepared by:  
Adam Carace  
Pesticide Applicator/Owner  
Pest-End Exterminators  
2023



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**HOMEGUARD SERVICES- OUR MOST POPULAR OPTION**  
 Only for Residential Customers up to a 2 family home

<p><b>BENEFITS OF THE SERVICE</b></p> <ul style="list-style-type: none"> <li>• Year round coverage for the interior and exterior of your home for any ants, spiders, cockroaches, mice, rats, wasps, hornets, and yellow jacket nests, and any other general crawling pests.</li> <li>• Automatic visits 4 times a year to keep pest pressure down.</li> <li>• Any additional visits throughout the year are at no charge.</li> <li>• Discounts on add on services such as mosquito and tick control and wildlife exclusion.</li> <li>• Service includes 2-4 exterior rodent stations with bait in them according to the label. Bait is changed at every service whether it is moldy, has gnaw marks, has broken down, or is perfectly fine.</li> </ul>	<p><b>COST OF THE SERVICE</b></p> <p>The cost is based on the square footage of your home:</p> <ul style="list-style-type: none"> <li>• 0-3000 Square Feet: Initial \$*** Monthly \$*** First Year Cost: \$*** Additional Years: \$***</li> <li>• 3001-4000 Square Feet: Initial \$*** Monthly \$*** First Year Cost: \$*** Additional Years: \$***</li> <li>• 4001-5000 Square Feet: Initial \$*** Monthly \$*** First Year Cost: \$*** Additional Years: \$***</li> <li>• Over 5000 Square Feet needs an inspection performed to determine pricing.</li> </ul>
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**PEST-END**

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## HOMEGUARD RODENT

Only for Residential Customers up to a 2 family home

### BENEFITS OF THE SERVICE

- Year round coverage for the interior and exterior of your home for any mice and rats.
- Automatic visits 4 times a year to keep rodent pressure down.
- Any additional visits throughout the year are at no charge for mice or rats.
- Service includes 2-4 exterior rodent stations with bait in them according to the label. Bait is changed at every service whether it is moldy, has gnaw marks, has broken down, or is perfectly fine.

### COST OF THE SERVICE

The cost is based on the square footage of your home:

- 0-3000 Square Feet: Initial \$\*\*\* Monthly \$\*\*\*  
First Year Cost: \$\*\*\* Additional Years: \$\*\*\*
- 3001-4000 Square Feet: Initial \$\*\*\* Monthly \$\*\*\*  
First Year Cost: \$\*\*\* Additional Years: \$\*\*\*
- 4001-5000 Square Feet: Initial \$\*\*\* Monthly \$\*\*\*  
First Year Cost: \$\*\*\* Additional Years: \$\*\*\*
- Over 5000 Square Feet needs an inspection performed to determine pricing.



## EXCLUSION PRO SERVICES

### BENEFITS OF THE SERVICE

- No Rodenticide is used
- Metal, concrete, mortar, and other construction materials are used to seal up any entryways into your home for rodents.
- A more permanent solution to your rodent problem.
- Aesthetically pleasing as we match the colors of the metal to the colors of your home or foundation.
- Interior multi-catch traps are used in case of a breakdown in the service or materials.
- A team of at least 2 will be at your home for a minimum of 1 day to perform this service.
- No future services unless you sign up for a regular program such as the HomeGuard
- No minimizing of rodent pressure on the exterior of the home.

### COST OF THE SERVICE

The cost of this service is based upon an inspection that is performed. The pricing is based upon the size of the home, the amount of areas that need to be repaired, if decks/porches need to be removed to allow access along the foundation under those areas, if just the lower portion of the home is being sealed or the entire home, garage doors, and wood rot.

Typical Price Ranges:

Ranch or Similar Style: \$\*\*\*\*- \$\*\*\*\*

Colonial or Similar Style: \$\*\*\*\*-\$\*\*\*\*

Contemporary or Similar Style- \$\*\*\*\*- \$\*\*\*\*

\*\*Rodent dropping clean up and sanitation is additional cost.



## Trapping Services- Mice

BENEFITS OF THE SERVICE	COST OF THE SERVICE
<ul style="list-style-type: none"> <li>• No Rodenticide is used</li> <li>• Many different types of traps such as snap traps, multi-catch devices, and glue boards can be used.</li> <li>• All snap traps and glue boards must be placed in concealed areas away from people and pets or in locked boxes. This can limit the use of the devices in areas that are needed such as a kitchen.</li> <li>• Weekly services are needed until the problem is resolved due to the removal of any mice that are caught.</li> <li>• Once a snap trap has caught a mouse or been set off, it is useless until we return.</li> <li>• Glue boards in dusty areas such as a basement lose their stickiness quickly.</li> <li>• A lot of labor is involved in this service.</li> <li>• Best use is for a high infestation for a quick knock down.</li> </ul>	<p>The cost of this service is based upon an inspection that is performed. The pricing is based upon the level of infestation that is found within the home. Another factor is how widespread the infestation is meaning is it contained to a room or section of the home or is there activity in every part of the home.</p> <p>Hourly rate is \$***.</p> <p>Most homes need an initial visit, plus 4-6 follow ups depending on the level of activity. This puts the cost at approximately \$***-\$*** for the rodent removal. Once the program is over, we remove the devices for safety and to eliminate the chances of rodent odors in the home for future occurrences.</p>

**PEST-END**

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## Trapping Services- Rats

BENEFITS OF THE SERVICE	COST OF THE SERVICE
<ul style="list-style-type: none"> <li>• No Rodenticide is used</li> <li>• Snap traps are the only real option for effective traps</li> <li>• All snap traps must be placed in concealed areas away from people and pets or in locked boxes. This can limit the use of the devices in areas that are needed such as a kitchen. Most trapping is done on the exterior of the home as most cases have no rats on the interior.</li> <li>• Services are needed 2-3 times a week for a minimum of a moth.</li> <li>• Once a snap trap has caught a rator been set off, it is useless until we return. Many other smaller animals can set the snap trap off or remove the bait prior to a rat getting to the trp.</li> <li>• Rats become very shy to new objects and learn to stay away from snap traps if they set them off.</li> <li>• A lot of labor is involved in this service.</li> <li>• Best use is for a high infestation for a quick knock down.</li> <li>• Very difficult to trap the alpha-male rat.</li> </ul>	<p>The cost of this service is based upon an inspection that is performed. The pricing is based upon the level of infestation that is found within the home. Another factor is how widespread the infestation is meaning is it contained to a room or section of the home or is there activity in every part of the home.</p> <p>Hourly rate is \$***.</p> <p>Most homes need an initial visit, plus 8-12 follow ups depending on the level of activity. This puts the cost at approximately \$***-\$**** for the rodent removal. Once the program is over, we remove the devices for safety and to eliminate the chances of rodent odors in the home for future occurrences.</p>

**PEST-END**

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## Burrow RX- Rats

### BENEFITS OF THE SERVICE

- No Rodenticide is used
- This is a treatment made specifically to the burrows for rats.
- All burrows are covered with sandbags except for one. Carbon Monoxide is pumped into the one open burrow which should connect to all of the burrows underground. The rats cannot escape and will die while underground.
- Disadvantages to this treatment are any rats that are not currently in the burrows will be unharmed. It is also difficult to find every burrow and properly close it up prior to the treatment. This leads to rats fleeing the burrows and running to other hiding spots. There is also no residual to this treatment.

### COST OF THE SERVICE

The cost of this service is based upon an inspection that is performed. The pricing is based upon the level of infestation that is found on the exterior of the home. If there is any activity on the interior of the home or burrows near the home, we cannot treat for the safety of the residents.

Hourly rate is \$\*\*\* due to 2 people needed to be on site.

Usually there is a minimum of 2 treatments that are needed for rat control. This is a great service for a knockdown, but usually will not completely eliminate the rodent problem.



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## Electronic Systems- Anticimex

### BENEFITS OF THE SERVICE

- No Rodenticide is used
- The traps continuously work as long as their is electricity that is still working
- No need to clean up the rodents in most cases.
- Only 1 company currently has this system and they are international.
- Very expensive and meant for town/city wide control and not to be used on a small scale.
- If there are any power outages, the system stops working.

### COST OF THE SERVICE

This is not a system that I have used or have access to. I did speak with a representative from Anticimex and they explained that this service is almost never worth the expense for a small business or home.



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## Additional Options- Water Bucket

### Why is this not an option?

- This is an at home service that is not offered by any pest control company that I am aware of nationally. There are many flaws to this service including off target animals falling into the bucket and dying. The lure that is typically used is some sort of seeds which attract a lot of wildlife. Larger wildlife will also be attracted to the bucket and will knock it over pretty quickly.
- This is not realistic on a commercial setting as businesses cannot have buckets placed around their businesses on a regular basis for extended periods of time.

### What you may not think about...

- The way in which the animals die in this method is extreme. They swim until they are exhausted and then drown. If a bird ends up in the trap, the same will happen or it may end up smashing into the sides until it succumbs to its injuries.

**PEST-END**

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## Additional Options

### Ultrasonic Repellers

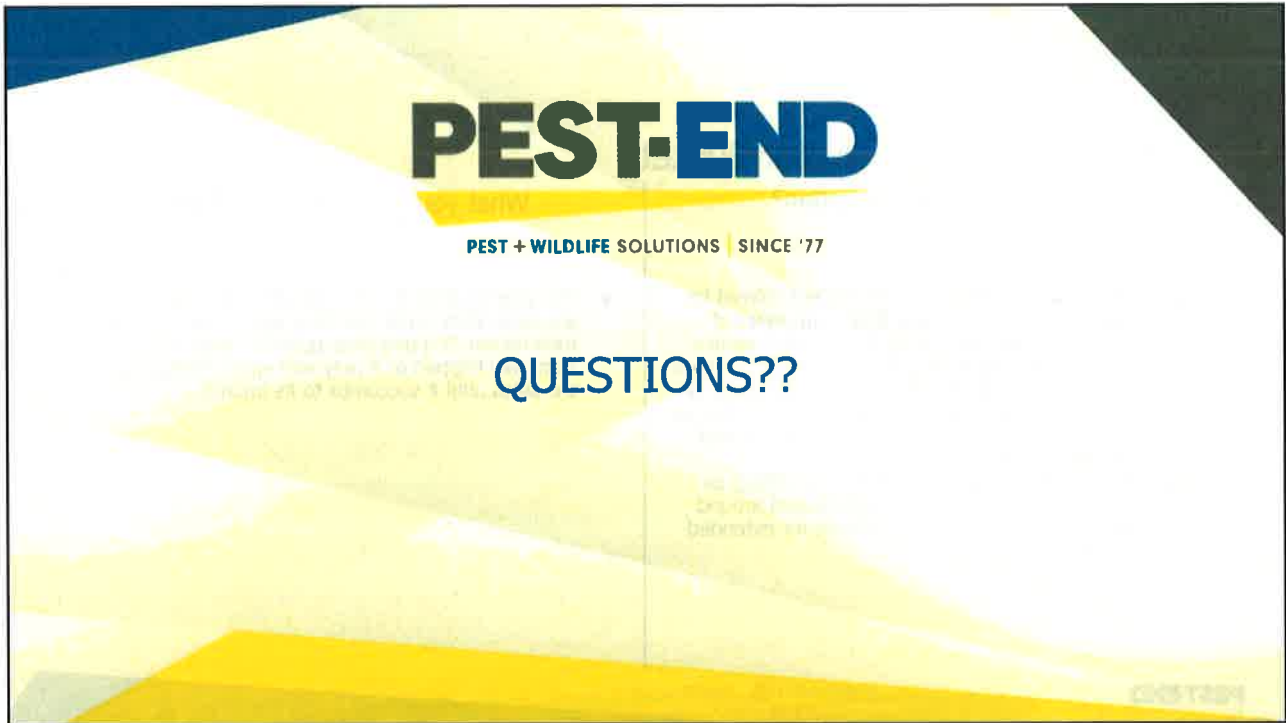
- These devices have been debunked many times as a scam that does not work. Rodents are very accustomed to many sounds.
- The sounds can impact your at home pets who hear different frequencies similar to rodents.
- It does not take long for rodents to realize the annoying sounds do not harm them. This leads to them quickly entering your home and ignoring the sound.

### RAT X

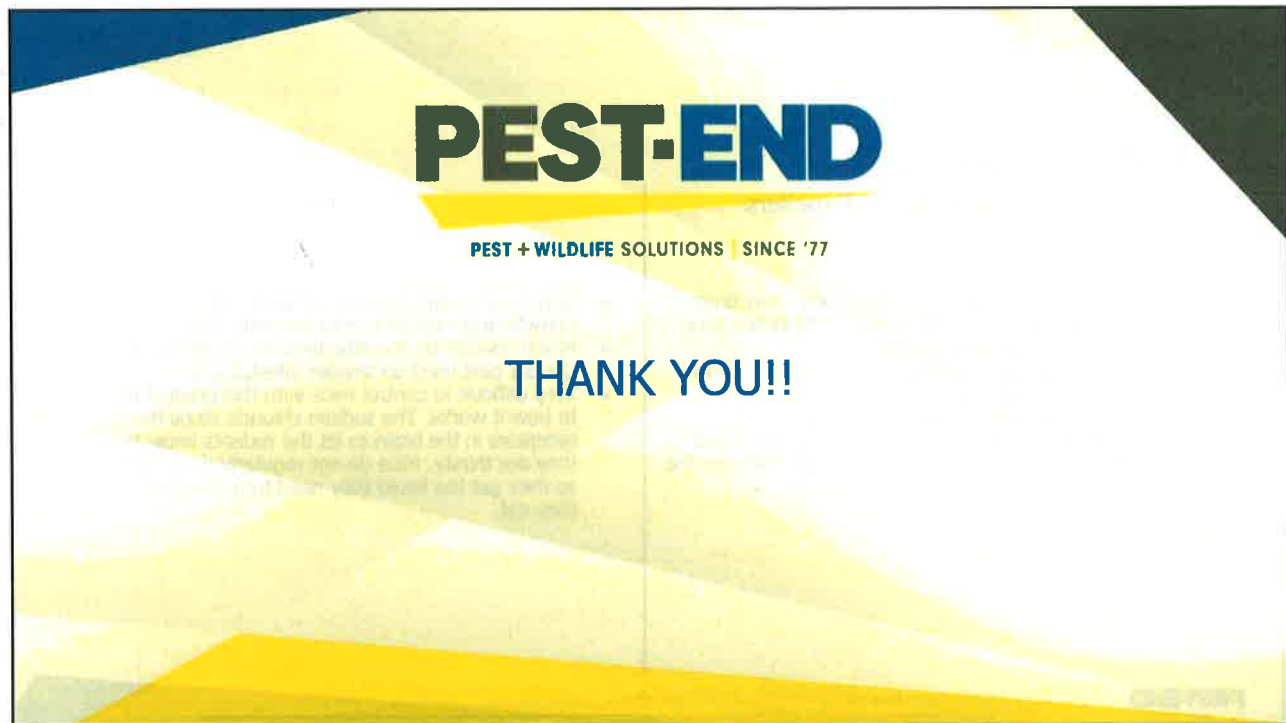
- Non-Toxic rodent pellets that works by dehydrating rodents due to the sodium chloride
- Mixed reviews on the effectiveness of the pellets
- Usually best used on smaller infestations
- Very difficult to control mice with this product due to how it works. The sodium chloride stops the receptors in the brain to let the rodents know that they are thirsty. Mice do not regularly drink liquid as they get the liquid they need from the food they eat.

**PEST-END**

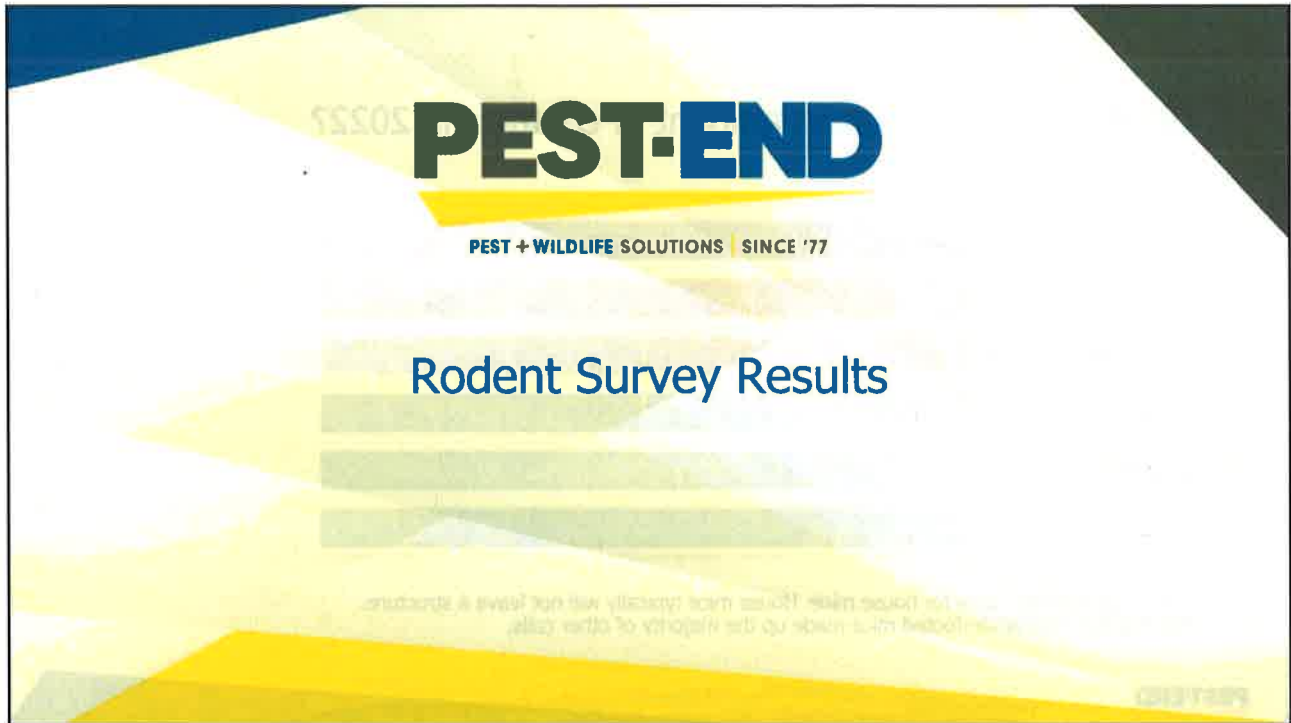
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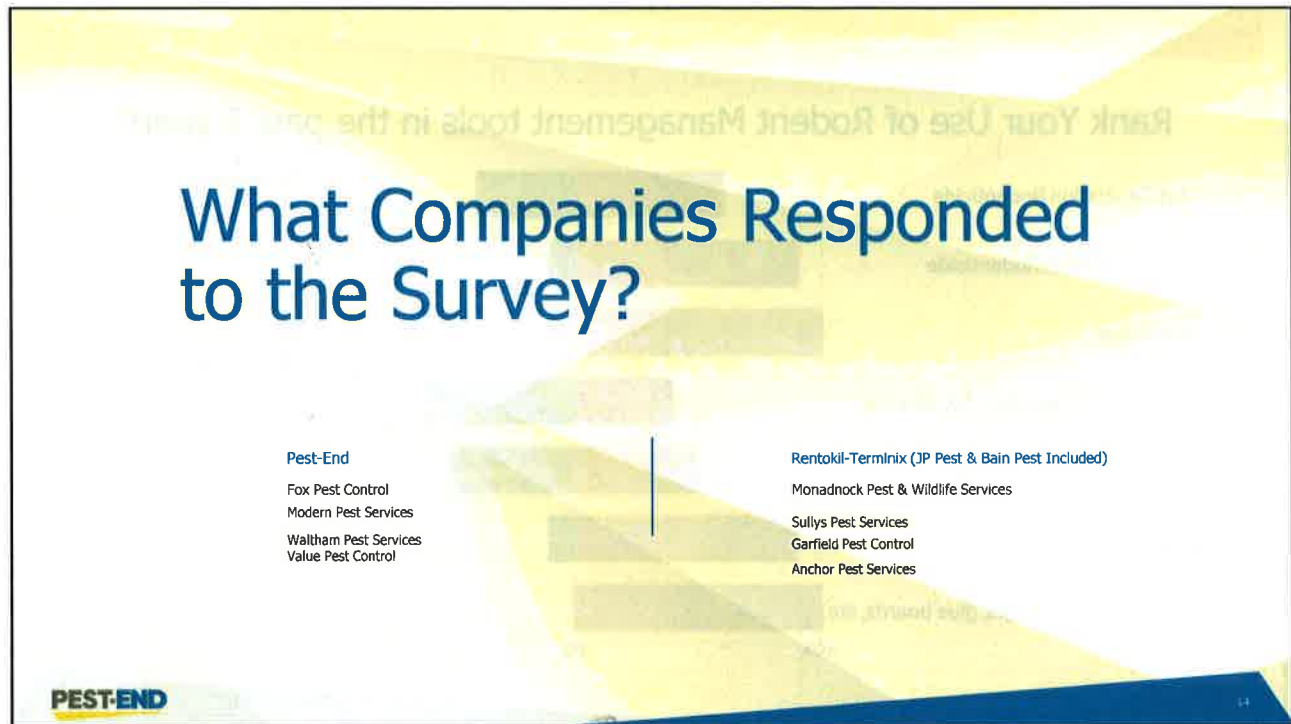
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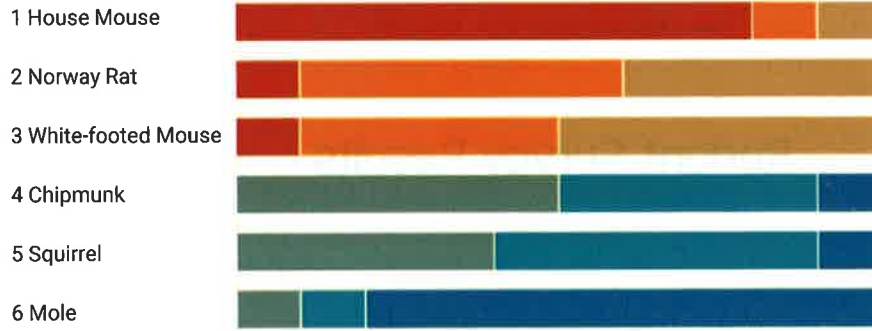
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## What made up the most amount of contacts in 2022?

### Rank Options

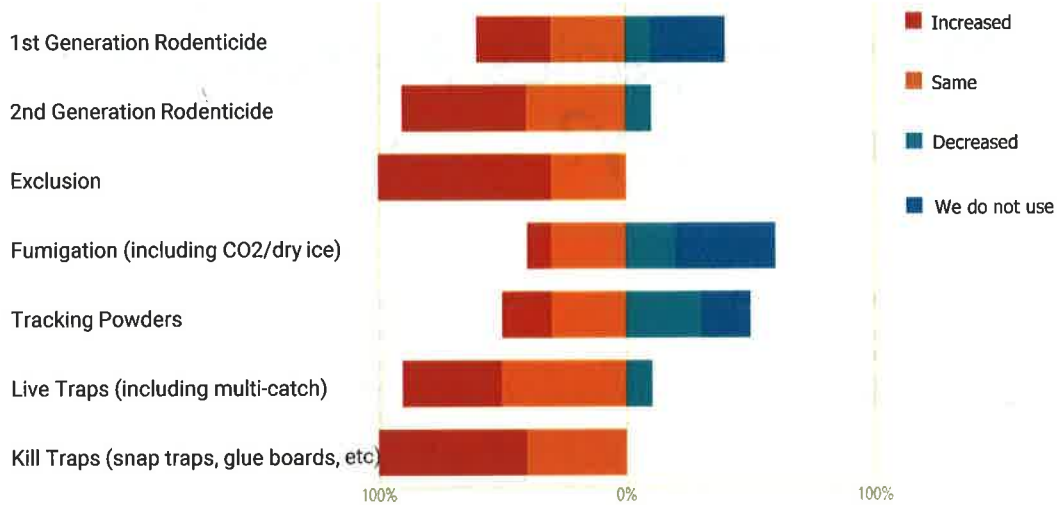


80% most contacts were for house mice. House mice typically will not leave a structure. Norway Rats and White-footed mice made up the majority of other calls.

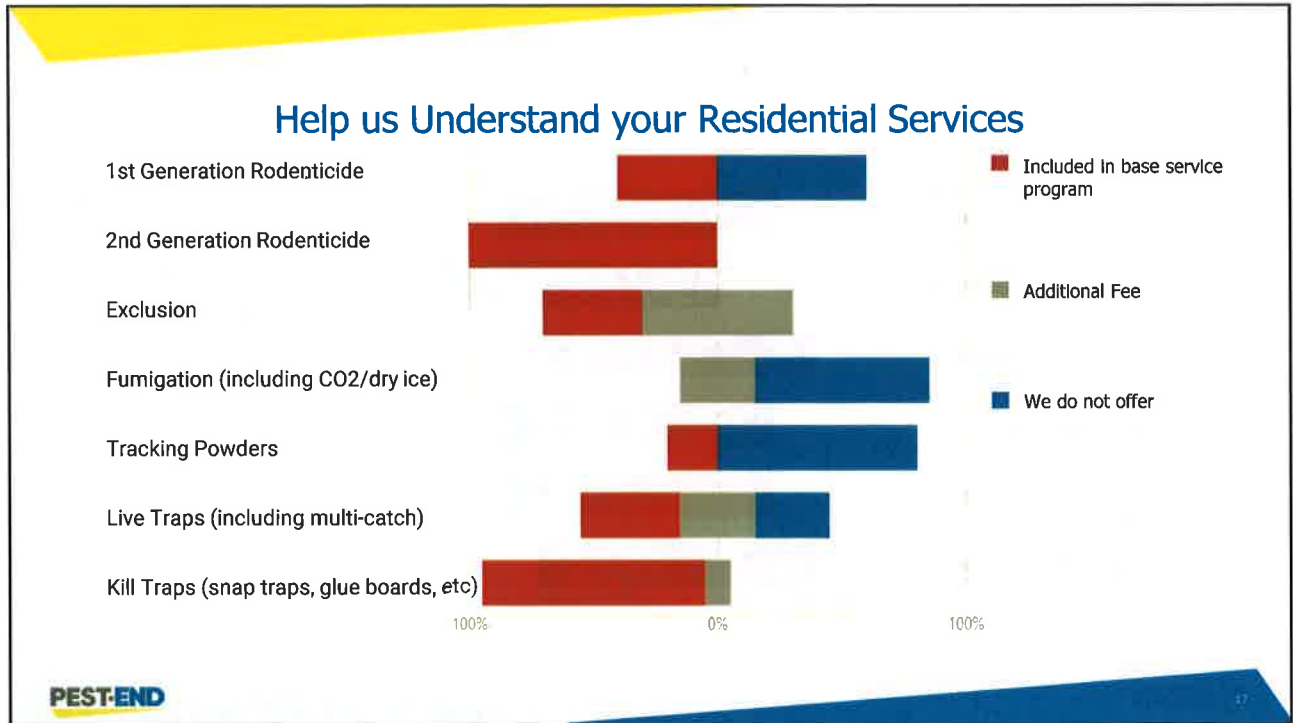


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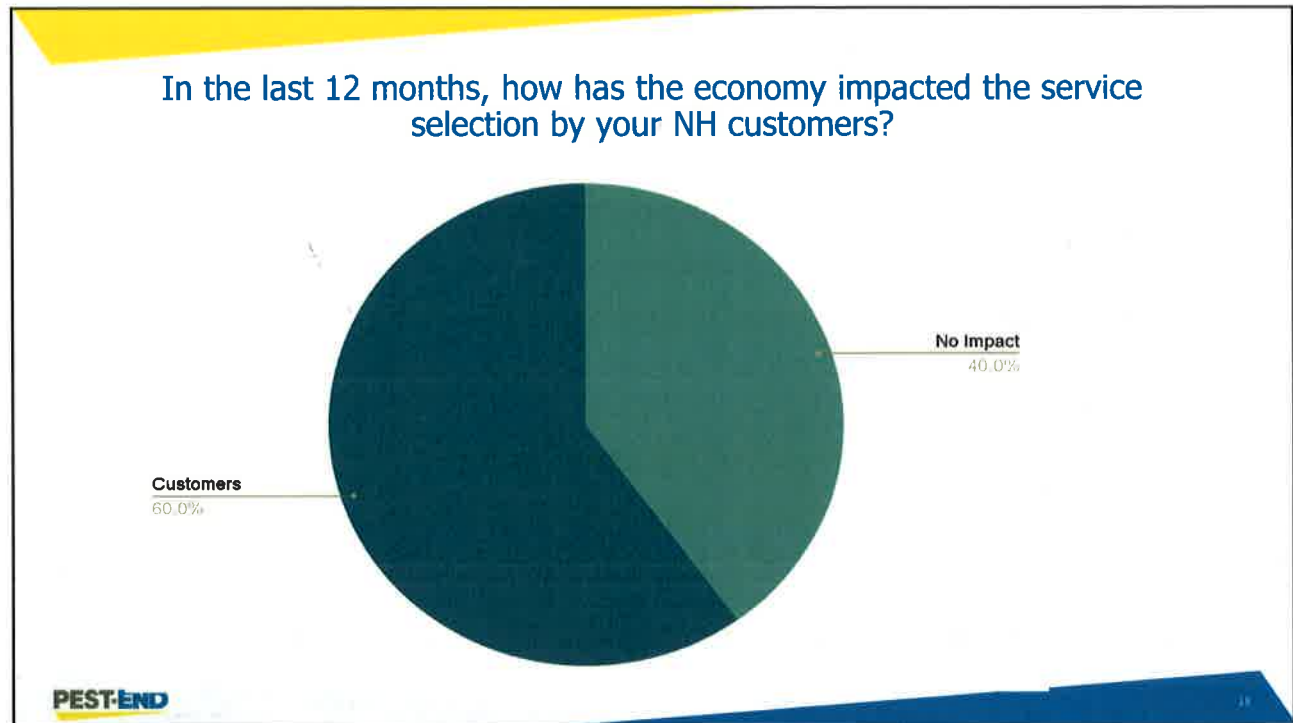
## Rank Your Use of Rodent Management tools in the past 5 years



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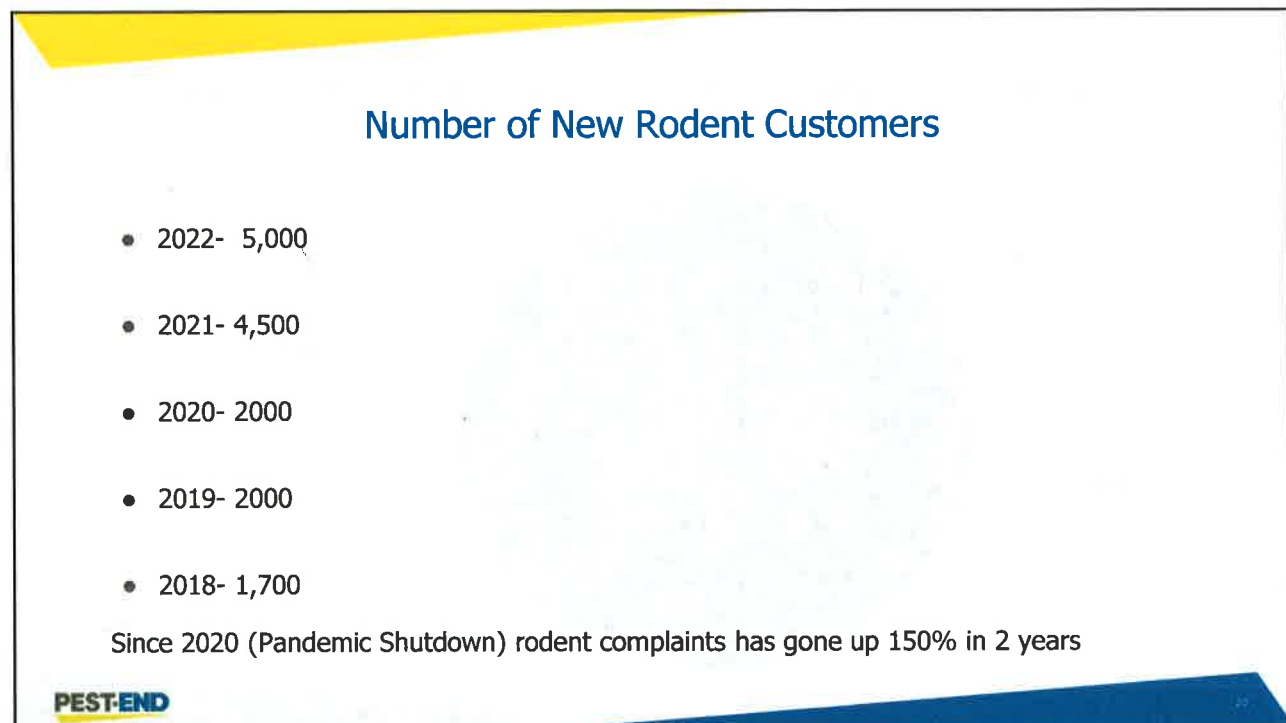
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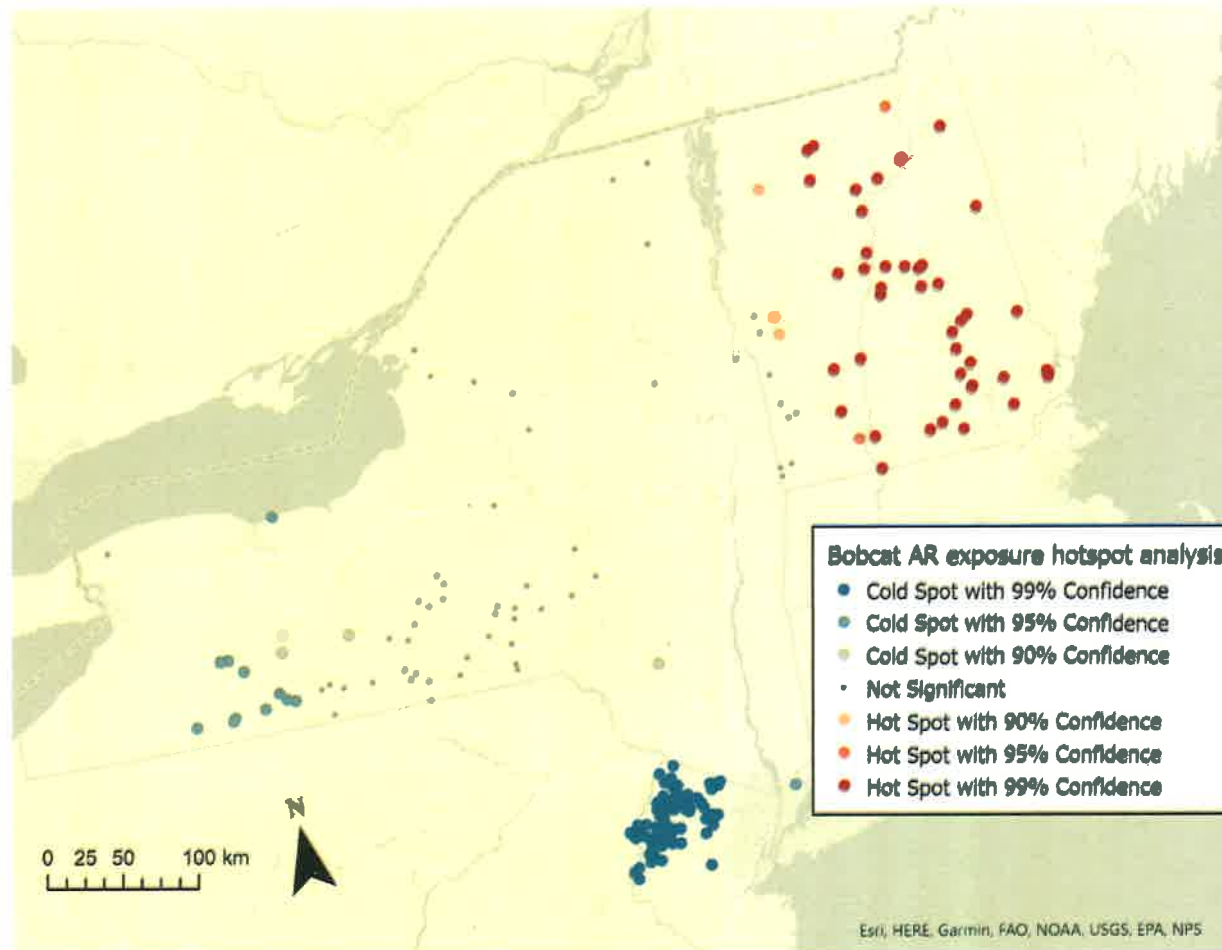
ATTACHMENT 6

Bobcat Study

Georgianna Silveria  
Roosevelt Wildlife Station  
SUNY College of Environmental Science and Forestry

Jacqueline Frair  
Director  
Roosevelt Wildlife Station  
SUNY College of Environmental Science and Forestry

David B. Needle, DVM, DACVP  
Pathology Section Chief  
New Hampshire Veterinary Diagnostic Laboratory



**Figure 2.** Hotspot analysis results for 203 tests for anticoagulant rodenticide (AR) exposure in bobcats using the Getis-Ord  $G_i^*$  statistic with a fixed distance band spatial relationship and band size equal to the maximum nearest neighbor value (103,355.78 m). Statistically significant hot spots are shown in red, significant cold spots in blue, and point values with no statistically significant spatial clustering are shown in grey. Georgianna Silveira, Roosevelt Wild Life Station, SUNY College of Environmental Science and Forestry ([gsilveira@esf.edu](mailto:gsilveira@esf.edu)); Jacqueline Frair, Director, Roosevelt Wild Life Station, SUNY College of Environmental Science and Forestry ([jfrair@esf.edu](mailto:jfrair@esf.edu)); David Needle, NHVDL Pathology Section Chief ([david.needle@unh.edu](mailto:david.needle@unh.edu))