Ministry for Primary Industries
Manatū Ahu Matua

Statistics on the Use of Animals in Research, Testing and Teaching in New Zealand in 2019

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1 Executive summary

This report presents numbers of animals used in research, testing and teaching (RTT) studies in New Zealand that were completed and reported to MPI in 2019. Numbers 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 less than three years.

Any RTT activities involving animals in New Zealand can only be carried out under the requirements of the Animal Welfare Act 1999. No animal manipulations can be carried out without the prior approval of an animal ethics committee (AEC), membership of which must include at least three independent members: one a veterinarian nominated by the New Zealand Veterinary Association, one a nominee of the Royal New Zealand Society for the Prevention of Cruelty to Animals (SPCA) and one from a local territorial authority. The AEC is tasked with assessing the necessity for any RTT activities, including weighing up the potential benefits against the cost to animal welfare. In addition, the AEC must be confident that researchers have fully addressed the Three Rs – replacement of animals with non-sentient or less sentient alternatives; reduction in animal numbers to the minimum required for statistical significance; and refinement of procedures to ensure the minimum possible impact on animal welfare.

A range of animals are used in RTT, as described in this report. The largest individual species grouping in 2019 was cattle, with more than 80 000 used. In general, the majority of animals used for RTT in New Zealand are agricultural animals. This was the case again in 2019 with nearly 50 percent of the total of 315 574 animals reported to MPI being farm animals. Ninety-eight percent of farm animals used for RTT returned to their normal lives following their temporary use as research animals.

Some research, however, does have a greater impact on animals. Efforts to find the most humane methods of pest control, for instance, can carry a relatively high welfare cost. As an example, researchers may need to measure the length of time from ingestion of a poison until an animal is unconscious or dead in order to ascertain the efficiency or otherwise of that method of pest control. Such activities may cause considerable distress, and these are the type of issues that AEC members are required to weigh very carefully against the benefits of improving the survivability of our vulnerable native wildlife populations. Details of RTT activities that are graded as having a high or very high impact on animal welfare are given later in the report.

For the first time in 2019, an amendment to the Animal Welfare (Records and Statistics) Regulations 1999 requires reporting of the number of animals that were bred for RTT but were not used for those purposes and killed (see Section 4).

2 Introduction

The use of animals in RTT is covered by a self-contained set of provisions within New Zealand's animal welfare legislation - Part 6 of the Animal Welfare Act 1999 (the Act). This is because the nature of such use of animals may mean that general obligations under the legislation cannot be met. This recognises that compromised care and some pain and distress to a small number of animals may result in significant benefits to people, other animals or the environment. However, such use carries with it 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 which has been approved by the Ministry for Primary Industries (MPI). In 2019, 24 institutions had codes of ethical conduct approved by the Director-General of MPI. These codes set the parameters within which the institutions are allowed to use animals for RTT purposes. Code holders undergo review by an accredited reviewer at least once every five years.

Each project must also be scrutinised and approved by an AEC established under the code of ethical conduct. There are currently 28 AECs (some institutions, because of their geographic spread, operate more than one committee). In addition, another 107 institutions engaging in RTT involving animals had an arrangement to use another institution's AEC rather than forming their own. The membership of each AEC must include at least one senior staff member of the institution and at least three people with no other association with the institution carrying out the research. These external members must include a nominee from each of the New Zealand Veterinary Association, the SPCA and a local or regional council. The AEC's role is to decide whether or not to approve projects, to set, vary or revoke conditions of project approvals, to monitor compliance with conditions of project approvals and to monitor animal management practices and facilities to ensure compliance with the terms of the organisation's code of ethical conduct.

When considering applications for project approvals, AECs must have regard to a number of criteria specified in the Act including:

- the scientific or educational objectives of the project;
- the harm to or distress felt by the animals and the extent to which that can be alleviated;
- whether the design of the experiment or demonstration is such that it is reasonable to expect the objectives will be met;
- the factors taken into account in the choice of species;
- whether the number of animals is the minimum necessary to achieve meaningful results.

In essence, AECs are required to carry out a cost-benefit analysis in deciding whether a RTT protocol should be allowed to proceed: the higher the cost to the animal, the greater the expected benefit must be, whether that benefit be to people, to other animals or to the environment. AECs also ensure that the costs to the animal are minimised through the implementation of the "Three Rs", the internationally accepted principles of humane experimental technique. They are the *reduction* in the numbers of animals to the minimum necessary to achieve a result; the *replacement* of animals with a less sentient or non-sentient alternative wherever possible; and the *refinement* of procedures as well as of animal environments to minimise pain or distress.

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 in a readily accessible manner. For record keeping purposes, the term "code holder" includes any person or organisation that has made arrangements to use an existing code and AEC, as well as anyone with an approval to use non-human hominids. (It should be noted that any RTT involving non-human hominids must be in the best interests of the individual non-human hominid or its species and must be approved by the Director-General of MPI rather than an 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 Animal Welfare Act 1999 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.

Records of the number of animals used in long-term projects are not reported annually to MPI but every three years or at the end of the year in which the project is completed (if less than three years). Hence annual animal usage detailed below reflects the numbers of animals used in studies that were completed during the year and reported to MPI.

The 21 more common species used in RTT in New Zealand are grouped into the following categories:

- Birds (fowls/chickens, "other birds", pigeons)
- Farm animals (alpacas/llamas, cattle, deer, goats, pigs, sheep)
- Miscellaneous (amphibia, cephalopod/crustacea, fish, marine mammals, possums, reptiles)
- Other domestic mammals (cats, dogs, horses)
- Rabbits
- Rodents (guinea pigs, mice, rats)

A further category – "other" – covers any other species, including zoo animals and wild animals.

3 Summary of 2019 Animal Use Statistics

A total of 315 574 animals were reported as manipulated in 2019, an increase of 14,239 over the previous year. An additional 136 679 animals were recorded under the new reporting category of bred for the purposes of RTT but not used (killed). The rolling 3-year average was 310 497, up 20 504 on the previous year. A total of 131 institutions submitted a return in 2019.

The most commonly reported species in 2019 was cattle – with 81 595 animals making up 25.9 percent of the total. Sheep (72 550) were the second most common species followed by mice (63 171) and fish (54 108). Reflecting the importance of research relating to agriculture, production animals (alpacas/llamas, cattle, sheep, deer, goats and pigs) made up 49.9 percent of the total (157 473). This is the first year alpacas/llamas have been included in the farm animal category. Rodents and rabbits together accounted for 25.5 percent (80 143) and fish 17.2 percent.

The main reasons for using production animals were for veterinary research, basic biological research, and teaching, accounting for 107 194 (68.1 per cent) of these species. Over 93 percent of the rodents were used in medical research, basic biological research and testing the safety and efficacy of animal health products. Most fish were used in basic biological research (33 047) and animal husbandry (13 267). The majority (90.7 percent) of cats, dogs and horses were used in teaching, veterinary research and basic biological research.

Over 72 percent of animals were exposed to manipulations which had no, virtually no, or little impact on their welfare, with another 24.9 percent experiencing "moderate impact". A total of 8258 animals (2.6 percent of the total) experienced manipulations of "high impact" or "very high impact". The species that experienced a "very high impact" were guinea pigs (527) and mice (5367).

Animals classified as transgenic/chimera in 2019 were mostly rodents – 12 202 mice and 303 rats, but also included fish, goats and sheep, for a total of 13 404 (4.2 percent of the total).

Thirty-four per cent of animals were dead or euthanased following their use in manipulations. These include:

- animals that died or were euthanased incidentally for animal welfare or other reasons during the course of, or as an approved manipulation at the end of a project (88 715); and
- animals that were killed for their tissues (18 568).

While 98 percent of production animals remained alive following use, nearly 97 percent of rabbits and rodents were 'dead or euthanased' following manipulation.

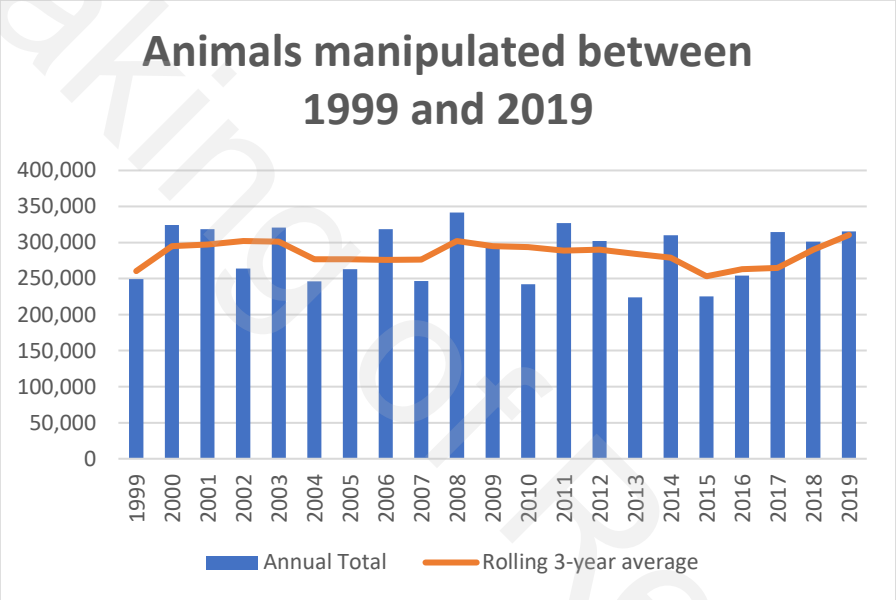
For the first time in 2019, the numbers of animals that were bred for RTT purposes but were neither manipulated or used and were subsequently killed, were recorded. A total of 136 679 animals included 87 150 mice, 27 518 fish, 19 996 rats, 1977 guinea pigs, 28 sheep, eight rabbits and two goats. These animals are not included in the overall total because they did not undergo manipulations.

4 Animal Usage

During 2019, a total of 315 574 animals[1] were reported as manipulated[2] in RTT[3]. This was 14 239 more than in 2018 when 301 335 animals were reported. A further 136 679 animals that were bred for RTT purposes but not used were killed. These included 87 150 mice, 27 518 fish, 19 996 rats, 1977 guinea pigs, 28 sheep, eight rabbits, and two goats.

Much of the annual variability in the statistics can be attributed to the three-yearly cycle of reporting of long-term projects. Reports of the numbers of animals used in long-term projects are not required annually but rather 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, up 20 504 in 2019.

To illustrate the influence of the three-yearly reporting cycle, the accompanying graph shows the rolling three-year average compared with the annual totals. For the last three years (2017 to 2019) the average was 310 497.



Those species most commonly reported in 2019 were (in order) cattle, sheep, mice and fish, which collectively accounted for 86.0 percent of the total animals manipulated for RTT. Mice, sheep and cattle have all been included in the four most commonly used animals since 1989. The other species making up this group in those 30 years have been fish (in 18 years), rats (in seven years) and birds (in five years). Farm animals were the largest group used for RTT in 2019, making up 49.9 per cent of the total, followed by rodents and rabbits (25.4 per cent) and fish (17.1 per cent).

Cattle and sheep made up 97.9 per cent of the farm animals used and 48.8 percent of total animals used. Cattle were mainly used in veterinary research, teaching, basic biological research, animal husbandry, testing and production of biological agents. Sheep were mainly used for basic biological research, production of biological agents and veterinary research. Mice (63 171) were mainly used for medical research, testing and basic biological research. Fish (54 108) were mainly used for basic biological research, animal husbandry, species conservation, teaching and environmental management.

In 2019, 456 animals were reported in the “other species” category. This group was made up of 47 bats used for species conservation; 5 chinchillas used for teaching; 211 ferrets used for environmental management (209) and veterinary research (2); 21 Himalayan tahr used for environmental management; 46 hedgehogs used for veterinary research (41) and basic biological research (5); 13

[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.

meerkats used for basic biological research; 5 otters used for basic biological research; 55 stoats used for environmental management; 47 wallabies used for environmental management; and 6 weasels for environmental management (4) and veterinary research (2).

Wherever it appears, the category “cats” includes feral cats. Likewise, wild rats and mice are included in the “rats” and “mice” categories and feral pigs in the “pigs” category.

5 Source of Animals

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

Source of animals	2019	2018
	%	%
Farms	44.1	36.9
Breeding units	26.3	23.9
Captured	10.7	18.6
Commercial sources	8.3	8.8
Public sources	6.2	6.4
Born during project	4.3	5.3
Imported	<0.1	0.1

A total of 139 163 animals were sourced from farms in 2019. While over 85 per cent of these were indeed farm animals (119 468), 19 301 fish were also classified as coming from farms, as were chickens, dogs, horses, rabbits “and “other birds”.

Animals sourced from breeding units numbered 83 013 in 2019. The majority of these were mice, rats and fish.

A total of 33 858 animals were captured in 2019 for RTT purposes. The majority of these were fish, “other birds”, cephalopod/crustacea, rats and possums.

A total of 26 045 animals came from commercial sources. Most of these were cattle, sheep and fish but also included chickens, pigs, mice, rats, cephalopod/crustacea, amphibia, pigeons, horses and “other birds”.

A total of 19 636 animals came from public sources, with the majority being cattle and marine mammals. Others were dogs, “other birds”, cats, reptiles, pigeons, rats, mice, guinea pigs, rabbits, horses, fish, amphibia, “other species” and sheep.

A total of 13 634 animals were born during projects in 2019. The majority of these were sheep, mice and rats.

A total of 225 animals were imported into New Zealand for RTT purposes in 2019. These included 195 mice, 24 rats and six “other birds”.

In 2019, 42 institutions used cattle and sheep for RTT purposes. Thirteen institutions used only cattle, seven used only sheep and four used only sheep and cattle.

6 Status of Animals

Code holders are required to categorise the status of the animals they use. The following table breaks down the animal status for the past two years.

Status of animals	2019	2018
	%	%
Normal/conventional	82.3	86.5
SPF/germ-free	9.1	4.9
Transgenic/chimera	4.2	2.9
Protected species	3.0	2.8
Unborn/pre-hatched	1.3	2.6
Diseased	0.2	0.2
Other	<0.1	<0.1

As in previous years, the majority of animals manipulated in RTT in New Zealand in 2019 were classified as normal, healthy, conventional animals.

All SPF/germ-free animals were rodents in 2019.

A total of 13 404 animals were classified as transgenic/chimera, 91.0 per cent of which were mice. This category also included fish (872), rats (303) and goats (22). Six institutions used transgenic/chimera animals in 2019.

The 9431 protected species included marine mammals, “other birds”, reptiles, and “other species”.

3991 animals were included in the unborn/pre-hatched category, made up of fetal mice, chicken eggs, fetal rats and fetal lambs.

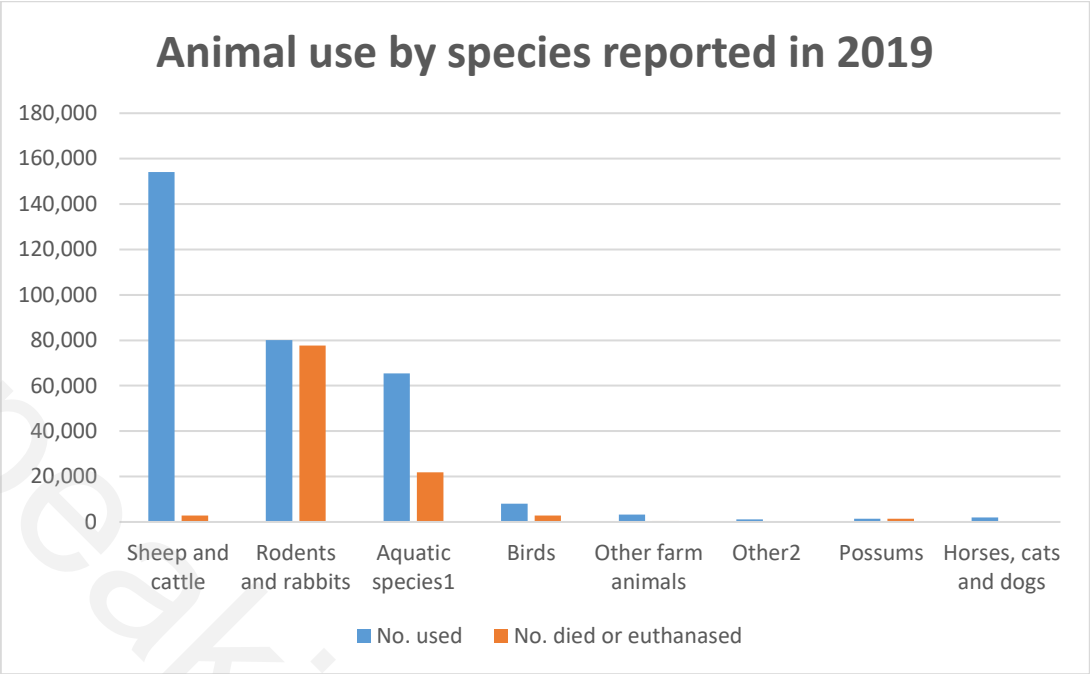
A total of 526 animals were classified as “diseased”[4] and included rats, sheep, mice, dogs, horses and cattle.

84 rats, nine sheep and two cattle were classified as having a status other than those listed above.

7 Outcome

Appendix 1 shows the five-year summary of the animals used (by species) and the percentages that died or were euthanased before, during, or after manipulations. In 2019, 18 568 animals (5.9 percent of the total) were killed for the purpose of using their tissues for RTT purposes but did not undergo any prior manipulation. Another 88 715 animals died or were euthanased during, or after, manipulations. The remaining 208 291 animals remained alive following manipulation. Of those, 141 632 were returned to owners, 32 733 were released to the wild, 28 620 were retained by the institution and 5195 were disposed of to others. Animals rehomed numbered 111 - 56 chickens, 14 cattle, 11 guinea pigs, nine rats, seven rabbits, five “other birds”, four “other species”, three horses and two mice.

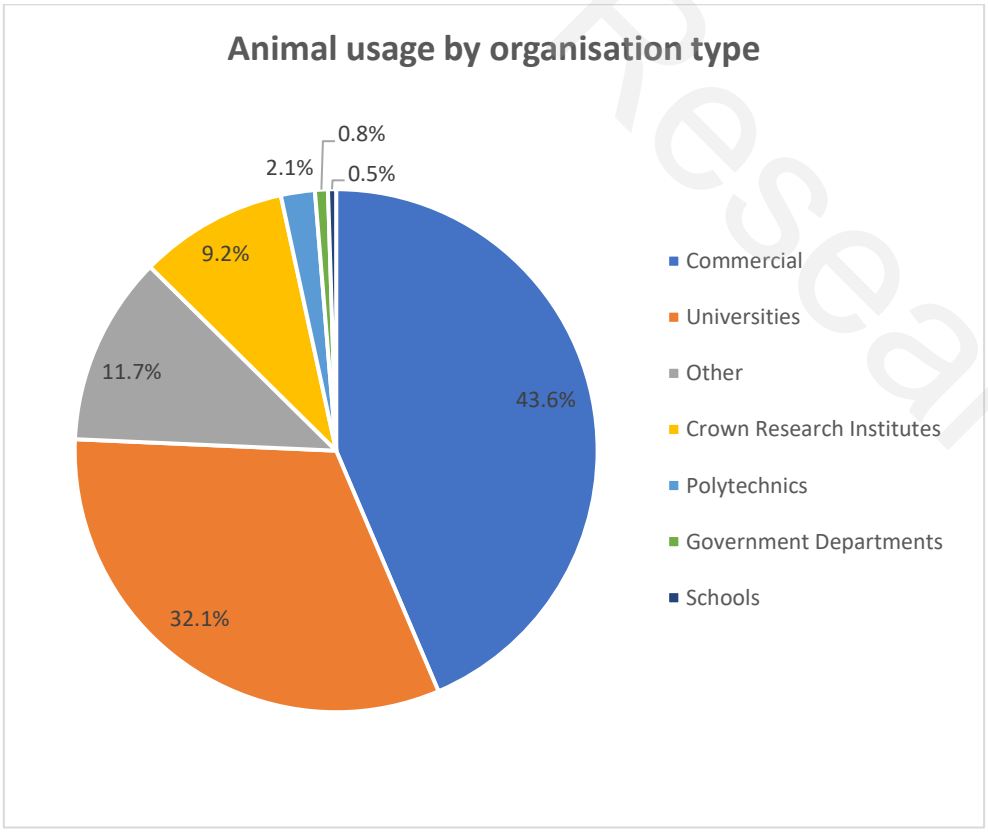
[4] Animals afflicted with naturally occurring disease, the focus of study usually being the cause, effects, cure or prevention of the disease.



(1)- 'Aquatic species' includes amphibia, fish, marine mammals and cephalopods/crustaceans
(2)- 'Other' includes reptiles and "other species"

8 Organisation Type

Appendix 2 tabulates animal usage by organisation type over the past five years. The pie chart below shows the 2019 information graphically. The top three user groups in 2019 were (in order) commercial organisations, universities and "other organisations".



Commercial organisations used 137 505 animals in 2019. Animals reported by commercial organisations were used for veterinary research, basic biological research, production of biological agents, testing, teaching, animal husbandry research, “other purposes”, medical research and environmental management.

Universities reported using 101 352 animals in 2019. Animals reported by universities were used for basic biological research, veterinary research, medical research, species conservation, animal husbandry research, teaching, “other purposes”, environmental management, producing offspring and testing.

Organisations in the ‘other’ category include non-university medical research institutes, zoos/wildlife parks and individuals. The number of animals reported from this sector was 36 981 in 2019. The majority of these (29 993) were used in medical research. Other animals were used for basic biological research, species conservation, “other purposes”, teaching, veterinary research and animal husbandry.

Crown Research Institutes (CRIs) used 29 014 animals in 2019. Animals reported by CRIs were used for basic biological research, animal husbandry research, environmental management, testing, medical research, species conservation, veterinary research, “other purposes” and teaching.

Polytechnics and institutes of technology reported 6729 animals in 2019. The wide variety of animals manipulated by this sector were nearly all used for teaching, usually for low impact animal husbandry/veterinary nursing or similar training. Other animals were used for basic biological research, environmental management, veterinary research, medical research and animal husbandry research.

Government departments reported the use of 2387 animals in 2019. The majority of these were used in veterinary research, mainly for investigation and surveillance of exotic avian diseases. Other were used in species conservation, teaching and environmental management.

The number of animals in RTT reported by schools was 1606 in 2019. These were mainly cephalopod/crustacea (1400). In addition, sheep, mice, chickens, possums, dogs, cattle, horses and other birds were used for teaching purposes.

9 Animal Reuse

In 2019, 39 060 animals used in RTT were reported as having been used previously. Domestic animals (including livestock) accounted for 82.2 per cent of the animals that were reused. With the exception of marine mammals and possums, a proportion of every animal species was reported as having been previously used.

10 Purpose of Manipulation

Organisations are required to provide information on the purpose of manipulations (in broad categories). The table below shows the breakdown and compares the 2019 figures with those reported in 2018. Descriptions of the "purpose of manipulation" categories are outlined in Appendix 3.

Purpose of manipulation	% of animals used	
	2019	2018
Basic biological research	26.7	30.3
Veterinary research	18.2	21.0
Medical research	14.3	7.7
Animal husbandry	9.5	4.0
Teaching	8.9	12.3
Production of biological agents	7.3	1.4
Testing	6.5	9.3
Species conservation	4.3	2.5
Environmental management	2.4	9.4
Other purposes	1.9	2.0
Producing offspring with potential for compromised welfare[5]	<0.1	0.1
Development of alternatives	0	<0.1

The main purpose for which animals were manipulated in 2019 was again for basic biological research with 84 269 animals in this category. Most of these were fish, sheep, mice, cattle and rats. No alpacas/llamas, marine mammals, possums or guinea pigs were used for this purpose.

A total of 57 463 animals were reported as used for veterinary research in 2019. The majority of these were cattle and sheep. All species were included in this group except pigeons, alpacas/llamas, amphibia, cephalopod/crustacea, fish, marine mammals, possums and reptiles.

The number of animals reported as being manipulated for medical research was 44 999 in 2019. The majority of these were rabbits and rodents.

Animal husbandry research used 30 068 animals in 2019. The majority of these were farm animals, fish and chickens.

A total of 28 076 animals were reported as used in teaching in 2019, the majority of which were cattle, sheep, cephalopod/crustacea, and fish. All species except pigeons, alpacas/llamas and marine mammals were used for teaching purposes.

The number of animals reported as utilised in the production of biological agents was 22 898 in 2019. The majority of these were cattle and sheep. Mice, guinea pigs, rabbits, horses and goats were also used for this purpose.

The number of animals manipulated for the purposes of testing was 20 584 in 2019. Most of these were rodents and rabbits and farm animals.

Animal numbers reported for species conservation in 2019 were 13 561, mostly made up of marine mammals, fish and "other birds". Smaller numbers of amphibia, reptiles, rats and "other species" were also used in this category.

Environmental management research used 7519 animals in 2019. Most of these were rats, possums and fish.

[5] This category was introduced in 2018

Animals reported as used for purposes other than those included above numbered 5924 in 2019. Most of these were cattle and sheep.

Animal numbers reported for the purpose of producing offspring with potential for compromised welfare were 213 made up of 203 mice and 10 rats.

No animals were used for the development of alternatives in 2019 (see section 12).

11 Grading of Animal Manipulations

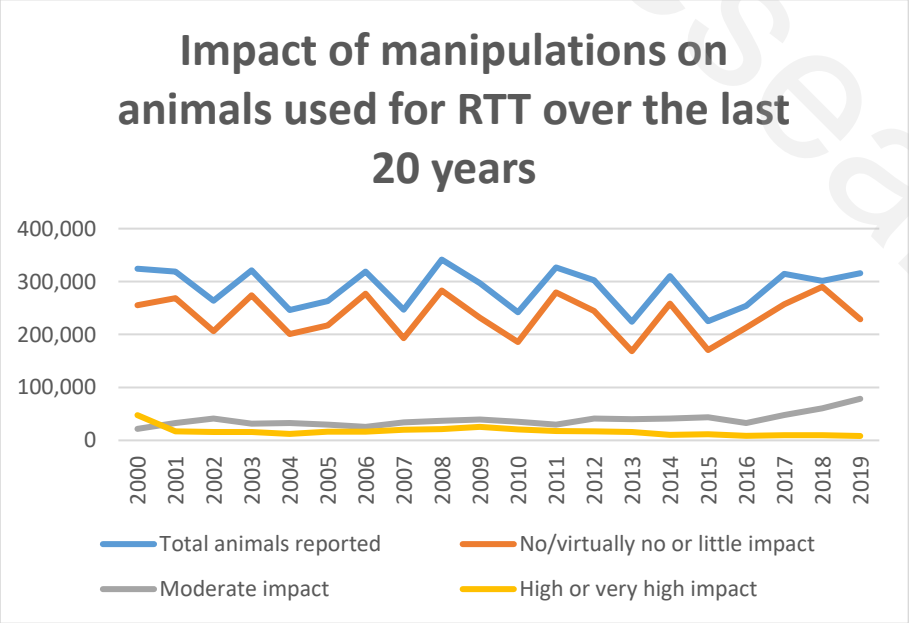
Animal manipulations are graded according to a five-point scale as specified in the Animal Welfare (Records and Statistics) Regulations 1999. The name and description of the scale was changed in 2008 to better reflect the overall estimate of the impact or invasiveness of each animal use. The five grades are:

- "no impact or virtually no impact" - manipulations that causes no stress or pain or virtually no stress or pain
- "little impact" - manipulations of minor impact and short duration
- "moderate impact" - manipulations of minor impact and long duration or moderate impact and short duration
- "high impact" - manipulations of moderate impact and long duration or high impact and short duration
- "very high impact" - manipulations of high impact and long duration.

A more comprehensive description of the grading system has been published in the MPI publication *Animal Use Statistics* and is available on the website https://www.mpi.govt.nz/dmsdocument/1477-animal-use-statistics-guidance-for-completing-statistical-returns

Appendix 4 summarises the impact grade allocated to animals manipulated for RTT and reported in 2019.

11.1 LONG-TERM TRENDS OF THE IMPACT OF RTT ON THE ANIMALS USED IN N NEW ZEALAND



The percentage of animals that experience “no/virtually no” or “little impact” has averaged 80.4 percent since 2000 with a range from 75.2 percent to 87.0 percent. In 2019, 80.4 percent (228 827) of animals were exposed to manipulations in these categories.

The percentage of animals that experience “moderate impact” has averaged 13.1 percent over the last 20 years with a range from 6.7 percent to 24.9 percent. In 2019, 24.9 percent (78 489) of animals were classified in this category.

The percentage of animals that experience “high impact” or “very high impact” has averaged 5.9 percent over the last 20 years with a range from 2.6 percent to 14.7 percent. In 2019, a total of 8258 animals (2.6 percent of the total) experienced manipulations in these categories.

11.2 MANIPULATION GRADING OF ANIMALS REPORTED IN 2019

The table below gives details of the gradings for various groupings of animals.

11.2.1 Summary of impact of manipulations in animals used for RTT in 2019

2019 summary	Total reported	Number in each manipulation grade				
		No/virtually no impact	Little impact	Moderate impact	High impact	Very high impact
Rodents and rabbits	80 143	2 620	34 480	36 258	891	5 894
Sheep and cattle	154 145	33 583	98 070	22 218	274	0
Aquatic species[1]	65 428	12 347	38 516	13 905	660	0
Other domestic species	5 269	838	3 980	451	0	0
Birds	8 115	389	3 102	4 624	0	0
Possums	1 369	146	124	563	536	0
Other[2]	1 105	147	485	470	3	0
Grade totals	**315 574**	**50 070**	**178 757**	**78 489**	**2 364**	**5 894**
Grade percentages		**15.9%**	**56.6%**	**24.9%**	**0.7%**	**1.9%**

[1] ‘Aquatic species’ includes amphibians, fish, marine mammals and cephalopods/crustaceans.
[2] ‘Other’ includes reptiles and “other species”.

Animals featuring in the “very high” impact group were guinea pigs and mice. Animals were classified in this and the “high” impact grades for the following reasons:

Fish

- Fish were used in an environmental toxicity test for a regional council; a standard assessment. The fish that died under the toxicity test were graded as high impact.
- Fish were used in a trial looking at the effect of predator threat on small snapper. The fish graded as high impact died as a result of disease.
- One fish died due to a disease event.
- Migrating eels were captured to obtain fertilised eggs in a project aimed to help close the lifecycle of endangered New Zealand eel species.
- Fish trapping led to the death of 84 bignose galaxiaz (out of 2677 captured), probably due to low overnight dissolved oxygen levels in three spring heads. This occurred unexpectedly and affected around 3% of the fish captured and would have resulted in a higher level of impact on those fish.
- Fish were graded D due to the combination of various manipulations and sleep deprivation/varying photoperiods.
- Fish were left in containers on the seafloor for 2-3 hours, a process that is likely to be stressful.
- In a study involving the capture of fish using a spear gun, five fish that needed a secondary method of euthanasia (i.e. did not die immediately from being speared) were graded D.
- Fish were reported with an impact grading D as they were transported for 2-6 hours and underwent respirometry testing (for a period not exceeding 48 hours).

Possums

- Possums were used in a study to improve the efficiency of live trapping of this species.
- Possums were used in the testing of new traps, baits, deer repellents and baiting strategies. The research has produced several improved tools for controlling populations of possums.

Rodents and rabbits

- Rats were used in testing the efficacy of baits containing a kea repellent, providing for improved protection of kea during rat-baiting operations.
- Guinea pigs were used in veterinary research, and production & evaluation of biological reagents, as well as in batch release testing for animal vaccines. This is a regulatory requirement to demonstrate potency.
- Mice in the very high impact group were used in testing of antigens and animal vaccines mandated by regulation and in veterinary research, production and evaluation of biological reagents.
- Seven mice were given an incorrect dose of DMSO.
- Three mice were infected with S. aureus via intraperitoneal injection, intravenously or through a large intranasal inoculum to induce pneumonia.
- A mouse was found unexpectedly dead in the cage. A post-mortem examination showed no signs of suffering or abnormalities.
- A mouse was euthanased in a project assessing inflammatory markers associated with a murine model of colitis.
- Three captured wild rats became distressed and died in a trial investigating the potential for deterrents aimed at preventing them from crossing a border.
- Four rabbits should have been reported with an impact grading of C rather than grade D. The Committee approved a D grade in case the impact on the rabbits was more significant than anticipated as this was a new study, however the rabbits were only mildly affected, and a C grade would have been appropriate.

Other species

- Three weasels were part or a research trial testing the effectiveness of a long-life PAPP bait for weasel control.

Sheep

- Sheep were graded D in research into Facial Eczema.
- Sheep were dosed with facial eczema.

12 The Three Rs

No animals were used for the development of alternatives that would lessen the impact of procedures in 2019.

Appendix 1

ANIMAL USAGE REPORT: FIVE-YEAR SUMMARY OF THE NUMBER OF ANIMALS USED AND THE PERCENTAGE THAT DIED OR WERE EUTHANASED (BY SPECIES)

	2019		2018		2017		2016		2015	
	No. used	% died or euthanased	No. used	% died or euthanased	No. used	% died or euthanased	No. used	% died or euthanased	No. used	% died or euthanased
Alpacas/llamas	49	0								
Amphibia	617	7	258	9	66	38	593	3	1368	13
Birds	8115	35	8229	24	33 355	55	9716	17	15 627	13
Cats	698	<1	701	10	1099	<1	926	<1	519	3
Cattle	81 595	1	102 520	1	44 007	<1	104 338	<1	59 330	1
Cephalopods/ crustaceans	3956	34	4349	28	4028	20	4815	28	2200	27
Deer	1399	4	1968	11	1537	11	7688	2	8497	<1
Dogs	956	<1	2624	<1	888	2	1304	7	812	3
Fish	54 108	38	55 926	40	101 167	82	19 632	56	40 764	49
Goats	962	4	11 429	2	3297	3	4400	5	2052	9
Guinea pigs	2565	91	2 404	94	1952	94	1900	96	1967	95
Horses/donkeys	314	<1	918	2	756	<1	924	1	283	0
Marine mammals	6747	0	1710	6	698	0	2974	0	403	0
Mice	63 171	99	47 983	99	52 196	99	34 013	98	48 341	99
Pigs	918	34	1479	15	455	91	533	89	738	54
Possums	1369	99	2030	96	983	89	1169	75	2977	84
Rabbits	1086	96	1291	90	1208	85	1225	90	1494	90
Rats	13 321	90	22 222	95	7592	84	8770	87	9387	87
Reptiles	622	16	4001	<1	1096	<1	1235	8	4473	<1
Sheep	72 550	3	29 056	12	57 436	6	47 548	4	23 474	11
Other species	456	37	237	44	360	18	604	7	2801	5
Total	**315 574**		**301 335**		**314 571**		**254 063**		**225 310**	
Yearly %		34%		35%		54%		25%		39%

Appendix 2

ANIMAL USAGE REPORT: FIVE-YEAR SUMMARY OF ANIMAL USAGE (BY ORGANISATION TYPE)

Group	Year	Rodents, rabbits	Sheep, cattle, goats	Other domestic animals	Birds	Fish	All other species	Total
Commercial organisations	2015	22 195	60 708	714	7474	4811	319	96 221
	2016	15 726	98 908	960	12	-	48	115 654
	2017	22 777	54 923	172	1	10	10	77 893
	2018	17 530	101 535	1048	60	10	37	120 220
	2019	**16 377**	**113 452**	**295**	**13**	**7055**	**313**	**137 505**
Universities	2015	22 737	9682	2003	5801	22 554	6393	69 170
	2016	20 403	10 981	1554	2505	9862	5106	50 411
	2017	22 203	16 098	2283	30 321	81 692	1818	154 515
	2018	32 098	25 315	4218	424	31 252	6655	103 802
	2019	**31 220**	**27 739**	**2221**	**5053**	**25 686**	**9433**	**101 352**
Crown Research Institutes	2015	1818	13 828	7422	-	8537	2980	34 585
	2016	4681	43 039	7788	4791	2284	1265	63 848
	2017	2442	18 023	1444	191	9327	2909	34 336
	2018	14 194	12 650	1824	1559	7495	2158	39 880
	2019	**2307**	**8816**	**1264**	**401**	**14 892**	**1334**	**29 014**
Others	2015	14 231	73	37	65	1398	563	16 367
	2016	4367	947	78	79	1628	584	7683
	2017	15 124	35	110	102	1834	497	17 702
	2018	9755	2212	86	93	11 309	811	24 266
	2019	**29 993**	-	**51**	**4**	**5852**	**1081**	**36 981**
Polytechnics	2015	208	491	652	75	3455	75	4956
	2016	207	2342	910	57	5602	34	9152
	2017	299	509	707	78	8294	38	9925
	2018	288	1289	505	111	5537	82	7812
	2019	**194**	**5030**	**458**	**286**	**623**	**138**	**6729**
Government Departments	2015	-	-	17	2212	5	613	2847
	2016	501	-	7	2243	245	977	3973
	2017	-	-	-	2620	-	629	3249
	2018	-	-	-	2145	298	794	3237
	2019	-	-	-	**2310**	-	**77**	**2387**
Schools	2015	-	74	4	-	4	1082	1164
	2016	23	69	78	29	11	3132	3342
	2017	3	15 152	19	42	10	1725	16 951
	2018	35	4	9	13	25	2048	2134
	2019	**52**	**70**	**18**	**48**	-	**1418**	**1606**
Total	2015	61 189	84 856	10 849	15 627	40 764	12 025	225 310
	2016	45 908	156 676	11 375	9716	19 632	11 146	254 453
	2017	62 948	104 740	4735	33 355	101 167	7626	314 571
	2018	73 900	143 005	7690	8229	55 926	12 585	301 335
	2019	**80 143**	**155 107**	**4307**	**8115**	**54 108**	**13 794**	**315 574**

Appendix 3

ANIMAL USAGE REPORT: '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	Basic biological research.
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 to meet 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 4

ANIMAL USAGE REPORT: SUMMARY OF THE IMPACT GRADE ALLOCATED BY SPECIES IN 2019

Species	No impact	Little impact	Moderate impact	High impact	Very High impact	Total
Alpaca/llama	2	45	2	-	-	49
Amphibia	3	579	35	-	-	617
Birds	389	3102	4624	-	-	8115
Cats	349	340	9	-	-	698
Cattle	8039	56 578	16 978	-	-	81 595
Cephalopods/ crustacea	1051	1810	1095	-	-	3956
Deer	29	1207	163	-	-	1399
Dogs	343	589	24	-	-	956
Fish	11 293	29 426	12 729	660	-	54 108
Goats	9	931	22	-	-	962
Guinea pigs	232	984	28	794	527	2565
Horses	75	177	62	-	-	314
Marine mammals	-	6701	46	-	-	6747
Mice	2027	26 682	29 083	12	5367	63 171
Pigs	31	718	169	-	-	918
Possums	146	124	563	536	-	1369
Rabbits	21	1037	24	4	-	1086
Rats	340	5777	7123	81	-	13 321
Reptiles	135	184	303	-	-	622
Sheep	25 544	41 492	5240	274	-	72 550
Other species	12	274	167	3	-	456
TOTAL	50 070	178 757	78 489	2364	5894	315 574
Percentage	15.9%	56.6%	24.9%	0.7%	1.9%	

Appendix 5

LIST OF CODE HOLDERS AND ORGANISATIONS WITH AN ARRANGEMENT TO USE A CODE IN 2019

Abacus Biotech Ltd
Advanced Genetics 2015 Ltd
Ag Challenge Ltd
Agilis Vets Ltd
AgResearch Ltd
AgriHealth NZ Ltd
AgVet NZ Ltd
Alleva Animal Health Ltd
Alltech (NZ) Ltd
Animal Breeding Services (2007) Ltd
Ara Institute of Canterbury
Argenta Manufacturing Ltd
Aroa Biosurgery Ltd
Arotec Diagnostics Ltd
AsureQuality Ltd
Auckland University of Technology
Auckland Zoological Park
Bayer New Zealand Ltd
B+LNZ Genetics
BCF Ultrasound
BioCell Corporation Ltd
Boehringer Ingelheim Animal Heath New Zealand Ltd
Boffa Miskell Ltd
BW & MB McLeod Partnership
Caledonian Holdings Ltd
Carne Technologies Ltd
Cawthron Institute
Cognosco, Anexa Animal Health
Cropmark Seeds Ltd
CRV Limited
CuroNZ Ltd
Dairy Goat Co-operative (NZ) Ltd
DairyNZ Ltd
Dairy Production Systems Ltd
Damar Industries Ltd
DCS Animal Health Studies Ltd
Department of Conservation
Disease Research Ltd
Donaghys Ltd
Duopharm Animal Health Ltd
Eastern Institute of Technology
Elanco Animal Health
EquiBreed NZ Ltd
Eurofins Animal Health NZ
FIL (New Zealand) Ltd
Flint, Pania
Franklin Vets
Halter Ltd
Haywood, Ursula
Innovative Medical Solutions Ltd
InterAg
Intuit Regulatory & Marketing Ltd
Invetus NZ Ltd
Jurox Pty Ltd
K9 Medical Detection New Zealand Charitable Trust

Karori Sanctuary Trust
Landcare Research New Zealand Ltd - Manaaki Whenua
Lawrence, Dr David W
Levin and Horowhenua Veterinary Centre
Life Technologies New Zealand Ltd
Lincoln University
Livestock Improvement Corporation Limited
Living Cell Technologies New Zealand Limited
Malaghan Institute of Medical Research
ManukaMed Limited Partnership
Massey University
Matamata Veterinary Services Ltd
Matthews, Lindsay
McLeod, Graeme & Janelle
Medical Plus New Zealand
MPI Diagnostic and Surveillance Services
National Institute of Water and Atmospheric Research Ltd
National Trade Academy
Nelson Marlborough Institute of Technology
New Zealand Agriseeds Ltd
New Zealand Association of Science Educators
New Zealand Institute for Plant and Food Research Ltd
New Zealand Leather and Shoe Research Association
North Canterbury Veterinary Clinics
Northern New Zealand Seabird Charitable Trust
NZ AutoTraps Ltd
Nzeno Ltd
Oamaru Veterinary Centre
On-Farm Research Ltd
Otago Polytechnic
Otakaro Pathways Ltd
PGG Wrightson Seeds Ltd
Pharmfirst Ltd
PharmVet Solutions
PJM Scientific Pty Ltd
Practical CPD Ltd
Quantec Ltd
SBScibus Ltd
Schering-Plough Animal Health Limited
SciLactis Ltd
Seacrest Farms Ltd
Sirona Animal Health Ltd
Skretting Australia
South Pacific Sera Limited
Southern Institute of Technology
StemVet New Zealand Ltd
Synlait Milk Ltd
Synthase Biotech Ltd
Te Whare Wananga o Awanuiarangi
Techion Group Ltd
The New Zealand King Salmon Co Ltd
The New Zealand Merino Company Ltd
Toi Ohomai Institute of Technology
Totally Vets Ltd
Trinity Bioactives Ltd
Unitec Institute of Technology
Universal College of Learning
University of Auckland
University of Canterbury
University of Otago
University of Waikato
Vence NZ Ltd
Vet Nurse Plus

Vet Resource Ltd
Veterinary Enterprises Group
VetLearn
Vetlife Ltd
Vetora
VetSouth Ltd
Victoria University of Wellington
Waikato Institute of Technology
Waikato Regional Council
Wellington Institute of Technology
Wellington Zoo Trust
Wildland Consultants Ltd
Zoetis New Zealand Ltd