



Statistics on the Use of Animals in Research, Testing and Teaching in New Zealand in 2015

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Requests for further copies should be directed to:

Publications Logistics Officer
Ministry for Primary Industries
PO Box 2526
WELLINGTON 6140

Email: brand@mpi.govt.nz

Telephone: 0800 00 83 33

Facsimile: 04-894 0300

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1 Introduction

The use of animals in research, testing and teaching is covered by a self-contained set of provisions within New Zealand's animal welfare legislation - Part 6 of the Animal Welfare Act 1999. 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 research, testing and teaching purposes only in accordance with a code of ethical conduct which has been approved by the Ministry for Primary Industries. In 2015, 26 institutions had codes of ethical conduct approved by the Director-General of the Ministry for Primary Industries. These codes set the parameters within which the institutions are allowed to use animals for research, testing and teaching 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 animal ethics committee (AEC) established under the code of ethical conduct. There are currently 30 animal ethics committees (some institutions, because of their geographic spread, operate more than one committee). In addition, as at the end of 2015, another 100 institutions engaging in research, testing and teaching 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 Royal New Zealand 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 research, testing or teaching 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 research, testing and teaching 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 research, testing and teaching 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 the Ministry for Primary Industries 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 the Ministry for Primary Industries 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.

2 Summary of 2015 Animal Use Statistics

A total of 225 310 animals used in research, testing and teaching were reported in 2015, 84 977 fewer than the previous year. This was a 27.4 percent decrease and the second lowest total under the current legislation. The rolling 3-year average, at 253 215, was at its lowest under the Animal Welfare Act 1999.

The most commonly reported species in 2015, as it was in 2014, was cattle, making up 63.0 percent of the farm animals used, and 26.3 percent of the total number. Mice were again the second most common species in 2015, making up 21.5 percent of the total. Fish (18.1 percent) and sheep (10.4 percent) were the third and fourth most commonly used species. In terms of species groupings, production animals (cattle, sheep, deer, goats and pigs) made up 41.8 percent of the total, with rodents and rabbits together accounting for 27.2 percent. The fall in numbers in 2015 was reflected in all species except other birds, reptiles, amphibia, fish, pigeons, guinea pigs, rabbits, horses and pigs.

Veterinary research (39.5 percent), animal husbandry research (20.2 percent), teaching (19.5 percent) and basic biological research (18.3 percent) were the main reasons for using production animals, accounting for 91 654 animals. Nearly 90 percent of the rodents were used in medical research, testing the safety and efficacy of animal health products and basic biological research. The majority (79.1 percent) of birds were “other” birds, 66.8 percent of which were used in environmental management research.

More than 75 percent of animals were exposed to manipulations which had no, virtually no, or little impact on their welfare. A total of 11 474 animals (5.1 percent of the total) experienced manipulations of “high impact” or “very high impact”. The species that experienced a “very high” impact were rodents, possums, fish and one reptile.

New Zealand’s usage of animals classified as transgenic/chimera is low by world standards, with only 6948 (3.1 percent of the total) such animals used in 2015.

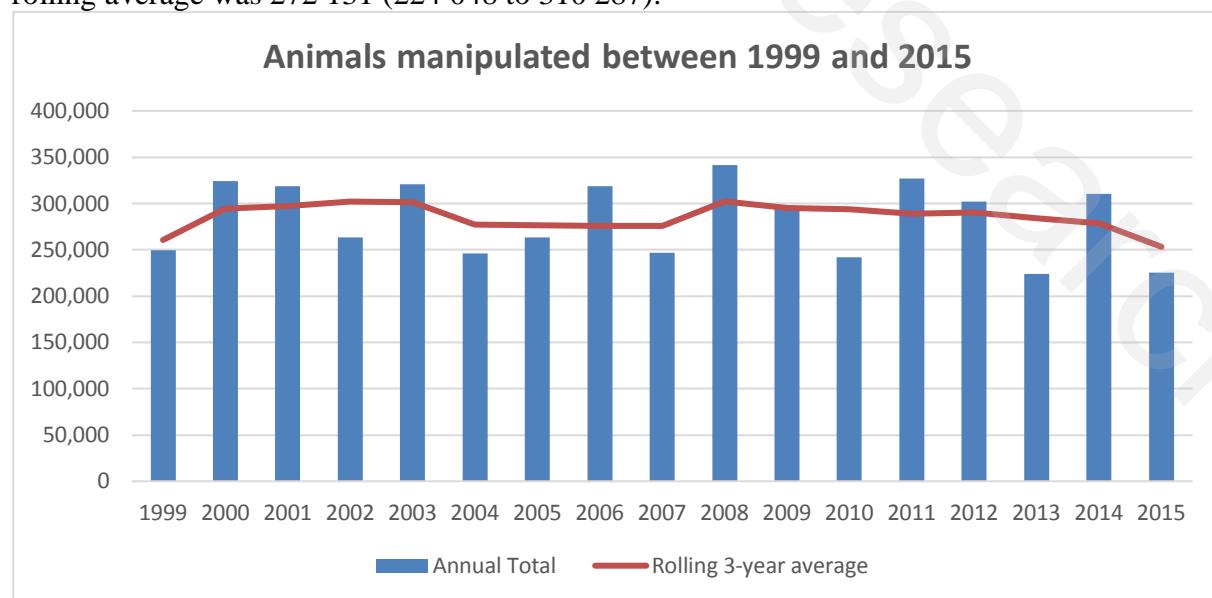
Nearly 61 percent of animals returned to their normal environment following their use in manipulations. Over 96 percent of production animals remained alive following use. However, nearly 97 percent of rabbits and rodents were ‘dead or euthanased’ following manipulation.

3 Animal Usage

During 2015, a total of 225 310 animals¹ were reported as manipulated² in research, testing and teaching³. This was a decrease of 27.4 percent (- 84 977) compared to 2014, when 310 287 animals were reported.

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, down, in 2015, to its lowest level under the current legislation (253 215).

To illustrate the influence of the three-yearly reporting cycle, the accompanying graph shows the rolling three-year average compared with the annual totals. From 1999 to 2000, the rolling average was 277 567 (249 272 to 324 395); for the years 2001 to 2003 the rolling average was 300 232 (263 684 to 320 911); for the years 2004 to 2006 the rolling average was 276 532 (246 122 to 318 489); for the years 2007 to 2009 it was 291 149 (246 667 to 341 520); for the years 2010 to 2012 it was 290 854 (242 149 to 326 770); and for the last three years the rolling average was 272 131 (224 048 to 310 287).



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.

Those species most commonly reported in 2015 were (in order) cattle, mice, fish and sheep, which collectively accounted for 76.3 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 25 years have been fish (in 14 years), rats (in seven years) and birds (in five years).

The fall in numbers in 2015 was reflected in all species except other birds, reptiles, amphibia, fish, pigeons, guinea pigs, rabbits, horses and pigs. The largest numerical decrease was reported for fowls/chickens (- 23 390, an 88.5 percent drop). The other species with lower numbers were sheep (- 21 271, down 47.5 percent), deer (- 11 473, down 45.8 percent), cattle (- 16 166, down 21.4 percent), mice (-10 038, down 17.2 percent), cephalopod/crustacea (- 2556, a 53.7 percent drop), rats (- 2420, down 20.5 percent), other species (- 2197, down 78.4 percent), goats (- 1124, a drop of 35.4 percent), possums (- 1006, down 25.3 percent), marine mammals (- 440, a decrease of 52.2 percent), cats (- 209, down 28.7 percent) and dogs (- 194, down 19.3 percent). The largest numerical increase was recorded in the number of other birds (+ 7314, a 145 percent increase), followed by reptiles (+ 4148, a 1276.3 percent increase), amphibia (+ 597, a 77.4 percent increase), fish (+ 209, up 0.5 percent), pigeons (+ 115, up 110.6 percent), guinea pigs (+ 103, a 5.5 percent increase, rabbits (+ 49, up 3.4 percent), horses (+ 46, a 19.4 percent increase) and pigs (+ 14, up 1.9 percent).

Overall, the use of agricultural livestock fell by 63.1 percent (- 55 108), with only pig numbers rising (by 14). Cattle were again the most numerous (63.1 percent) of the agricultural livestock, with over half (56.4 percent) being used for veterinary research, 26.7 percent for teaching and another 10.4 percent for basic biological research. Sheep were mostly used in animal husbandry research (43.4 percent), basic biological research (32.5 percent) and veterinary research (12.0 percent). Most deer were used in animal husbandry research (61.8 percent), with basic biological research accounting for 23.7 percent. Nearly two thirds (63.5 percent) of goats were used for basic biological research, with 32.6 percent used in animal husbandry research. In the farm animal category, only pig numbers rose marginally, with 51.6 percent used for teaching, 27.0 percent for medical research and 16.3 percent in basic biological research. In addition, 38 pigs were used in research into environmental management.

Rodent use fell by 17.1 percent (- 12 355), mainly due to fewer animals being used in basic biological research (- 6477), medical research (- 3279), environmental management (- 3057) and testing (- 978). On the other hand, more rodents were used in the production of biological agents (+ 1559). Mice made up the majority (81.0 percent) of rodent numbers, followed by rats (15.7 percent) and guinea pigs (3.3 percent).

Most fish (24 657) were used in basic biological research, 459 more than in 2014. More fish were used in veterinary research (+ 2435), environmental management (+ 577), teaching (+ 389) and medical research (+ 225) in 2015. Fewer were used in animal husbandry (- 3066) and species conservation (- 810).

Bird use fell by more than half from 31 588 in 2014 to 15 627 in 2015. This was mainly due to the reporting in 2014 of nearly 20 000 fowls/chickens being used in animal husbandry research compared to only 396 in 2015. Fowls/chickens were also used for teaching (1330), veterinary research (1054), basic biological research (250) and environmental management (21). However, numbers of other birds rose 145.0 percent, most of this increase being due to the reporting of 8254 birds for research into environmental management compared to only 29 reported in this category in 2014. Other birds were also used for basic biological research

(1992), veterinary research (1187), species conservation (739), teaching (181) and other purposes (4). Pigeons (up 115) were used for basic biological research (64), species conservation (18), environmental management (18), teaching (5) and other purposes (114).

In 2015, 4473 reptiles were reported compared to only 325 in 2014. The majority of these (85.9 percent) were used for basic biological research, with others used for species conservation (535), teaching (48), environmental management (38) and veterinary research (8). The number of possums reported in 2015 fell 25.3 percent to 2977. More than three quarters of these (77.6 percent) were used in basic biological research. The remainder were used in environmental management (663) and teaching (5). The numbers of amphibia rose by 597. The majority of these (89.1 percent) were used in research relating to species conservation (975) and basic biological research (244). The fall in numbers of cephalopod/crustacea was mainly due to 1115 fewer being used for teaching, and 1191 fewer being used for basic biological research. Four hundred and forty fewer marine mammals were used in 2015. They were used for the purposes of species conservation (191), teaching (150) and basic biological research (62).

The numbers of dogs and cats reported in 2015 both fell – dogs by 19.3 percent; cats by 28.7 percent. The majority of dogs were used for teaching (53.2 percent). Others were used for veterinary research (35.2 percent), testing (6.4 percent), and basic biological research (5.2 percent). Most cats were also used for teaching (64.9 percent) and veterinary research (30.8 percent), and were also manipulated environmental management (14) and basic biological research purposes (8). Horse numbers rose by 46 to 283 in 2015. This species was used for teaching (138), veterinary research (104), basic biological research (17), animal husbandry (16) and testing purposes (8).

The number of rabbits used rose by 14 in 2015. They were used for testing (58.9 percent), production of biological agents (19.0 percent), teaching (10.3 percent), basic biological research (8.1 percent), veterinary research (2.2 percent), medical research (1.3 percent) and animal husbandry research (3 rabbits).

In 2015, 604 animals were reported in the “other species” category, a marked decrease from the 2801 reported in 2014. This group was made up of 311 bats (used in basic biological research), 217 alpacas (used in veterinary research and teaching), 65 stoats (used in species conservation and environmental management), 5 llamas (used in teaching) and two each of cheetahs (veterinary research), chinchillas (teaching) and donkeys (basic biological research).

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.

4 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	2015	2014
	%	%
Farms	37.2	47.4
Breeding units	27.5	20.9
Captured	15.3	12.0
Commercial sources	10.4	9.6
Public sources	5.2	3.2
Born during project	4.1	6.6
Imported	0.3	0.2

The lower number of animals used in 2015 was mainly reflected in those sourced from farms, with 63 328 fewer animals in this category. Although the percentage of animals sourced from breeding units, commercial sources, captured and imported into New Zealand all rose, the numbers in each of these categories also fell. The percentage of animals born during projects fell 4.1 percent to 9253, 11 381 fewer than in 2014. Only in the public sources category did the numbers rise in 2015, up 5.2 percent to 11 757.

The largest decrease was in those sourced from farms, down 43 percent. The only species whose numbers rose from this source were fish, up 3356 (54.3 percent), and horses, up 23 (29.9 percent). Numbers sourced from breeding units fell by 2867 (4.4 percent), with rodents and rabbits accounting for 91.0 percent of these. A total of 2865 fewer animals were captured, a decrease of 7.7 percent. These included fish (18 123), reptiles (4304), other birds (4178), possums (2977), cephalopod/crustacea (2200), amphibia (1151), rats (519), “other” species (374), marine mammals (253), fowls/chickens (152), rabbits (108), mice (22), pigs (17) and 14 cats. Commercial enterprises were the source of 6269 fewer animals in 2015, a decrease of 21.1 percent. Farm animals made up 16 043 (68.6 percent) of this total, and fish accounted for 19.6 percent (4588 fish). More animals were obtained from public sources (up 5.2 percent) in 2015. Most of these (66.3 percent) were other birds. Numbers of animals born during projects fell by 55.2 percent to 9253. The majority of these were fish (4046), sheep (1926) and mice (1783). Numbers of animals imported, at 694, was the same as in 2014 – these were all mice.

In 2015, 95.0 percent of farm animals were sourced from farms or commercial organisations, with a further 2.7 percent - 1926 sheep, 349 cattle, 272 deer, 17 goats and 10 pigs – born during projects. Farm animals were also sourced from breeding units (1.8 percent), public sources (0.5 percent) and captured (17 pigs). Reflecting New Zealand’s focus on agricultural research, farm animals were used by 56 organisations or individuals (hereafter referred to as organisations), 31 of which used only cattle and/or sheep.

The majority of rodents (92.6 percent) (used by 28 organisations) and rabbits (79.7 percent) (used by 19 organisations) came from breeding units. Rodents were also born during projects (4.1 percent), imported (1.2 percent), obtained from commercial sources (1.0 percent), captured (0.9 percent) and obtained from public sources (0.3 percent). Rabbits were also captured (7.2 percent), obtained from public sources (5.7 percent), obtained from commercial sources (5.4 percent), and born during projects (2.0 percent).

Capture was the main method for obtaining fish (44.5 percent). Fish, used by 18 organisations, were also obtained from farms (23.4 percent), from commercial sources (11.3 percent), born during projects (9.9 percent), from breeding units (7.4 percent) and from public sources (3.6 percent). Of the 403 marine mammals (used by 4 organisations), 62.8 percent were classified as “captured”; 37.2 percent were obtained from public sources.

“Other birds”, i.e. birds excluding chickens and pigeons, were used by 20 organisations, made up 79.1 percent of total birds used, with most being classified as either obtained from public sources (63.1 percent) or captured (33.8 percent). The remainder were sourced from breeding units (255), were born during projects (79) or were obtained commercially (47). The majority of chickens, which made up 19.5 percent of total birds used and were used by 14 organisations, were obtained from commercial sources (61.6 percent), with the remainder coming from farms (22.1 percent), from breeding units (7.1 percent), captured (5.0 percent), from public sources (4.0 percent) or born during projects (0.2 percent). Most pigeons, used by 6 organisations, were obtained from farms (114), commercial sources (94) or public sources (11).

The amphibia (used by 6 organisations), cephalopods/crustaceans (6 organisations), possums (8 organisations), and reptiles (12 organisations) were mostly captured or obtained from public sources or breeding units. Dogs (18 organisations) were obtained from public sources (88.7 percent), from breeding units (7.8 percent), from commercial sources (2.7 percent) or from farms (0.9 percent). Cats (used by 15 organisations) came from public sources (71.1 percent) and breeding units (26.2 percent), with 14 (2.7 percent) captured. Horses were used by a total of 15 organisations and supplied from public sources (53.7 percent), from farms (35.3 percent) and from commercial organisations (11.0 percent).

5 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	2015	2014
	%	%
Normal/conventional	83.0	89.1
SPF/germ-free	4.4	4.2
Protected species	3.5	2.1
Unborn/pre-hatched	3.1	2.3
Transgenic/chimera	3.1	1.9
Other	2.7	0.1
Diseased	0.1	0.3

As in previous years, the majority (85.7 percent) of animals manipulated in RTT in New Zealand in 2015 were classified as normal, healthy, conventional animals.

Fewer animals manipulated for RTT had a specific pathogen-free (SPF) or germ-free status than in 2014 (- 2977). All of these animals were mice (74.1 percent) or rats (25.9 percent).

The number of animals in the unborn/pre-hatched category increased by 12 to 7059. Most of these were fish eggs (42.5 percent) and prenatal sheep (34.7 percent), with the remainder made up of chicken eggs (16.1 percent) and unborn mice (6.7 percent).

More animals with protected species status were manipulated in 2015 (+ 1147). The rise was mostly due to an increase (+ 4420) in the number of reptiles reported. Other protected species reported as manipulated for RTT in 2015 included “other birds” (2471), “other species” (313), amphibia (307), marine mammals (246) and fish (50).

The number of animals classified as transgenic/chimera rose by 1011 or 17.0 percent from 2014. The majority of these were mice (83.8 percent) and fish (12.6 percent), with rats (1.8 percent), cattle (0.9 percent) and amphibia (also 0.9 percent) making up the total. One more institution – six in total - used transgenic/chimera animals in 2015 than in the previous year. Reflecting our relatively small biomedical research industry, New Zealand’s usage of this category of animal is low by world standards.

Numbers of animals with a “diseased”⁴ status fell by 579 to 294 in 2015. These included amphibia (140), dogs (68), sheep (43), fowls/chickens (20), cattle (13) and fish (10).

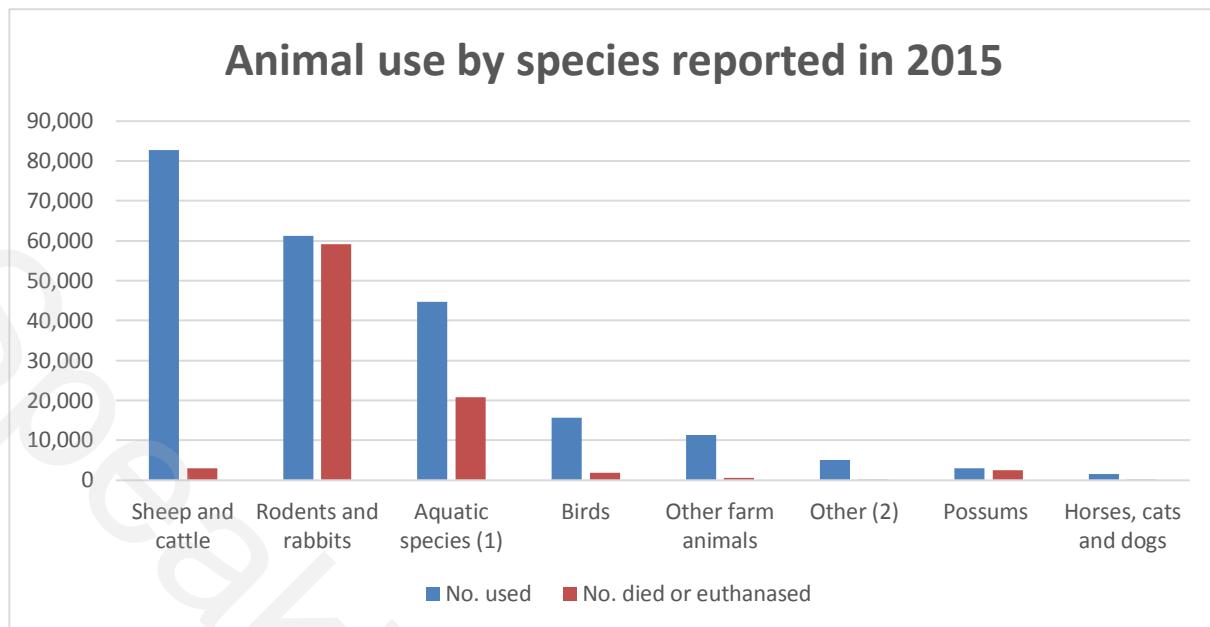
6 Outcome

Appendix 1 shows the five-year summary of the animals used (by species) and the percentages that died or were euthanased during, or after, manipulations. The number of animals that died or were euthanased during, or after, manipulations in 2015, fell by 18 478 to 88 200. After use, 60.9 percent of animals remained alive, compared to 65.6 percent in 2014. Of those alive, 53.8 percent were returned to owners, 25.7 percent were released to the wild, 10.7 percent were disposed of to others and 9.9 percent were retained by the institution. The majority of animals released to the wild were fish (42.0 percent), “other birds” (33.8 percent) and reptiles (12.2 percent). Other species released were cephalopod/crustacea (1414), amphibia (978), marine mammals (403), deer (337), “other species” (309), possums (294), rats (266), fowls/chickens (210) and 11 pigs.

The high survival rates (96.2 percent) for livestock reflect the number of trials of low invasiveness that take place while the animals remained in their normal farm environment and continued as part of the herd/flock at the conclusion of the trial. On the other hand, only 3.3 percent of rodents and rabbits remained alive following projects.

The following histogram shows information on the proportion of animals that died or were euthanased for the major groups of species.

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

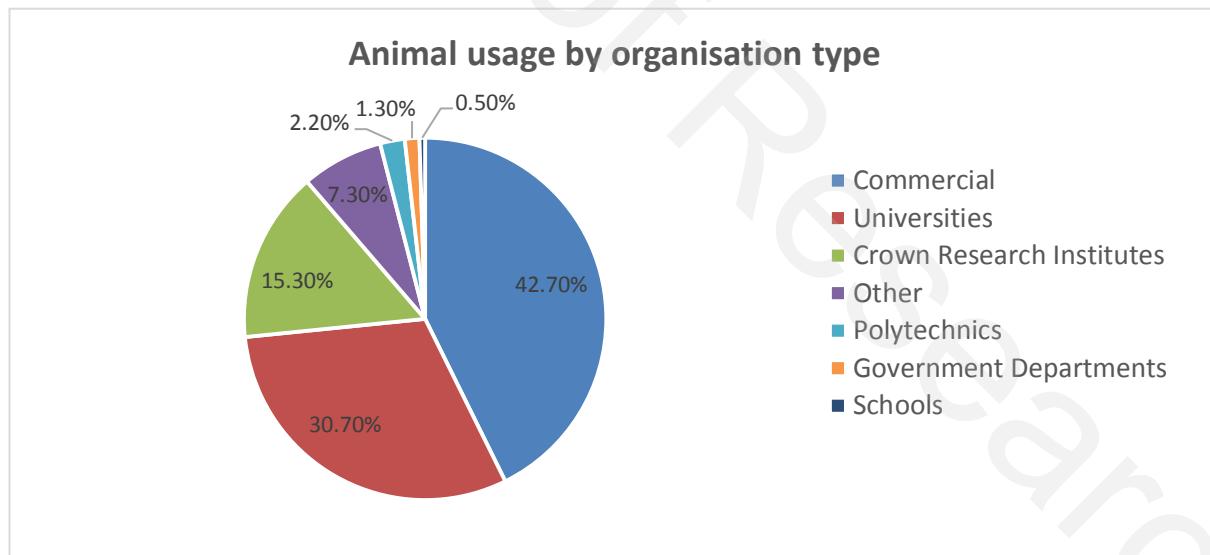


(1)- 'Aquatic species' includes amphibia, fish, marine mammals and cephalopods/crustaceans

(2)- 'Other' includes reptiles and 'other species'

7 ORGANISATION TYPE

Appendix 2 tabulates animal usage by organisation type over the past five years. The pie chart below shows the 2015 information graphically. The top three user groups in 2015 were (in order) commercial organisations, universities and CRIs.



Commercial organisations used 96 221 animals in 2015 - 9638 fewer than in 2014. Animals reported by commercial organisations were used for veterinary research (36.0 percent), testing (19.7 percent), teaching (15.7 percent), basic biological research (13.0 percent), environmental management (8.4 percent), animal husbandry research (4.1 percent), production of biological agents (2.0 percent), medical research (0.9 percent), species conservation (0.2 percent) and "other" purposes (<0.1 percent).

Universities reported 51 275 fewer animals than in 2014. Animals reported by universities were used for basic biological research (45.3 percent), medical research (16.0 percent),

teaching (11.4 percent), veterinary research (13.1 percent), animal husbandry research (7.4 percent), species conservation (3.8 percent), environmental management (2.4 percent), other purposes (0.4 percent), testing (0.3 percent) and production of biological agents (0.1 percent).

CRIs' animal use fell by 16 072 to 34 585 in 2015. Animals reported by CRIs were used for basic biological research (50.2 percent), animal husbandry research (32.4 percent), environmental management (12.4 percent), veterinary research (3.8 percent), medical research (0.7 percent), teaching (0.2 percent), species conservation (0.2 percent) and "other purposes" (0.1 percent).

Organisations in the 'other' category include non-university medical research institutes, zoos/wildlife parks and individuals. The number of animals reported from this sector fell by 608 in 2015. The vast majority of these (86.5 percent) were rodents used for medical research. Other animals were used for basic biological research (11.2 percent), teaching (1.7 percent), environmental management (0.7 percent) and veterinary research (<0.1 percent).

Polytechnics and institutes of technology reported 844 fewer animals in 2015 compared with 2014. The wide variety of animals manipulated by this sector were nearly all (99.6 percent) used for teaching, usually for low impact animal husbandry / veterinary nursing or similar training. Other animals were used for veterinary research (15) and animal husbandry research (5).

Government departments reported the use of 2847 animals in 2015, down 5256 from 2014. The majority of these (73.7 percent) were used in veterinary research, mainly for investigation and surveillance of exotic avian diseases. Species conservation accounted for 17.2 percent, basic biological research for 8.4 percent and research into environmental management for 0.6 percent.

The use of animals in RTT reported by schools fell to 1164 in 2015, 1284 fewer than in the previous year. The wide range of animals, including cephalopods/crustaceans (1077), sheep (49), cattle (25), possums (5), fish (4), dogs (3) and one horse, were all used for teaching purposes.

8 Animal Reuse

In 2015, 5.4 percent of animals were used more than once for RTT. Domestic animals (including livestock) made up 79.1 percent of the animals that were reused. With the exception of cephalopod/crustacea, numbers of every animal species were reported as being used more than once in 2015, although in many cases the numbers were very low.

9 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 2015 figures with those reported in 2014. Descriptions of the “purpose of manipulation” categories are outlined in Appendix 3.

Purpose of manipulation	% of animals used	
	2015	2014
Basic biological research	27.9	24.3
Veterinary research	20.6	19.2
Teaching	13.1	16.9
Medical research	11.7	9.7
Animal husbandry	9.0	15.4
Testing	8.5	6.8
Environmental management	6.3	4.9
Species conservation	1.5	2.0
Production of biological agents	0.9	<0.1
Development of alternatives	0.3	<0.1
Other	0.3	0.8

The main purpose for which animals were manipulated in 2015 was again for basic biological research, although the numbers in this category fell 8.6 percent to 63 222. The fall was mainly due to less use of fowls/chickens (- 5613), mice (- 5212) and sheep (- 5124) in this category. The numbers of pigeons, deer, pigs, amphibia, cephalopod/crustacea, “other” species, cats, dogs, guinea pigs and rats also fell. The largest rises were in the number of reptiles (+ 3753) and possums (+ 2297) used for basic biological research. Universities (49.5 percent), CRIs (27.4 percent) and commercial organisations (19.7 percent) conducted the bulk of this research, with “other” organisations (2.9 percent) and government departments (0.4 percent) using the remainder in this category.

Veterinary research accounted for 47 125 animals reported in 2015, 21.0 percent down on the previous year. This was mainly due to decreased numbers of farm animals being used in this category. While the number of cattle rose (+ 11 601), this was counteracted by decreases in the number of both deer (- 17 231) and sheep (- 9567), while no goats or pigs were used for veterinary research in 2015. More fish (+ 2435) were used for veterinary research, as were mice (+ 446), “other” species (+ 211), dogs (+ 48), rabbits (+18), fowls/chickens (+13), cats (+ 5) and horses (+ 2). Fewer other birds (- 341), reptiles (- 91) and possums (- 19) were used in this category in 2015. Veterinary research was undertaken by commercial organisations (73.5 percent), universities (19.3 percent), government departments (4.5 percent), CRIs (2.8 percent), polytechnics (<0.1 percent) and other organisations (<0.1 percent).

The number of animals reported as used in teaching fell 44 percent in 2015 to 29 410. The fall was mainly due to a more than 60 percent drop in the number of cattle reported for teaching purposes (- 24 308), although cattle were still the most common species used in this category. In 2015, all species were used for teaching purposes. Apart from cattle, the most common species used were fish (5052), sheep (1661), fowls/chickens (1330) and cephalopod/crustacea (1195). Commercial organisations reported most animal use in teaching in 2015, accounting for 51.4 percent of the total. Other organisations involved in teaching

were universities (26.7 percent), polytechnics (16.8 percent), schools (4.0 percent), “other” organisations (0.9 percent) and CRIs (0.3 percent).

The number of animals reported as being manipulated for medical research fell 12.2 percent to 26 291 in 2015. Rabbits and rodents made up 94.8 percent of the total. Other animals manipulated in this category included 626 fish, 540 sheep and 199 pigs. Medical research was undertaken by “other” organisations (53.8 percent), universities (42.0 percent), commercial organisations (3.2 percent) and CRIs (0.9 percent).

A total of 20 268 animals were reported as used for animal husbandry research in 2015, down 27 430 from the previous year. Farm animals made up 85.0 percent of the total in this category. Other species reported in 2015 as manipulated for animal husbandry include mice (700), fowls/chickens (396), fish (97), amphibia (91), horses (16), cephalopod/crustacea (5) and rabbits (3). CRIs (55.2 percent), universities (25.4 percent), commercial organisations (19.4 percent) and polytechnics (<0.1 percent) reported manipulating animals for animal husbandry purposes in 2015.

The number of animals manipulated for the purposes of testing fell 9.4 percent to 19 191 in 2015. The decrease can largely be attributed to a fall in the number of farm animals (- 540) and rodents (- 978). Rabbits and rodents accounted for the majority (96.6 percent) of the animals used in this category, with farm animals (345 cattle and 243 sheep) accounting for a further 3.1 percent. Other animals used for testing included 52 dogs and eight horses. Commercial organisations carried out 98.9 percent of the testing reported in 2015, with the remainder done by universities (1.1 percent).

Environmental management research used 14 195 animals in 2015, 968 fewer than in 2014. A large increase (+ 8264) in the number of birds – mainly “other” birds – was counteracted by reductions in the number of possums (- 3289), farm animals (- 2839), mice (- 1746), rats (- 1311). “Other” birds were the main species (58.1 percent) used in this category in 2015, followed closely by fish (25.6 percent). Possums (663), rats (600), mice (83), reptiles (38), fowls/chickens (21), pigeons (18), cats (14), “other” species (13) and dogs (- 6) made up the remainder. Commercial organisations (56.9 percent), CRIs (30.3 percent), universities (11.9 percent), “other institutions” (0.8 percent) and government departments (0.1 percent) carried out environmental management research.

Animal numbers reported for species conservation in 2015 fell 45.4 percent to 3336. These were made up of amphibia (975), fish (749), “other” birds (739), reptiles (535), marine mammals (191), rats (77), “other” species (52) and pigeons (18). The majority of this work was undertaken by universities (78.3 percent) with the remainder made up of government departments (14.7 percent), commercial organisations (4.7 percent) and CRIs (2.3 percent).

The number of animals reported as utilised in the production of biological agents rose from 199 in 2014 to 2016 in 2015. These were made up of 1373 mice, 284 rabbits, 229 guinea pigs, 92 sheep, 30 cattle and eight goats. Commercial organisations carried out 95.4 percent of this work, with the remaining 4.6 percent carried out by universities.

Animals reported as used for purposes other than those already specified fell by 2241 to 256 in 2015. These included 118 pigeons, 115 farm animals, 15 mice and eight rats. Research in the “other” category was undertaken by universities (52.0 percent), commercial organisations (34.4 percent) and CRIs (13.7 percent).

No animals were reported as used in the development of alternatives in 2015.

10 Grading of Animal Manipulations

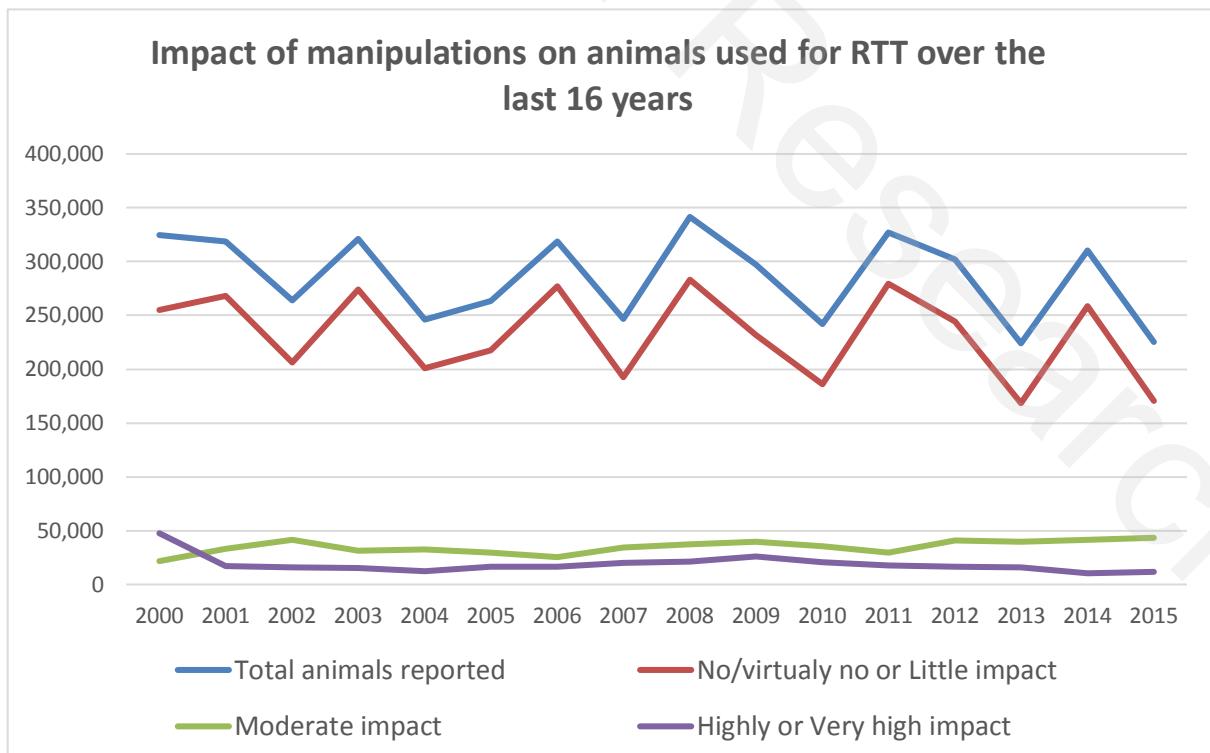
Animal manipulations are graded according to a five point scale as specified in the Animal Welfare (Records and Statistics) Regulations. The name and description of the scale was changed in 2008 to better reflect the overall estimate of the impact or invasiveness of each animal use. The five grades are:

- “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 <http://www.mpi.govt.nz/protection-and-response/animal-welfare/animals-in-research-testing-teaching/resources/>

Appendix 4 summarises the impact grade allocated to animals manipulated for RTT and reported in 2015.

10.1 LONG-TERM TRENDS OF THE IMPACT OF RTT ON THE ANIMALS USED IN



NEW ZEALAND

The percentage of animals that experience “no/virtually no” or “little impact” has averaged 80.9 percent since 2000 with a range from 75.2 percent to 87.0 percent. In 2015, 75.7 percent (170 448) of animals were exposed to manipulations in these categories.

The percentage of animals that experience “moderate impact” has averaged 12.5 percent over the last 16 years with a range from 6.7 percent to 19.3 percent. In 2015, 19.3 percent (43 388) of animals were classified in this category.

The percentage of animals that experience “high impact” or “very high impact” has averaged 6.6 percent over the last 16 years with a range from 3.4 percent to 14.7 percent. In 2015, a total of 11 474 animals (5.1 percent of the total) experienced manipulations in these categories.

10.2 MANIPULATION GRADING OF ANIMALS REPORTED IN 2015

The decrease in the number of animals manipulated for RTT in 2015 was reflected in the “no impact” (down 42.0 percent) and “little impact” (down 31.2 percent) gradings. Compared to 2014 statistics, numbers rose by 4.8 percent (+ 1970) in the “moderate impact” category, by 34.2 percent (+ 631) in the “high impact” category and by 5.2 percent (+ 443) in the “very high” category.

Of the farm animals, 92.5 percent fell into the “no/virtually no” or “little impact” category, as did 96.8 percent of other domestic mammals (cats, dogs and horses), 97.7 percent of rabbits, 72.3 percent of birds, 83.5 percent of miscellaneous species, 41.7 percent of rodents and 100 percent of “other” species. The largest percentages of groups represented in the “moderate impact” category were rodents (42.7 percent) and birds (24.9 percent). Miscellaneous species (13.3 percent), farm animals (7.4 percent), other domestic mammals (3.8 percent) and rabbits (5.4 percent) were also recorded as experiencing moderate impact on their welfare. Details of animals recorded in the “high” or “very high impact” category are shown below.

Summary of impact of manipulations in animals used for RTT in 2015

2015 summary	Total reported	Number in each manipulation grade				
		No/virtually no impact	Little impact	Moderate impact	High impact	Very high impact
Rodents and rabbits	61 189	3 680	22 642	25 552	1 363	7 952
Sheep and cattle	82 804	10 932	65 179	6 684	9	0
Aquatic species ¹	44 735	14 464	24 590	4 365	563	753
Other domestic species	12 901	1 894	10 634	334	39	0
Birds	15 627	8 111	3 194	3 897	425	0
Possums	2 977	0	892	1 725	68	292
Other ²	5 077	233	4 003	831	9	1
Grade totals	225 310	39 314	131 134	43 388	2 476	8 998
Grade percentages		17.4%	58.2%	19.3%	1.1%	4.0%

¹ ‘Aquatic species’ includes amphibians, fish, marine mammals and cephalopods/crustaceans.

² ‘Other’ includes reptiles and miscellaneous species as described in section 2.

Animals featuring in the “very high” impact group were rodents, fish, possums and one reptile. Animals were classified in this and the “high” impact grades for the following reasons:

Birds

- Population studies of mallard ducks required surgical insertion of radio-transmitters;
- A study to determine the effectiveness of current management practices in reducing the risk of bird-strike of black swans at the Auckland Airport required placement of tracking devices.

Fish

- Attachment of satellite tags to sharks;
- Aquatic toxicity testing;
- The study assesses the growth, physiology (respiration) and feeding behaviour of snapper after exposure to the turbidity and low oxygen that can be found in coastal waters;
- A study of the demography of New Zealand reef fishes involved the capturing of fish with a spear gun. Those fish that were not immediately killed by the spear gun were euthanased within minutes, and were classed as high impact.

Guinea pigs

- Batch release testing for animal vaccines. This is a regulatory requirement to demonstrate potency;
- Veterinary research, and production and evaluation of biological reagents.

Mice

- Testing of antigens and animal vaccines mandated by regulation;
- Veterinary research, and production and evaluation of biological reagents;
- Development of a new drug to control pain;
- Assessment of cardiac function in type-1 diabetes;
- A pilot study approved for modelling progress of the ataxin transgenic mice;
- Studies to increase understanding of how to create more effective immune therapy for brain cancer;
- Investigation of the mechanical changes in the heart that result from the changes in the structure of the heart tissue that result from diabetes;
- Infection model experiments to assessment of the growth and dissemination of bacteria in vivo;
- A study to investigate how a hypoxic/ischaemic insult affects auditory structures;
- Ongoing search for potential therapeutic effects in diabetes research, using a diabetic human amylin transgenic mouse model;

Pigs

- One pig died during transport to a facility.

Rats

- One rat developed post-operative peritonitis;
- An investigation of the mechanical changes in the heart that follow changes in the structure of the heart tissue that result from diabetes.

Reptiles

- One reptile died inside a pitfall trap.

Sheep

- Supplementation of prematurely born lambs with branch chain amino acids to improve pancreatic function.

Pest Control

- Possums, rats, mice and pigs were used in studies designed to improve effectiveness and humaneness of pest control methods; many of these studies were largely driven by the quest to find alternatives to sodium monofluoroacetate (1080).
- Rats were used in an environmental risk assessment study that estimated the proportion of the anticoagulant poison, bromadiolone, excreted in their faeces;
- Rabbits were used to isolate and test the effectiveness of 10 different strains of the Rabbit Haemorrhagic Disease virus;
- Pigs were graded high impact in a trial of the registered toxin sodium nitrite that could have resulted in their death.

11 The Three Rs

No animals were recorded as being used in the development of alternatives in 2015.

Appendix 1

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

	2015		2014		2013		2012		2011	
	No. used	% died or euthanased								
Amphibia	1368	13	771	51	238	3	2021	64	606	13
Birds	15627	13	31 588	42	25 685	13	14 638	15	40 937	35
Cats	519	3	728	<1	676	3	695	<1	978	10
Cattle	59330	1	75 496	<1	52 193	2	124 582	<1	106 601	<1
Cephalopods/crustaceans	2200	27	4756	28	5485	24	4288	27	5118	86
Deer	8497	<1	25 058	<1	2316	6	3927	8	16 779	<1
Dogs	812	1	1006	3	1437	8	915	2	1048	12
Fish	40764	49	40 555	30	24 354	53	28 044	32	15 531	64
Goats	2052	9	3176	6	581	24	1568	<1	1983	<1
Guinea pigs	1967	95	1864	95	2209	97	2090	96	2394	97
Horses/donkeys	283	0	237	2	272	2	758	<1	659	3
Marine mammals	403	0	843	0	927	<1	783	0	292	0
Mice	48341	99	58 379	97	45 018	98	55 870	99	74 133	98
Pigs	738	54	724	42	236	83	264	58	809	54
Possums	2977	84	3983	94	2626	84	5570	54	1629	84
Rabbits	1494	90	1445	91	1386	92	1519	95	1921	94
Rats	9387	87	11 807	92	10 806	94	10 523	92	10 674	93
Reptiles	4473	<1	325	<1	991	5	5349	<1	1664	1
Sheep	23474	11	44 745	8	46 218	3	38 544	7	42 571	6
Other species	604	7	2801	5	394	20	245	28	443	10
Total no. used	225310		310 287		224 048		302 193		326 770	
Yearly %		39%		34%		36%		29%		37%

Appendix 2

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

Group	Year	Rats, mice guinea pigs, rabbits	Sheep, cattle, goats	Other domestic animals	Birds	Fish	All other species	Total
Universities	2011	36,085	12,348	2,399	31,533	7,279	6,770	96,414
	2012	25,261	14,301	1,373	6,343	22,729	10,296	80,303
	2013	21,286	9,297	2,064	4,393	10,301	5,919	53,260
	2014	31,346	16,822	19,681	23,258	22,877	6,461	120,445
	2015	22,737	9682	2003	5801	22,554	6393	69,170
Commercial organisations	2011	37,994	102,589	12,426	107	1	175	153,292
	2012	24,319	123,849	755	32	23	117	149,095
	2013	28,087	63,468	225	10,120	341	32	102,273
	2014	20,436	82,185	218	24	2984	12	105,859
	2015	22,195	60,708	714	7474	4811	319	96,221
Crown research institutes	2011	3,407	31,157	4,522	294	5,026	2,131	46,537
	2012	2,586	24,168	3,648	7,951	1,838	5,022	45,213
	2013	3818	25,446	2001	6183	10,972	2677	51,097
	2014	1866	22,975	7108	6103	11,174	1431	50,657
	2015	1818	13,828	7422	-	8537	2980	34,585
Polytechnics	2011	121	4,612	589	116	3,158	70	8,666
	2012	152	1,715	549	116	3,187	168	5,658
	2013	174	729	614	73	2707	67	4364
	2014	206	1312	641	77	3418	146	5800
	2015	208	491	652	75	3455	75	4956
Government departments	2011	51	-	8	8,824	60	459	9,632
	2012	167	-	122	133	-	19	195
	2013	-	-	43	4815	-	841	5656
	2014	2920	-	47	2081	2	3053	8103
	2015	-	-	17	2212	5	613	2,847
Other	2011	11,292	449	162	7	-	-	11,910
	2012	17,662	600	162	8	263	28	18,723
	2013	6025	52	24	62	16	3	6182
	2014	16,705	-	-	4	50	216	16,975
	2015	14,231	73	37	65	1398	563	16,367
Schools	2011	56	-	53	56	7	147	319
	2012	22	61	29	55	4	2,606	2,777
	2013	29	-	9	39	17	1122	1216
	2014	16	123	58	41	50	2160	2448
	2015	-	74	4	-	4	1082	1164
TOTAL	2011	89,122	151,155	20,273	40,937	15,531	9,752	326,770
	2012	70,002	164,694	6,559	14,638	28,044	18,256	302,193
	2013	59,419	98,992	4937	25,685	24,354	10,661	224,048
	2014	73,495	123,417	27,753	31,588	40,555	13,479	310,287
	2015	61,189	84,856	10,849	15,627	40,764	12,025	225,310

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.
Other	Manipulations for purposes other than those listed above.

Appendix 4

ANIMAL USAGE REPORT: SUMMARY OF THE IMPACT GRADE ALLOCATED BY SPECIES IN 2015

Species	No impact	Little impact	Moderate impact	High impact	Very High impact	Total
Amphibia	367	483	518	-	-	1368
Birds	8111	3194	3897	425	-	15 627
Cats	281	209	29	-	-	519
Cattle	4008	55 021	301	-	-	59 330
Cephalopods/crustacea	1446	644	110	-	-	2200
Deer	16	8470	11	-	-	8497
Dogs	371	428	13	-	-	812
Fish	12 577	23 159	3712	563	753	40 764
Goats	1065	704	251	32	-	2052
Guinea pigs	45	438	7	887	590	1967
Horses	132	142	9	-	-	283
Marine mammals	74	304	25	-	-	403
Mice	2583	15 570	22 501	389	7298	48 341
Pigs	29	681	21	7	-	738
Possoms	-	892	1725	68	292	2977
Rabbits	172	1287	35	-	-	1494
Rats	880	5347	3009	87	64	9387
Reptiles	162	3470	831	9	1	4473
Sheep	6924	10 158	6383	9	-	23 474
Other species	71	533	-	-	-	604
TOTAL	39 314	131 134	43 388	2476	8998	225 310
Percentage	17.4%	58.2%	19.3%	1.1%	4.0%	