Ministry for Primary Industries
Manatū Ahu Matua

2023 Statistics on the Use of Animals in Research, Testing and Teaching in New Zealand

MPI Information Paper: 2025/01

Prepared for Ministry for Primary Industries

ISBN No: 978-1-991330-70-3 (online)
ISSN No: 2253-394X (online)

January 2025

Te Kāwanatanga o Aotearoa
New Zealand Government

Disclaimer

While every effort has been made to ensure the information is accurate, the Ministry for Primary Industries does not accept any responsibility or liability for error of fact, omission, interpretation or opinion that may be present, nor for the consequences of any decisions based on this information. Any view or opinion expressed does not necessarily represent the view of the Ministry for Primary Industries.

Email: brand@mpi.govt.nz
Telephone: 0800 00 83 33

This publication is also available on the Ministry for Primary Industries website at
http://www.mpi.govt.nz/news-and-resources/publications/

Contents

2023 Animal use statistics summary

MPI collects annual statistics on the use of animals in research, testing and teaching (RTT) in New Zealand. Production animals (such as cattle and sheep), rodents (such as rats and mice) and fish are the main types of animals used. Animal use contributes to our medical and veterinary knowledge and has benefits for humans, animals and ecosystems.

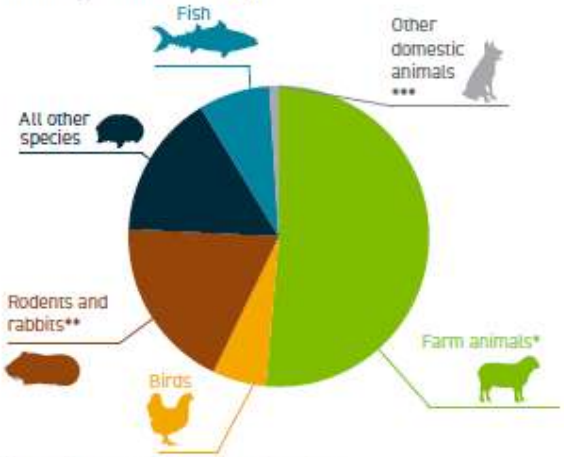
Total number of animals used in **2023** was

316,568

Rolling 3-year average in **2023** was

339,595

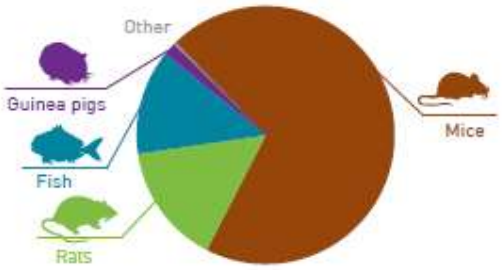
Types of animal used for research, testing and teaching



*Alpacas/llamas, cattle, deer, goats, pigs, sheep
**Guinea pigs, mice, rabbits, rats
***Cats, dogs, horses

Some key figures	2022	2023
Institutions with approved codes of ethical conduct that can carry out RTT	24	**22**
Organisations/individuals using another organisation's animal ethics committee	119	**120**
The largest individual species grouping used was cattle	50%	**40%**
Animals that were returned to their environment following use	76%	**44%**
Most animals experienced little or no impact as a result of use	86%	**66%**
(A smaller percentage of animals experienced high or very high impact as a result of use)	2%	**17%**
Animals rehomed	599	**444**
Animals bred but not used	134,845	**110,565**

Animals bred but not used in 2023



Total number of animals bred for the purposes of research, testing and teaching but not used in **2023** was

110,565

Animals recorded in this category include rodents, rabbits, and fish (with a small number of possums, amphibians and cats)

1 What is the purpose of this report?

The purpose of this report is to provide information regarding the number of animals used in research, testing and teaching (RTT) activities in New Zealand during the 2023 calendar year.

While the release of this information is not required under the Animal Welfare (Records and Statistics) Regulations 1999, MPI proactively provides this report to highlight how animals are used in RTT as well as advances in the 3 Rs. Manipulable datasets accompany the release of this report and are published on the MPI website.

2 What does this report cover?

This report covers the following information related to animals used in RTT:

- Type of animal (species);
- Number of animals;
- Purpose for which animals are used;
- Source of animals;
- Status of animals;
- Re-use of animals;
- Severity of each manipulation;
- Number of animals that were euthanised;
- Number of animals that were alive at the end of the study;
- Number of animals that were bred but not used;
- Information regarding the implementation of the 3 Rs (replacement, reduction, refinement).

The number of animals used in long-term projects are not reported annually but either every three years or at the end of the year in which the project is completed (if fewer than three years).

Additionally, a 2019 amendment to the Animal Welfare (Records and Statistics) Regulations 1999 requires that code holders report the number of animals that were euthanised where they had been bred for RTT but not used (see Section 7.3).

3 How is research, testing and teaching in Aotearoa New Zealand regulated?

In New Zealand, RTT activities involving animals are strictly controlled and may only be carried out according to the requirements in the Animal Welfare Act 1999 (the Act) (Figure 1).

According to Section 5 of the Act, 'research, testing and teaching' activities include any experimental, investigative or diagnostic work involving the manipulation of an animal. Section 3 of the Act states that 'manipulation' refers to anything that interferes with the normal physiological, behavioural or anatomical integrity of that animal. As such, RTT activities may only be undertaken while adhering to the requirements outlined in Part 6 of the Act. Use of animals in RTT has a dedicated part in the Act because it is fundamentally different from other types of animal use. Due to the nature of RTT activities, general obligations under the legislation cannot always be met. Part 6 provides a framework for the ethical treatment of animals used in RTT activities where some pain and distress may result in significant benefits to people, other animals or the environment. For example, several animal species have been used to study COVID-19 to understand the mechanisms of the disease as well as to develop vaccines and ventilators.

However, such use carries significant responsibilities and strict legislative obligations. Part 6 allows the use of animals for RTT purposes only in accordance with a code of ethical conduct (CEC) which has been approved by the Ministry for Primary Industries (MPI). CECs set the parameters within which the institutions are allowed to use animals for RTT purposes.

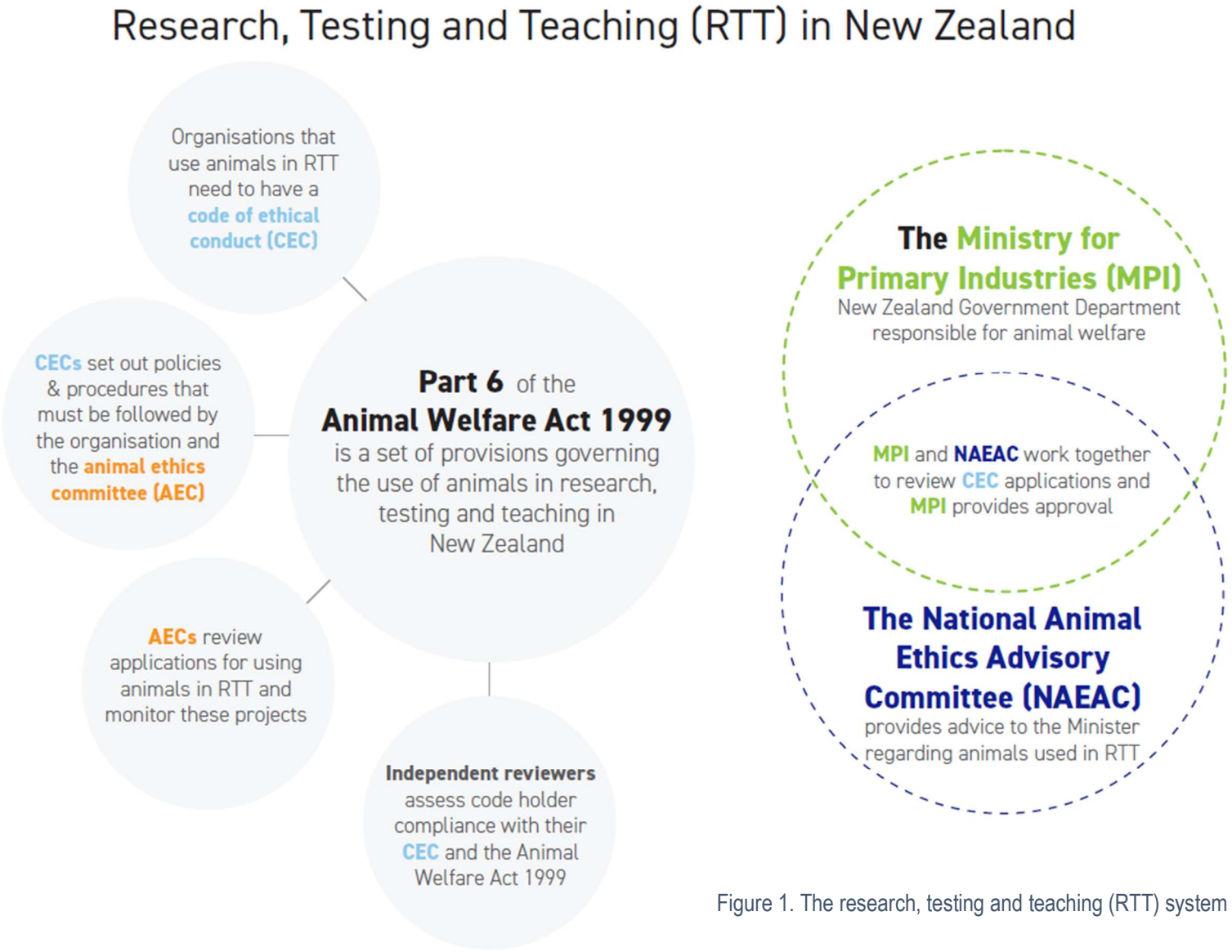


Figure 1. The research, testing and teaching (RTT) system in New Zealand.

All RTT activities must be scrutinised and approved by an animal ethics committee (AEC) established under the CEC. AECs are tasked with reviewing RTT activities, considering numerous criteria outlined in the Act (Section 100), and weighing up the potential benefits against the impact that the manipulation will have on the animals. They review animal ethics applications and decide whether or not to approve projects, to set, vary or revoke conditions of project approvals and to monitor compliance with conditions of project approvals.

AECs also monitor animal management practices and facilities to ensure compliance with the terms of the organisation's CEC. In addition, the AEC must be confident that researchers have considered and, where appropriate, incorporated the 3 Rs in their application: the **replacement** of animals with non-sentient or less sentient alternatives, the **reduction** in the number of animals used, and the **refinement** of procedures to ensure the minimum possible impact on animal welfare.

Records of the annual numbers of animals used in RTT have been collected since 1987. While previously published within the annual report of the National Animal Ethics Advisory Committee (NAEAC), animal use statistics are now produced as a stand-alone document.

All code holders are required to keep records as specified in the Animal Welfare (Records and Statistics) Regulations 1999. For record keeping purposes, the term "code holder" includes any person or organisation that has an arrangement to use an existing CEC and AEC.

The records must be retained for a period of five years after the year to which they relate, and an annual return of the figures for the previous calendar year must be submitted to MPI by 28 February each year. In addition, the regulations empower the Director-General of MPI, or any inspector appointed under the Act, to obtain copies of records or details from them at any time. The regulations provide penalties for non-compliance, including for late submission of returns or supplying false or misleading figures.

4 The 3 Rs

The 3 Rs are a critical cornerstone that must be considered by every researcher that intends to use animals in RTT activities. In brief the 3 Rs aim to:

- **Replace** animals, where appropriate, with non-sentient or non-living alternatives.
- **Reduce** the number of animals to the minimum number necessary to achieve a meaningful result.
- **Refine** techniques so that the harm caused to the animals is minimised and the benefits are maximised.

MPI is committed to promoting the implementation of the 3 Rs across the RTT space and would like to highlight and celebrate the work being done in this space.

Since 2022, MPI has included optional questions regarding implementation of the 3 Rs alongside the mandatory animal use statistics questions. The following section provides an overview of the dataset.

142 organisations submitted animal use statistics to MPI in 2023 – some of these also provided information regarding implementation of the 3 Rs at their organisation (breakdown below)

REPLACEMENT

48 organisations provided information about the replacement of animals at their organisation

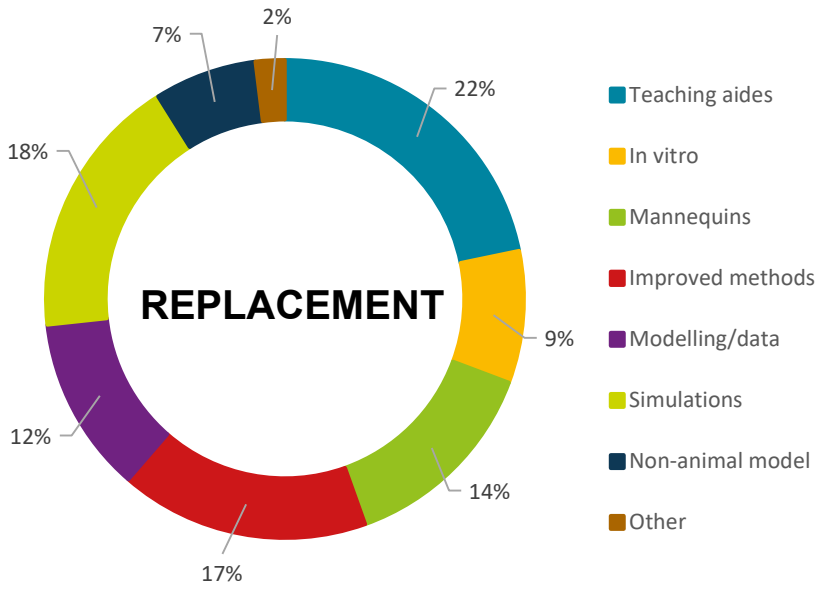


Figure 2. Percentage of total responses across replacement categories (described below).

Category	Description
Teaching aides	Using photos, videos and simulations instead of animals.
In vitro	Using in vitro techniques to replace animals in some stages of projects.
Mannequins	Using animal forms for practicing techniques instead of using animals.
Improved methods	Improved experimental design so animals don't need to be used at certain stages of projects.
Modelling/data	Modelling or using existing data instead of animals.
Simulations	Using simulations instead of animals.
Non-animal model	A non-animal model was used instead of animals.
Other	Case-specific replacement techniques.

What replacement techniques were used for the first time in 2023?

23 responses specified replacement techniques that were used for the first time in 2023

New techniques spanned all replacement categories

Improved methods	6
In vitro	4
Teaching aides	3
Modelling/data	3
Other	3
Simulations	1
Non-animal models	1
Mannequins	1

REPLACEMENT CASE STUDY Building on research into the evolutionary development of brains across species, researchers at Te Herenga Waka - Victoria University of Wellington have developed an innovative invertebrate model using planaria flatworms. This model aims to replace rodents in some studies of neuronal communication and has potential for the development of novel drug therapies for brain disorders, including drug addiction, anxiety, and memory loss. Planaria flatworms offer a unique advantage due to their brain's remarkable similarities to mammalian brains in terms of brain-to-body ratio and cell morphology. Moreover, the neurotransmitters and receptors in planaria function analogously to those in mammalian brains, facilitating comparable cellular communication. This model provides a viable and ethical alternative for investigating the intricate workings of the brain, reducing the reliance on animal research.

REDUCTION

60 organisations provided information about the reduction of animals at their organisation

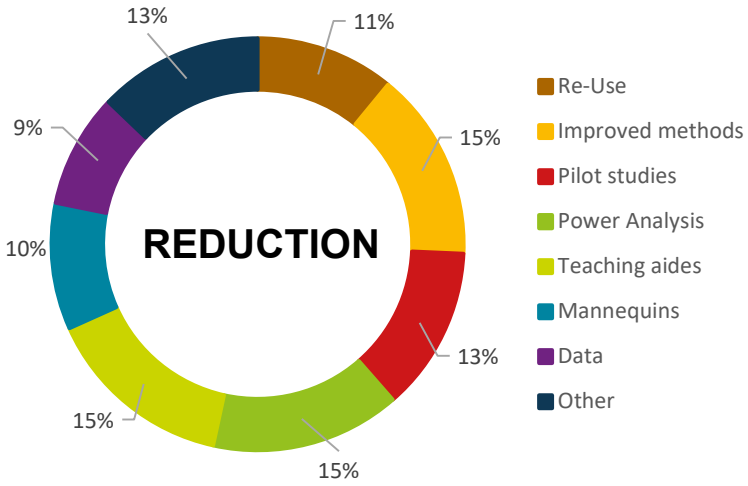


Figure 3. Percentage of total responses across reduction categories (described below).

Category	Description
Re-Use	Animals were reused and this reduced animal numbers.
Improved methods	Improved experimental design reduced the number of animals required.
Pilot studies	Pilot studies were used to answer preliminary questions and reduced the number of animals.
Power Analysis	Power analysis was used to calculate the minimum viable number of animals.
Teaching aides	Teaching aides reduced the number of animals required for teaching.
Mannequins	Mannequins reduced the number of animals required for teaching.
Data	Historic and/or current data was used to reduce animal numbers.
Other	Use of models other than animals, strategic breeding and in vitro techniques.

What reduction techniques were used for the first time in 2023?

32 responses specified reduction techniques that were used for the first time in 2023

New techniques spanned most reduction categories

Improved methods	15
Pilot studies	5
Re-use	4
Power analysis	3
Mannequins	2
In vitro	1
Data	1
Other	1

REFINEMENT

63 organisations provided information about the refinement of animals at their organisation

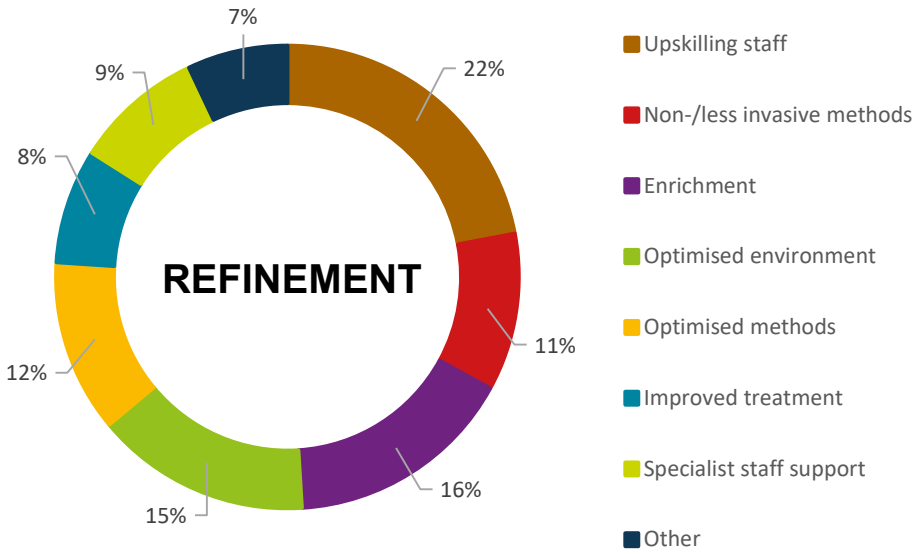


Figure 4. Percentage of total responses across refinement categories.

Category	Description
Upskilling staff	Development/implementation of training to increase staff competency/ skills.
Non-/less invasive methods	Using non or less invasive methods during experiments.
Enrichment	Use of enrichment before/during/after experiments.
Optimised environment	Incorporation of improved environmental conditions.
Optimised methods	Implementation of improved experimental methods.
Improved treatment	Incorporation of improved treatment options.
Specialist staff support	Incorporation of specialist staff support during experiments.
Other	Using different methods to administer treatments.

What refinement techniques were used for the first time in 2023?

39 responses specified refinement techniques that were used for the first time in 2023

New techniques spanned most refinement categories

Optimised methods	19
Upskilling staff	7
Enrichment	4
Optimised environment	3
Non-/less invasive methods	2
Improved treatment	2
Alternative treatment approaches	1
Other	1

REFINEMENT CASE STUDY In 2023, Massey University refined their housing of chickens used in poultry research by switching to floor pens, as opposed to brooder cages, for all chickens aged 1-14 days. These pens allowed the young chickens to have greater space and wood shavings underfoot instead of cage wire. Perches were also provided in every cage and floor pen for further enrichment.

When cages were required for research on nutrient digestibility and energy utilisation in adult chickens, the design of these studies was altered to restrict time in cages to the final week of the study rather than the duration of the bird's life. Cage size was also increased by 50% and cages were furnished with a scratch pad (artificial turf) and dust bath (sand on the turf). In addition to the perch, a hanging bell was also fitted. Cages house 4-8 birds each, depending on bird age/size at the end of the study. These changes allowed for improved conditions for chickens in studies where all faecal matter must be collected, and floor pens are impractical for research outcomes.

Figure 5. Cages are 50% larger and equipped with a perch and scratch pad/sand dust bath, and a hanging bell.

5 Code Holders

In 2023, 22 institutions had approved CECs. One of these organisations established two AECs; thus, over the course of the 2023, there were 23 AECs in New Zealand. In addition, another 120 institutions engaging in RTT involving animals had an arrangement to use another institution's CEC and AEC rather than forming their own.

22 CECs
23 AECs
120 Arrangements

6 Animal Usage

A total of 316,568 animals[1] were manipulated[2] in RTT[3] activities in 2023. An additional 110,565 animals were bred for RTT purposes but not used (and were subsequently killed) (see Section 7.3).

Cattle were the most commonly reported species in 2023 with a total of 127,167 animals. Mice (47,449) were the second most common species followed by wallabies (45,011) and sheep (30,461). Reflecting the importance of research relating to agriculture, farm animals (alpacas/llamas, cattle, sheep, deer, goats and pigs) made up more than 51% of the total animals used (316,568).
Rodents and rabbits together totalled 58,861 animals (Figure 6).

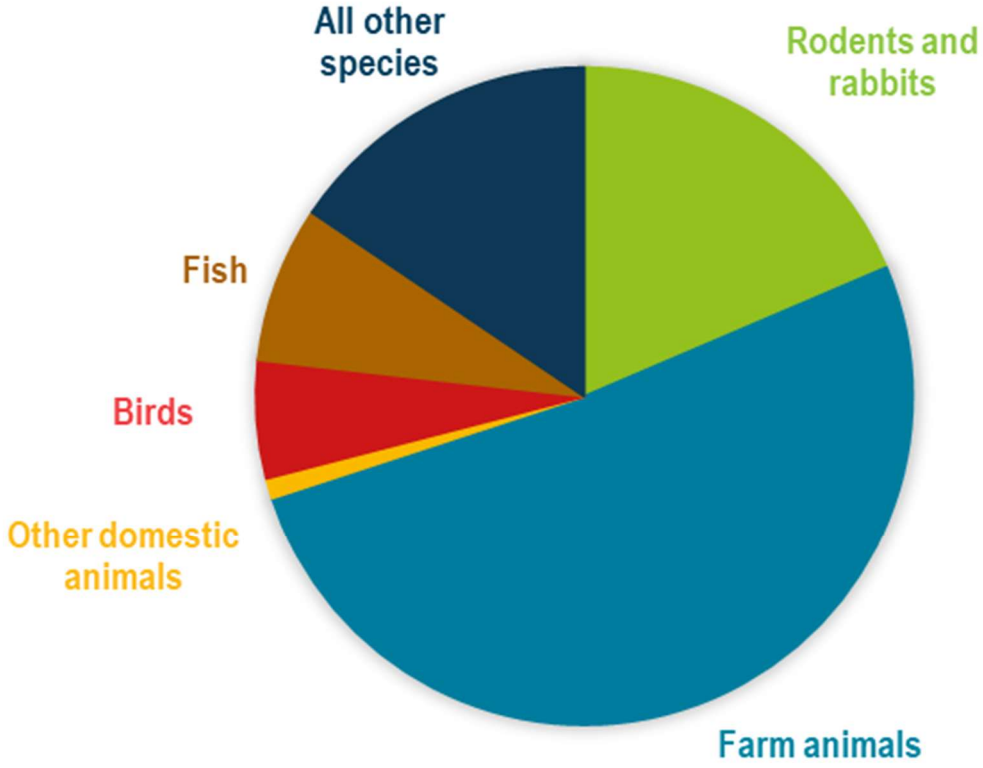


Figure 6. Proportion of animals (per type) used in research, testing and teaching in 2023.

In 2023, 49,239 animals were reported in the "other species" category. This group was primarily made up of various wallaby species used for basic biological research and research on environmental management (45,011), and cephalopods/crustaceans used for teaching and basic biological research (1,494). This group also included amphibians, marine mammals, possums, reptiles, hedgehogs, stoats, ferrets, and weasels. Much of the annual variability in animal use statistics can be attributed to the cycle of reporting for long-term projects.

[1] As defined in section 2(1) of the Animal Welfare Act 1999.
[2] As defined in section 3 of the Animal Welfare Act. 1999.
[3] As defined in section 5 of the Animal Welfare Act. 1999.

Reports of the animal numbers used in long-term projects are not required annually but every three years, when the project is completed or when AEC approval of the project expires, whichever comes first. A truer reflection of overall use is given by the three-year rolling average (Figure 7). For the last three years (2021 to 2023) the average number of animals used for RTT in New Zealand was 339,595.

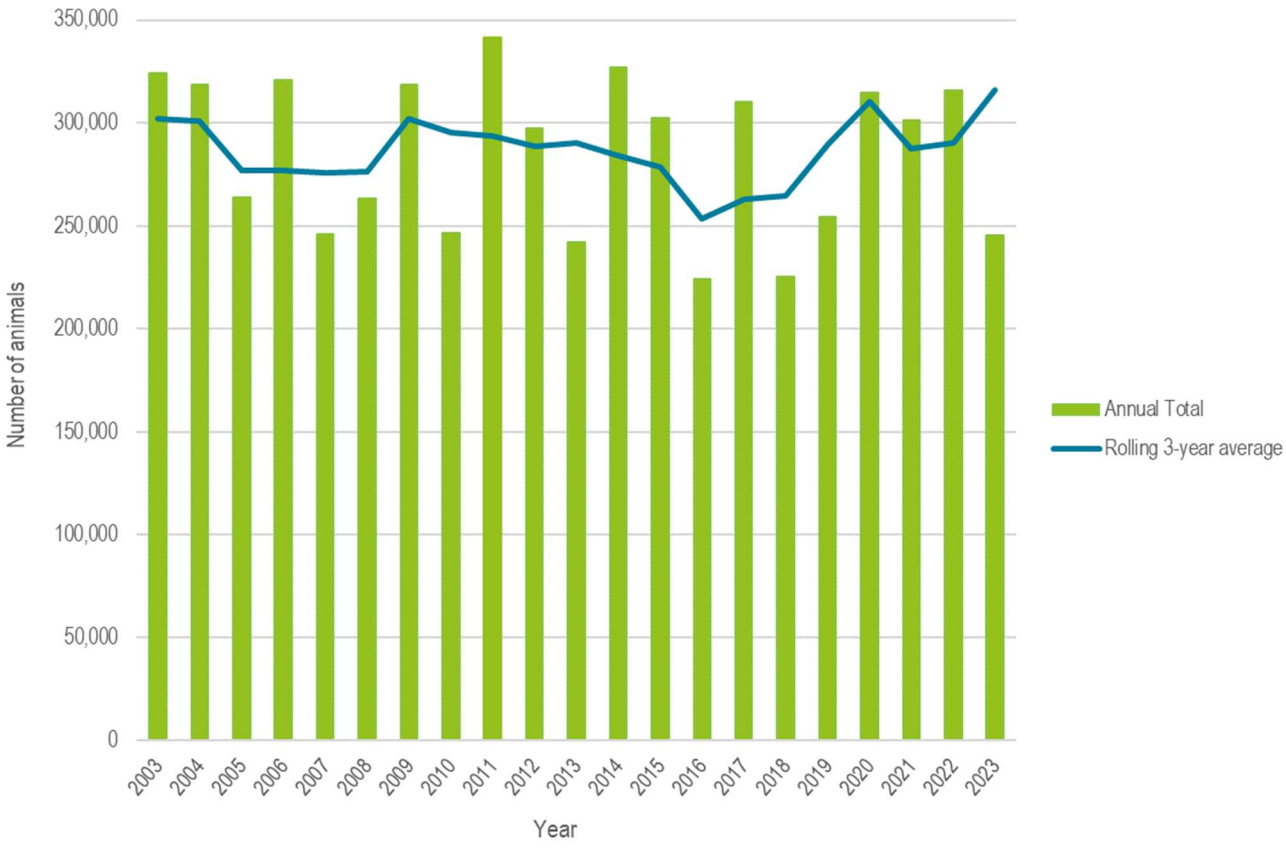


Figure 7. Total number of animals used in RTT activities per year (bars) including the three-year rolling average (line).

6.1 OUTCOMES FOR ANIMALS

The following section provides information regarding the outcomes for animals. This includes those that were alive after manipulation, those that were killed for the use of their tissues, and those that died or were euthanised before, during or after manipulations. Importantly, this section also includes information regarding animals that were rehomed. Lastly, information is included regarding animals that were bred but not used for the purposes of research, testing and teaching and were subsequently killed.

6.1.1 Animals that were alive after manipulation

Following manipulation, 189,781 animals remained alive. A breakdown regarding their outcome is give in Figure 8.

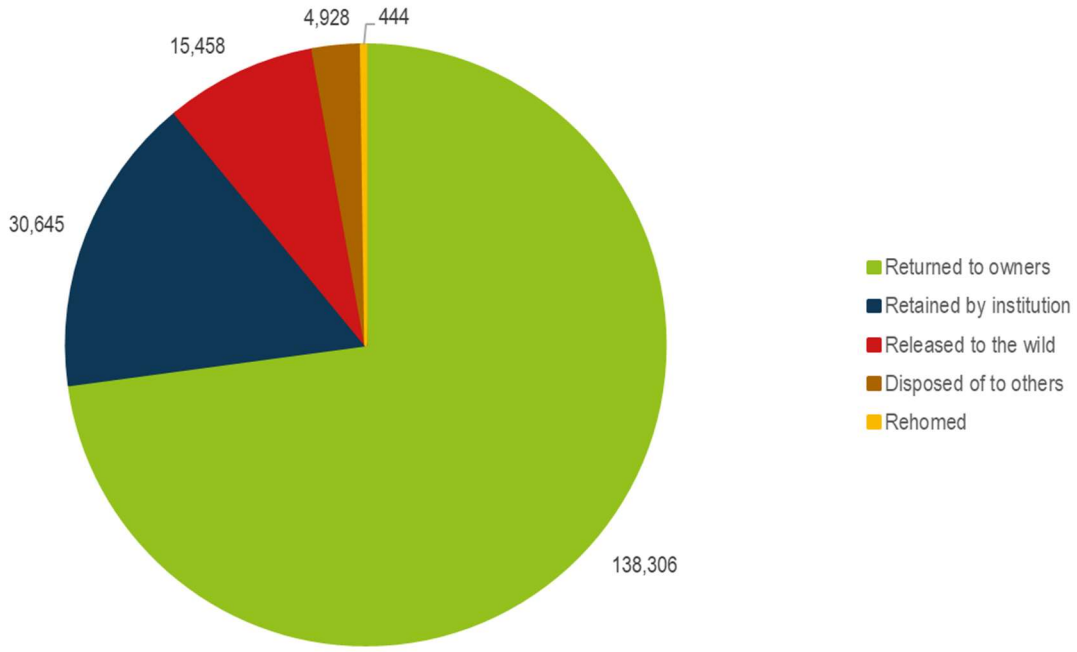


Figure 8. Outcome for animals that were alive after use in RTT activities.

6.1.2 Animals that were killed for the use of their tissues

In 2023, 45,344 animals (14% percent of the total) were killed for the purpose of using their tissues for RTT.

6.1.3 Animals that died or were euthanised

In 2023, 81,443 animals died or were euthanised during or after manipulation. Appendix 1 shows the five-year summary of the animals used (by species) and the percentages that died or were euthanised before, during, or after manipulations.

6.2 REHOMING

In 2023, 444 animals were rehomed (Table 1). This was a decrease from 2022 where 599 animals were rehomed.

Table 1. Number of animals per type that were rehomed in 2023.

Species	Number rehomed
Alpacas/Llamas	2
Amphibians	2
Cattle	20
Dogs	12
Fish	249
Fowls, Chickens	39
Guinea Pigs	8
Horses	20
Other Birds	1
Pigs	53
Rabbits	4
Rats	19
Reptiles	10
Sheep	5

6.3 BRED BUT NOT USED

In 2023, a total of 110,565 animals were bred for RTT purposes but not used and subsequently killed. A breakdown per animal type is provided in Figure 9. “Other” animal include goats (265), rabbits (147), possums (19), amphibians (11), and cephalopods/crustaceans (11). These animals are not included in the overall total because they did not undergo manipulations.

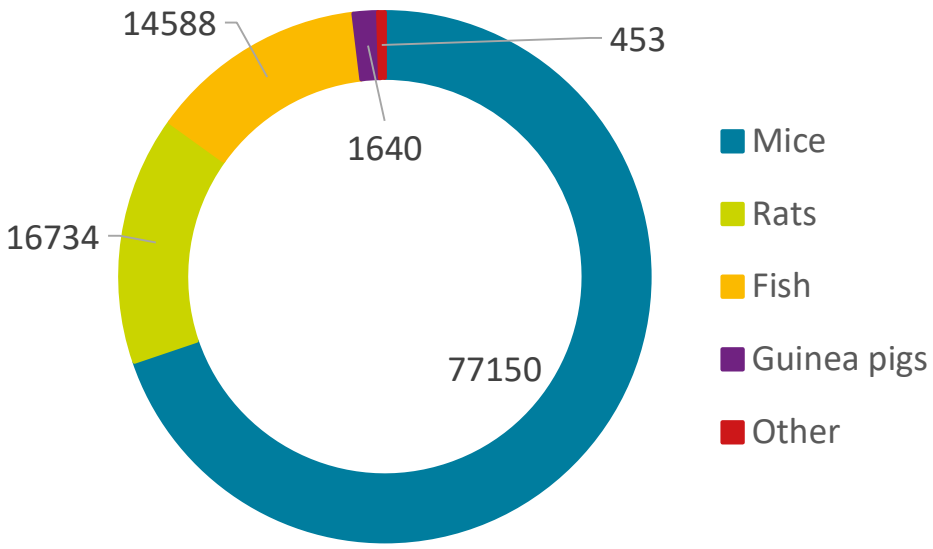


Figure 9. Number of animals that were bred but not used for RTT purposes in 2023.

6.4 SOURCE OF ANIMALS

Code holders are required to report the source of manipulated animals according to the categories specified below. Figure 10 shows the percentage of animals that came from each source in the past two years.

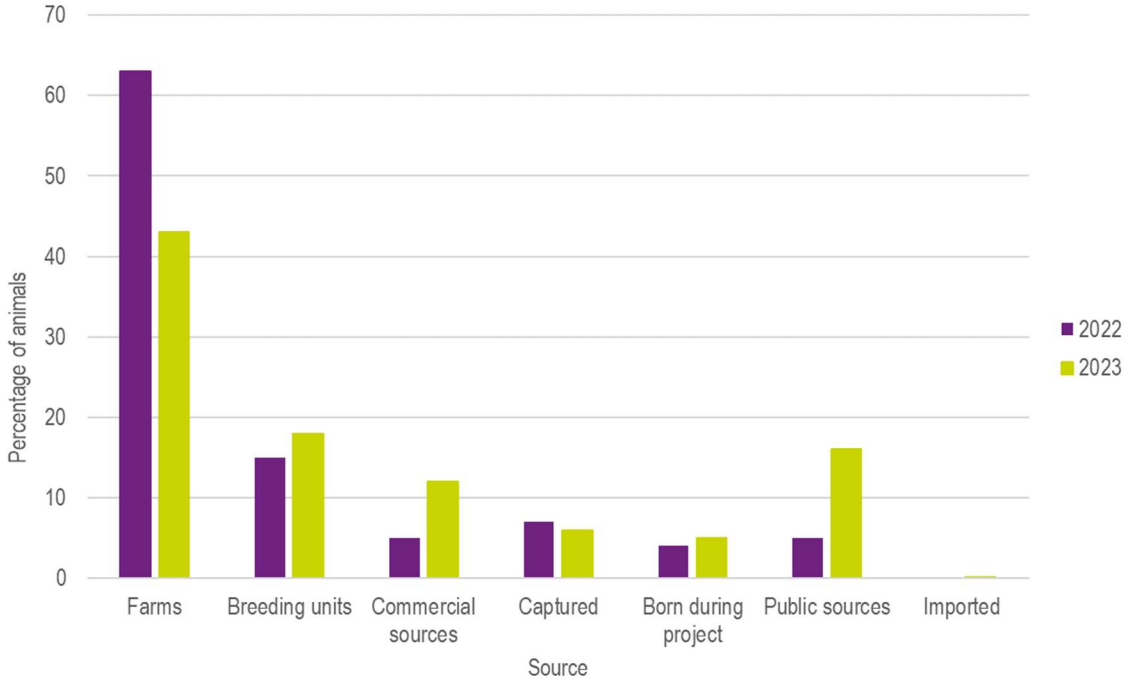


Figure 10. Percentage of animals from each source category for 2022 and 2023.

In 2023, the majority of animals were sourced from farms (134,941 total). 92% of these were traditional farm animals (123,496); however, fish (10,035), fowls or chickens (1,095), horses (290), dogs (25) and llamas and alpacas (3) were also sourced from farms.

18% of animals were sourced from breeding units (57,008 total) and included cats, cattle, deer, dogs, fish, fowls and chickens, goats, guinea pigs, hamsters, horses, llamas and alpacas, mice, wallabies, other bird species, possums, rabbits, rats, reptile species and sheep.

Commercial sources provided a wide range of species that were used for RTT activities (39,089 total). Most of these were cattle, fish, and fowl and chickens, but this category also included horses, mice, pigs, rabbits, rats and sheep.

Various amphibians, cats, fish, fowls and chickens, marine mammals, mice, cephalopods and crustaceans, wallabies, ferrets, weasels, stoats, hedgehogs, wild birds, possums, rabbits, rats and reptiles were captured for RTT purposes in 2023 (17,723 total).

Animals born during projects included cattle, deer, guinea pigs, mice, wild birds, possums, rats, miscellaneous reptiles and sheep (17,066 total).

Public sources provided 50,255 animals with the majority being wallabies and various bird species (excluding pigeons, fowls or chickens). Others were amphibians, cats, dogs, fish, fowls and chickens, guinea pigs, horses, llamas and alpacas, marine mammals, mice, pigeons, rabbits, rats and miscellaneous reptiles.

A small number of animals (486) were imported into New Zealand for RTT purposes. These included mice (473), various amphibians (12) and rats (1).

6.5 STATUS OF ANIMALS

Code holders are required to categorise the status of the animals they use. Figure 11 shows the percentage for each status category for the past two years.

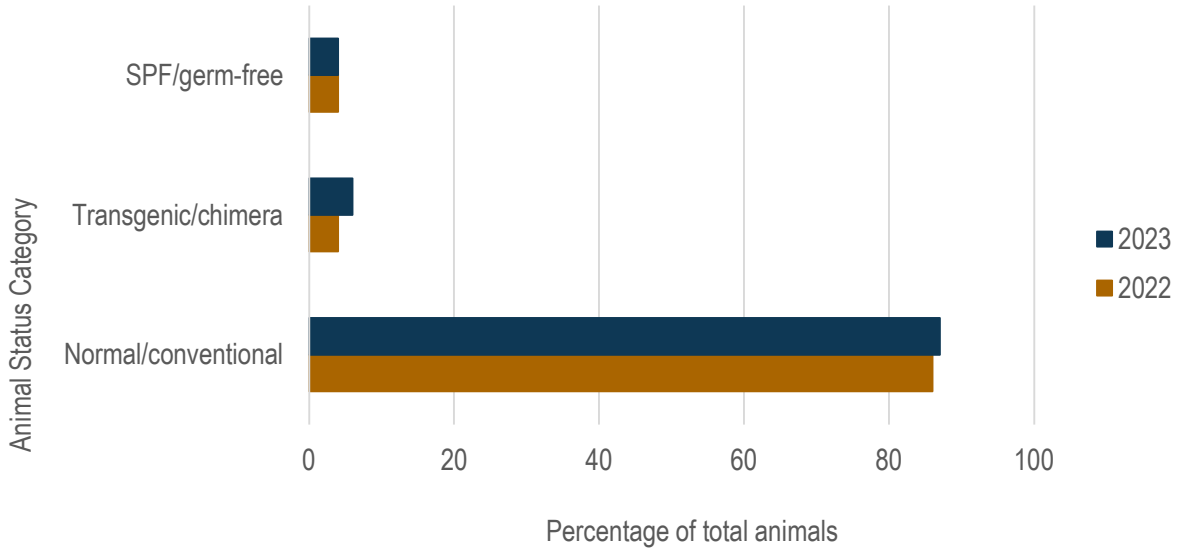


Figure 11. Percentage of total animals by status category for 2022 and 2023 for all categories that comprised > 1% of animals.

As in previous years, the majority of animals manipulated in RTT in New Zealand in 2023 were classified as normal, healthy, conventional animals (87% or 274,903 animals).

A total of 20,306 animals were classified as transgenic/chimera. This category included mice (19,721), rats (540) and cattle (45).

All SPF (specific pathogen free) /germ-free animals were rodents in 2023 (mice, rats and hamsters; 11,161 animals).

It should be noted that animals in the protected species, unborn/pre-hatched, diseased, pregnant and other categories made up approximately 1% or less (each) of the total number of animals.

- Protected species (4,436 total) included birds (3,760), marine mammals (288), reptiles (284) and fish (104).
- Unborn/pre-hatched animals (1,113 total) included fowls and chickens (1,095) and sheep (18).
- Diseased animals[4] (1,399 total) included rats (640), cattle (655), mice (57), sheep (23), horses (10), dogs (8) and cats (6).
- Pregnant animals (3,094 total) included cattle (1,229), goats (820), deer (640), sheep (400) and rats (5).
- A small number of animals (156 total) were classified as having a status other than those listed above and included cattle (68), dogs (66), birds (excluding pigeons, chickens or fowls) (12), sheep (6) and rats (4).

6.6 PURPOSE OF ACTIVITY

Organisations are required to provide information on the purpose of manipulations (in broad categories). Figure 12 shows the percentage and compares the 2023 figures with those reported in 2022 for all categories that made up more than 2% (each) of the 2023 total. Descriptions of the "purpose of manipulation" categories are outlined in Appendix 2.

The main purpose for the manipulation of animals (112,022 total) was animal husbandry. Most of these were farm animals (85,762 total), mice (12,581), fowls and chickens (8,410) and fish (4,985).

Veterinary research used 39,792 animals and the majority of these were cattle (26,071), sheep (5,232) and fish (3,320).

A wide variety of animals were used in environmental management (50,864 total): cats, cattle, fish, fowls and chickens, horses, mice, other species (wallabies, stoats, hedgehogs, weasels and ferrets), other birds (excluding pigeons, chickens or fowls), pigs, possums, rabbits, rats, reptiles and sheep. The majority of animals used in this category were wallabies (44,111).

Animals used in teaching totalled 39,412 and the majority included cattle (23,271), fish (5,263), sheep (4,330), other birds (excluding pigeons, fowls or chickens) (1,434) and cephalopods and crustaceans (1,395). All animal types were included in this category except possums and hamsters.

Animals used for testing purposes (9,745 total) were mostly mice (5,595), guinea pigs (1,354) and rabbits (855).

Medical research used 12,914 animals and included a small number of species: mice (9,460), rats (2,217), guinea pigs (838), sheep (279), pigs (106), dogs (8) and rabbits (6).

Animal numbers reported for species conservation (5,794 total) were other birds (excluding pigeons, fowls or chickens) (5,057), marine mammals (603), reptiles (90), fish (42) and cats (2).

Basic biological research used 36,142 animals in 2023. The following species are included in that number (from most to least number of animals used): mice, fish, rats, cattle, sheep, other birds (excluding pigeons, fowls or chickens), other species (wallabies and hedgehogs), deer, amphibians, reptiles, cats, possums, cephalopods and crustaceans, pigs, dogs, rabbits, pigeons and marine mammals.

[4] Animals afflicted with naturally occurring disease, the focus of study usually being the cause, effects, cure or prevention of the disease.

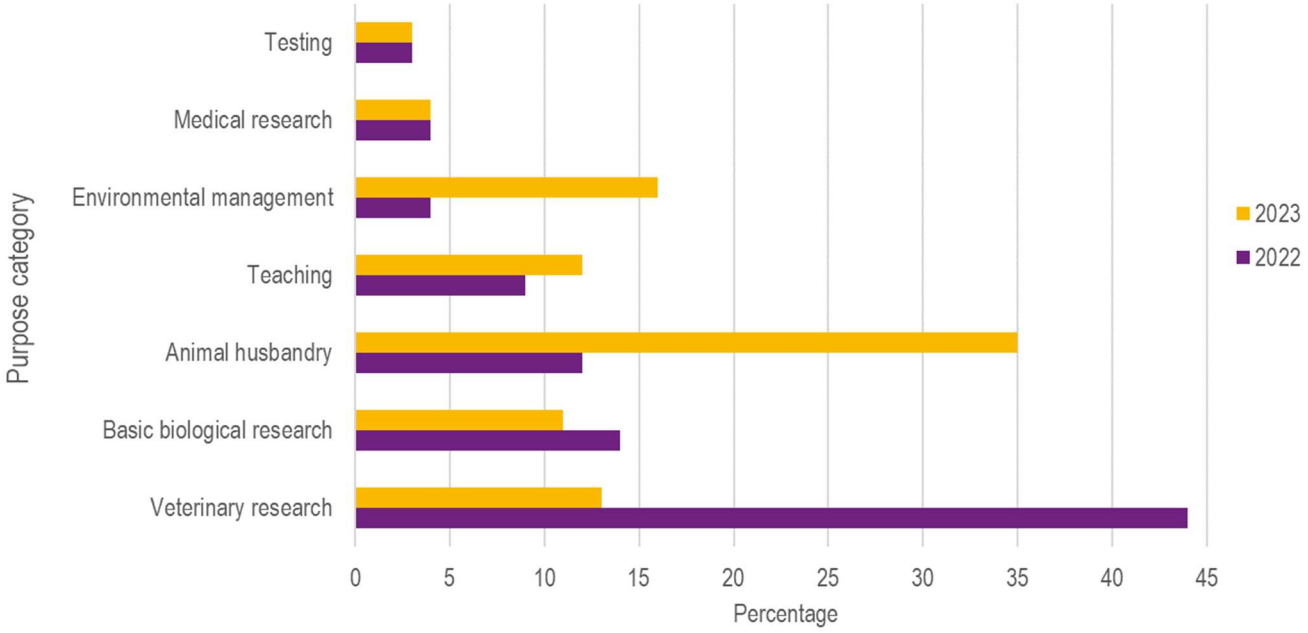


Figure 12. Percentage of total animals by purpose category for 2022 and 2023, for all use categories that made up more than 2% (each) of the 2023 total.

It should be noted that animals in the production of biological agents, production of offspring with compromised welfare, development of alternatives, and "other" categories made up less than 2% (each) of the total number of animals.

- The number of animals (3,688 total) used in the production of biological agents included mice (3,606), sheep (58), cattle (14), horses (7) and llamas and alpacas (3).
- Rats (8 total) were used for producing offspring with potential for compromised welfare.
- Mice (77 total) were used for the development of alternatives in 2023.
- Animals reported as used for purposes other than those included above numbered 6,110 in 2023. Most of these were sheep (4,510) and goats (945).

6.7 ORGANISATION TYPE

The top three user groups in 2023 were (in order): commercial organisations, universities and crown research institutes.

Animals (91,374 total) reported by universities were used for all use categories, with the two most common uses being veterinary research (12,402) and medical research (9,202).

Animals (176,265 total) reported by commercial organisations were used for all use categories except species conservation, the development of alternatives and the production of offspring with compromised welfare. The most common use categories for animals being used by commercial organisations were animal husbandry (67,364) and environmental management (46,157).

Animals (20,737 total) reported by crown research institutes were used for all use categories except species conservation, the production of biological agents, the development of alternatives and the production of offspring with compromised welfare. The most common use categories for animals at crown research institutes were animal husbandry (8,517) and basic biological research (5,523).

Organisations in the 'other' category include non-university medical research institutes, zoos/wildlife parks and individuals, and reported using 10,525 animals. The majority of these were used in animal husbandry (4,872) or medical research (3,625).

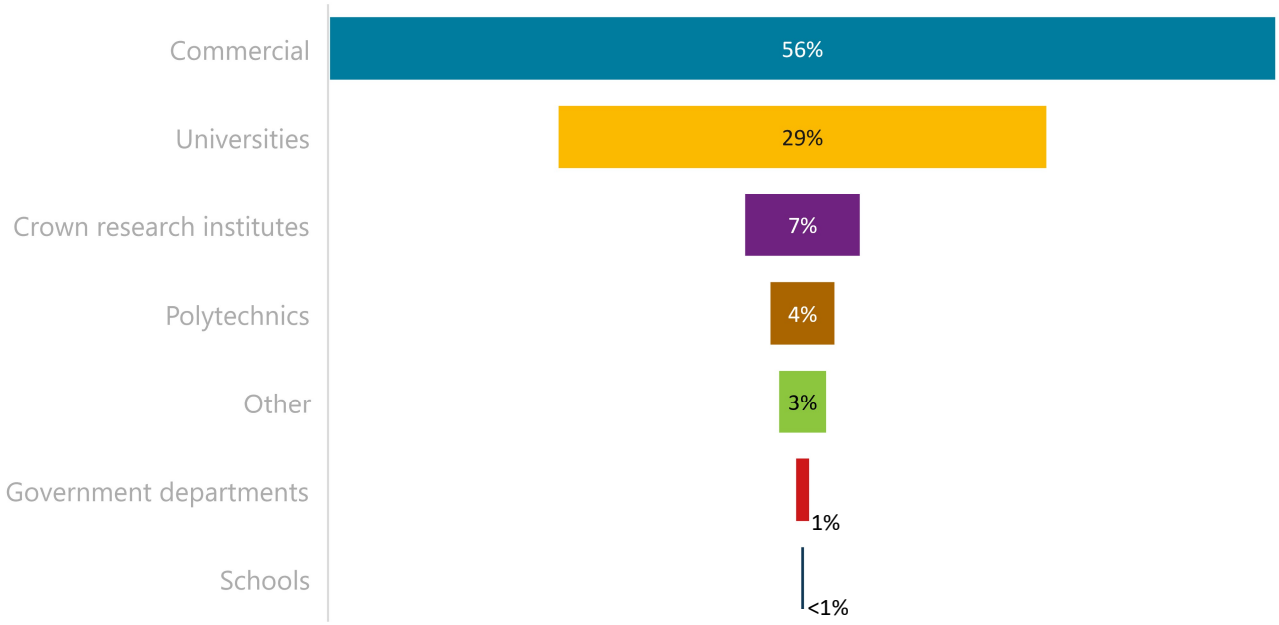


Figure 13. Percentage of animals used per institution category in 2023.

Polytechnics and institutes of technology reported using 12,763 animals. The wide variety of animals used by this sector were nearly all used for teaching (12,108), usually for low impact animal husbandry/veterinary nursing or similar training. Other animals were used for basic biological research (374), testing (270) and medical research (11).

Government departments reported using 3,549 animals and the majority of these were used in veterinary research (2,372). Other animals were used in species conservation (640), environmental management (522), basic biological research (14) and teaching (1).

The number of animals used by schools was 1,355; they were all used for teaching.

7 Impact on Animals

7.1 GRADE

Animal manipulations are graded according to a five-point scale as specified in the Animal Welfare (Records and Statistics) Regulations 1999. The five grades are described below.

Grade	Description
A - “no impact or virtually no impact”	Manipulations that cause no stress or pain or virtually no stress or pain.
B - “little impact”	Manipulations of minor impact and short duration.
C - “moderate impact”	Manipulations of minor impact and long duration or moderate impact and short duration.
D - “high impact”	Manipulations of moderate impact and long duration or high impact and short duration.
E - “very high impact”	Manipulations of high impact and long duration or very high impact for any duration.

A comprehensive description of the grading system has been published in the MPI publication Animal Use Statistics and is available on the MPI website.

Appendix 3 summarises the impact grade allocated to animals manipulated for RTT and reported in 2023.

66% percent of animals were exposed to manipulations which had no, virtually no, or little impact on their welfare, with another 17% percent experiencing "moderate impact". A total of 52,731 animals (17% percent of the total) experienced manipulations of "high impact" or "very high impact". The species that experienced a "very high impact" were mice (4,364), guinea pigs (510), possums (214), rats (187), wallabies (19), horses (1) and hedgehogs (1).

7.2 LONG-TERM TRENDS OF RTT IMPACT

The percentage of animals that experience "no/virtually no" or "little impact" has averaged 80% since 2000. In 2023, 66% of animals (210,010 total) were exposed to manipulations in these categories (Figure 14).

The percentage of animals that experience "moderate impact" has averaged 14% percent since 2000. In 2023, 17% of animals (53,827 total) were classified in this category.

The percentage of animals that experience "high impact" or "very high impact" has averaged 7% since 2000, with a range from 2 to 20%. In 2023, a total of 52,731 animals (17% percent of the total) experienced manipulations in these categories.

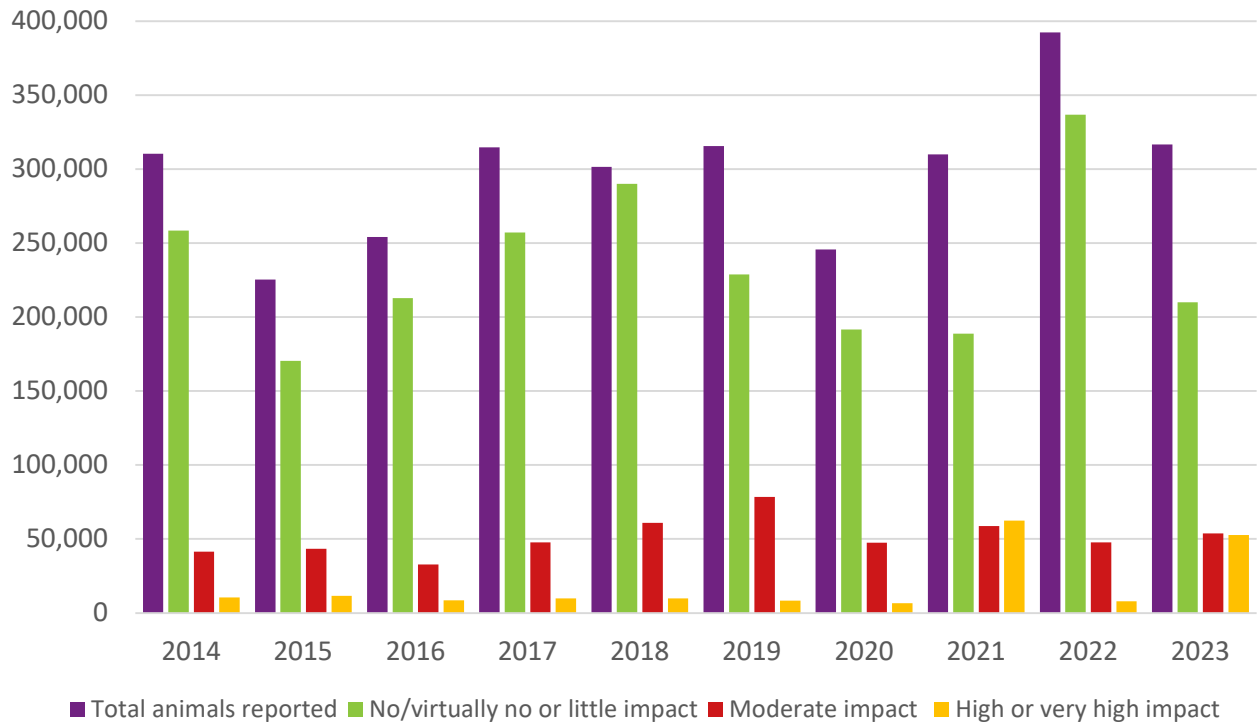


Figure 14. Total number of animals in each manipulation grade category for the last decade (2014-2023).

7.3 MANIPULATION GRADING

Animals featuring in the "high" (D) and "very high" (E) impact groups were classified in these grades for the following reasons:

Animal type	Animal number	Impact category	Impact description
Cats	14	D	Fourteen feral cats were graded D during a trial on toxin exposure and efficacy.
Sheep	2	D	Two sheep were graded D due to accidental injury that occurred during the study.
	3	D	Three sheep were graded D during a trial due to manipulation of the dopamine system.
Pigs	5	D	Five pigs were graded D during a trial on toxin efficacy.
Cattle	2	D	Two cattle beasts were graded D during a trial due to accidental injury that occurred during the study.
	3	D	Three cattle beasts were graded D due to accidental injury that occurred during the study.
	11	D	Eleven cattle beasts were graded D during trials due to accidental injury and illness that occurred during the study.
Possums	214	E	Two hundred and fourteen possums were graded E during a trial on toxin efficacy.
Reptiles	3	D	Three reptiles were graded D during a trial on UVB lighting effects in reptiles.
Mice	61; 6	D; E	Thirteen mice were graded D and euthanised due to fight wounds. Forty mice were graded D following inclusion in a cancer study. Three mice were graded D due to adverse events. Two mice were graded D and euthanised due to reaching experimental endpoint. Three mice were graded D during a study on treatment for Aspergillus infections. Six mice were graded E during the course of a study on Diphtheria.
	4,358	E	Four thousand, three hundred and fifty-eight mice were graded E during vaccine testing.
	86	D	Eighty-six mice were graded D during a trial on food contaminants.
	90	D	Ninety mice were graded D during a trial on therapeutic agents.
Rats	75	D	Seventy-five rats were graded D during trials on toxin efficacy.
	1	E	One rat was graded E after suffering side effects from an injection.
	30; 1	D; E	Thirty rats were graded as D, and one graded as E, during toxin efficacy trials.
	185	E	One hundred and eighty-five rats were graded E during trials on toxin and trap efficacy.
Guinea pigs	766; 510	D; E	Seven hundred and sixty-six guinea pigs were graded D, and five hundred and ten graded as E, during vaccine testing.
	37	D	Thirty-seven guinea pigs were graded D due to complications with premature delivery during the course of a trial.
Deer	12	D	Twelve deer were graded D due to stress associated with housing manipulation during the course of a study.
	37	D	One deer was graded D due to accidental injury that occurred during the course of a study. Thirty-six deer were graded D during a velveting trial.
Horses	21; 1	D; E	Twenty-one horses were graded D due to short-term impacts of a trial. One horse was graded E due to accidental death following a trial.
Fish	1,750	D	One thousand, seven hundred and fifty fish were graded D during a study on thermal challenge.
	1	D	One fish was graded D due to an adverse event that occurred during the study.
	153	D	One hundred and fifty-three fish were graded D during a study on bacterial infections.
Other species			
Hedgehogs	1	E	One hedgehog was graded E due to accidental death during a field trial.

	18	D	Eighteen hedgehogs were graded D during a trial on toxin efficacy.
Stoats	16	D	Sixteen stoats were graded D during a trial on toxin efficacy.
Dama Wallabies	19	E	Nineteen wallabies were graded E during a trial on toxin palatability and efficacy.
Bennett's Wallabies	323	D	Three hundred and twenty-three wallabies were graded D during trials on toxin delivery and efficacy.
	43,916	D	Forty-three thousand, nine hundred and sixteen wallabies were graded D during a large-scale trial on toxin efficacy.

7.4 RE-USE

In 2023, 22,188 animals used in RTT had been used previously. A large majority were farm animals (74%) or fish (13%). The remaining 13% comprised small proportions across every animal type, except for hamsters, possums and cephalopods and crustaceans.

8 Additional Information

8.1 ERRATUM

The following errors were noted in the Statistics on the Use of Animal in Research 2022 report:

In Section 6.6 (Purpose of Activity), the number of animals that were used to produce biological agents is missing (29,768).

In Appendix 1, the figure for the percentage of the cattle that were euthanised is incorrect (72%). The correct figure is '<1'.

In Appendix 1, the figure for the percentage of animals that were euthanised is incorrect (34%). The correct figure is '20.6%'.

Appendix 1: Five-year summary of the number of animals used and the percentage that died or were euthanised by species

	2023		2022		2021		2020		2019	
	Animal Number	Percentage died or euthanised	Animal number	Percentage died or euthanised	Animal number	Percentage died or euthanised	Animal number	Percentage died or euthanised	Animal number	Percentage died or euthanised
Alpacas/llamas	12	0	19	0	40	0	2	0	49	0
Amphibia	164	93	507	12	408	7	289	34	617	7
Birds	18,336	53	15,216	16	6,711	43	29,298	65	8,115	35
Cats	604	3	539	9	762	32	351	3	698	<1
Cattle	2,175	2	194,701	<1	57,308	2	46,937	4	81,595	1
Cephalopods/crustaceans	1,494	17	1,883	4	5,218	6	2,477	24	3,956	34
Deer	2,954	2	2,129	2	3,656	1	1,213	6	1,399	4
Dogs	856	8	659	<1	1,719	6	761	<1	956	<1
Fish	24,310	74	32,945	61	61,861	45	56,045	54	54,108	38
Goats	1,615	18	2,019	17	5,639	<1	3,967	2	962	4
Guinea pigs	2,572	97	1,547	97	3,431	97	1,744	99	2,565	91
Hamsters	16	63	21	0	0	0	0	0	0	0
Horses	1,684	24	1,095	<1	475	1	458	<1	314	<1
Marine mammals	701	3	2,305	<1	654	0	83	0	6,747	0
Mice	47,449	77	47,184	89	48,201	87	48,993	95	63,171	99
Pigs	469	45	235	45	706	49	299	81	918	34
Possums	1,086	84	734	43	680	75	445	100	1,369	99
Rabbits	1,014	93	1,067	94	56,187	100	1,055	97	1,086	96
Rats	7,810	92	8,395	87	11,068	76	7,107	84	13,321	90
Reptiles	437	6	1,364	5	3,580	1	1,860	11	622	16
Sheep	30,461	10	72,882	3	41,423	8	41,879	8	72,550	3
Other species	45,357	99	4,898	33	145	83	259	41	456	37
Total	**316,568**		**392,344**	**-**	**309,872**	**-**	**245,522**	**-**	**315,574**	**-**
Yearly percentage		40%		21%	-	47%	-	45%	-	34%

Appendix 2: Purpose of manipulation categories

Category	Description
Teaching	Animals used for teaching or instruction, at any level.
Species conservation	Work directed towards species conservation. The species to be conserved may or may not be directly involved (e.g., nutrition studies using more common species can benefit an endangered species).
Environmental management	Environmental management, including the control of animal pests and research into methods of reducing production of greenhouse gases.
Animal husbandry	Animal husbandry, including reproduction, nutrition, growth and production.
Basic biological research	Research that aims to understand the workings of living things.
Medical research	Research aimed at improving the health and welfare of humans, but not research on human subjects.
Veterinary research	Research aimed at improving the health and welfare of production and companion animals.
Testing	Animals used for public health testing or to ensure the safety, efficacy or quality of products, in order to meet the regulatory requirements for human or animal products, either in New Zealand or internationally.
Production of biological agents	Animals used for raising antibodies or for the supply of blood products.
Development of alternatives	Work aimed at developing methods to replace or reduce the use of live animals in research, testing and teaching.
Offspring with compromised welfare	Breeding animals, using a breeding technique that produces offspring that maybe/are likely to be more susceptible or at greater risk of pain or distress during their life.
Other	Manipulations for purposes other than those listed above.

Appendix 3: 2023 Summary of impact grade by species

	Impact Grade					
Species	**No impact (A)**	**Little impact (B)**	**Moderate impact (C)**	**High impact (D)**	**Very High impact (E)**	**Total**
Alpaca/llama	7	5	0	0	0	12
Amphibians	0	2	162	0	0	164
Birds	4,012	9,435	4,889	0	0	18,336
Cats	291	281	18	14	0	604
Cattle	7,513	97,453	22,185	16	0	127,167
Cephalopods/crustacea	1,227	262	5	0	0	1,494
Deer	511	2,116	278	49	0	2,954
Dogs	361	424	71	0	0	856
Fish	1,328	13,961	7,117	1,904	0	24,310
Goats	32	1,583	0	0	0	1,615
Guinea pigs	29	1,099	131	803	510	2,572
Horses	243	1,354	65	21	1	1,684
Marine mammals	20	486	195	0	0	701
Mice	11,509	21,323	10,016	237	4,364	47,449
Pigs	8	280	176	5	0	469
Possums	40	98	734	0	214	1,086
Rabbits	61	932	21	0	0	1,014
Rats	403	5,040	2,075	105	187	7,810
Reptiles	1	150	283	3	0	437
Sheep	6,008	19,684	4,764	5	0	30,461
Other species	312	126	642	44,273	20	45,373
TOTAL	**33,916**	**176,094**	**53,827**	**47,435**	**5,296**	**316,568**
Percentage	**10.71%**	**55.62%**	**17.00%**	**14.98%**	**1.67%**	

Appendix 4: 2023 Code holders/Organisations with an arrangement to use a code

CODE HOLDERS	
AgResearch Ltd	New Zealand Association of Science Educators
Alleva Animal Health Ltd	Schering-Plough Animal Health Ltd
Auckland Zoological Park	South Pacific Sera Ltd
Department of Conservation	Te Pūkenga
Eastern Institute of Technology Ltd	Toi Ohomai Institute of Technology Ltd
Invetus (NZ) Ltd	University of Auckland
Landcare Research New Zealand Ltd	University of Canterbury
Lincoln University	University of Otago
Massey University	University of Waikato
National Institute of Water & Atmospheric Research Ltd	Veterinary Health Solutions
Nelson Marlborough Institute of Technology Ltd	Victoria University of Wellington

ORGANISATIONS WITH AN ARRANGEMENT TO USE A CODE	
Abacus Biotech Ltd	Malaghan Institute of Medical Research
Ag Challenge Ltd	ManukaMed Limited Partnership
Agilis Vets Ltd	Matamata Veterinary Services
AgriHealth NZ Ltd	Matthews, Lindsay
Agscent Pty Ltd	Medical Plus New Zealand Ltd
Alltech (NZ) Ltd	MPI Diagnostic and Surveillance Services
Āmua (Deep Ltd)	MPI Mycoplasma Bovis Programme
Animal Breeding Services (2007) Ltd	National Trade Academy
Animal Pharma NZ Ltd	Neurotranslationz Ltd
Ara Institute of Canterbury Ltd	neXtgen Agri Ltd
Argenta Manufacturing	North Canterbury Veterinary Clinics
Aroa Biosurgery Ltd	Northern New Zealand Seabird Charitable Trust
Arotec Diagnostics Ltd	Nutrinza
AsureQuality Ltd	NZeno Ltd
Auckland University of Technology	NZ AutoTraps Ltd
Auckland Veterinary Centre	NZ Institute for Plant & Food Research Ltd
Barenbrug Agriseeds	On-Farm Research Ltd
BCF Ultrasound	Optimum Bio Innovations Ltd
Beef + Lamb	Orillion (Animal Control Products Ltd)
BioCell Corporation Ltd	Otakaro Pathways
Boehringer Ingelheim Animal Health NZ Ltd	Otago Polytechnic Ltd
Boffa Miskell Ltd	Pellew, Petra (Veterinary Professional Development Ltd)
BW & MB McLeod Partnership	PGG Wrightson Seeds
Cave and Harvey Research	Practical CPD Ltd
Cawthron Institute	ProTag Ltd
Cognosco, Anexa Animal Health	Ruakura Technologies Ltd
Cropmark Seeds Ltd	Ruminant Biotech Corp Ltd
CRV Ltd	SciPharma Ltd
CuroNZ Ltd	Seacrest Farms
Dairy Goat Co-operative (NZ) Ltd	Skretting Australia
Dairy Trust Taranaki	SNPshot Technologies Ltd
DairyNZ Ltd	SoleTech Ltd
Dermcare Vet	Southern Institute of Technology Ltd
Donaghys	SPCA
Duopharm Animal Health Ltd	Synlait Milk
Ecosure	Synthase Biotech Ltd

Encounter Solutions Ltd	Te Whare Wānanga o Awanuiārangi
Engender Technologies Ltd	The Cacophony Project
Envico Technologies	The New Zealand King Salmon Co Ltd
EpiVets Ltd	The New Zealand Merino Company Ltd
EquiBreeds NZ Ltd	ThermoFisher
Eurofins Animal Health NZ	Trinity Bioactives
Farm Health Services Ltd	Unitec
Franklin Vets	Universal College of Learning Ltd
FIL (New Zealand) Ltd	Vet Nurse Plus
Fonterra Co-operative Group Ltd	Vet Resource Ltd
Gallagher Group Ltd	Veterinary Centre Oamaru
Halter Ltd	Veterinary Enterprises Group
Haywood, Ursula	Veterinary Specialists Aotearoa
inMr Measure Ltd	Vetlife Ltd
Intuit Regulatory and Marketing Ltd	VetPartners Ltd
Jurox Pty Ltd	VetSouth Ltd
K9 Medical Detection New Zealand Charitable Trust	Waikato Institute of Technology
Karori Sanctuary Trust	Waikato Regional Council
Kiwicare Corporation Ltd	Welfare Concepts Ltd
Landcorp Farming Ltd	Wellington Institute of Technology Ltd
Leaft Foods Ltd	Wellington Zoo Trust
Lincoln Agritech Ltd	Zero Invasive Predators (ZIP)
Livestock Improvement Corporation Ltd	Zoetis New Zealand Ltd