Statistics of animal use in research and teaching, Victoria

1 January 2022 – 31 December 2022

Report No. 40

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Executive Summary

In Victoria, the use of animals for scientific research, teaching and testing is regulated by the *Prevention of Cruelty to Animals Act 1986* (the Act). Organisations or individuals that conduct scientific procedures with animals must hold an authorising licence issued by Animal Welfare Victoria.

The Act also requires that the breeding of specified animals (guinea pigs, rats, mice, rabbits, and non-human primates) to be used in scientific procedures is authorised by a Specified Animals Breeding Licence. Licences are subject to conditions prescribed by the Prevention of Cruelty to Animals Regulations 2019.

Each year, licence holders are required to submit data on their use of animals. This report details the number and species of animals reported by licence holders for the period 1 January to 31 December 2022.

In this period, 5,092,001 animals were used under licence for scientific research, teaching and testing. This is a 196% increase in animal use in 2022 compared to 2021, and 157% above the 10-year average of 1,983,315 animals. This increase is primarily due to a single project using approximately 3.65 million poultry sourced from a commercial supplier. These animals were used for regulatory product testing, for the purposes of improving animal management/production. The number of animals reported fluctuates each year due to variables such as changes to the focus of funded projects, technological advances, and economic factors.

A total of 62,560,896 embryonated eggs were reported in 2022. This is a 35% decrease in embryonated egg use in 2022 compared to 2021. These embryonated eggs are reported distinct from other animal use given the scale, and as the category was first reported in 2018, to prevent the skewing of historical data. The embryonated eggs were primarily used for vaccine production.

In 2022, around 86% of the non-specified animals reported as used for scientific purposes were sourced from a commercial supplier, 11% were sourced from their natural habitat and 2% from own derivation. For specified animals, 62% were bred by the licence holders for their own supply, 16% were sourced from interstate institutions authorised to distribute specified animals and 15% were sourced from Victorian Specified Animal Breeding Licenced suppliers.

The most common impact on animals during research, teaching and testing was minor physiological challenge (81%), followed by observational study involving minor interference (7%) and minor conscious intervention (7%). Less than 1% of animals experienced death as an end point.

Following their use in research, teaching and testing, 9% of animals were humanely euthanised.

Introduction

Animals are used for research and discovery in many fields of science. The *Prevention of Cruelty to Animals Act 1986* (the Act) regulates their use in Victoria.

The use of animals for scientific research, teaching and testing is termed 'scientific procedures' by the Act and must only be conducted under a licence. Laboratory mice, rats, guinea pigs, rabbits and non-human primates are classed in the legislation as 'specified animals' and their commercial production and supply requires a separate licence (specified animal breeding licence).

Animal Welfare Victoria licenses and monitors the scientific use of animals in Victoria. It safeguards the well-being of animals by assessing applications for licences to ensure they meet legislative requirements; monitoring compliance; providing advice on best practice procedures, housing and care; and providing training for Animal Ethics Committee (AEC) members. The Act requires animal use to be conducted under a licence and overseen by an AEC.

The AEC is responsible for determining whether animal use is ethically justified and for ensuring that there are no available alternatives, prior to that use commencing. They weigh the predicted scientific or educational value of the projects against the potential effects on the welfare of the animals.

Each year, licence holders are required to submit data on their use of animals.

This report details the number and species of animals reported by licence holders for 2022. Research and teaching organisations report the number of animals they used for scientific procedures as well as any animals held in breeding colonies for in-house supply. Commercial producers of specified animals for the supply of research report the number of breeders and the number of stock animals produced.

This report includes information on where animals were sourced, the purpose and benefit of their use, the impact it had on their well-being, and whether they were killed at the conclusion of the project or not.

Part 1: Guide to reading the report

1.1 The use of animals in research and teaching

1.1.1 Why are animals still used for experiments?

Over time, many animal experiments have been replaced by valid alternative methods. The process of validation is complex and rigorous, to ensure reproducibility and accuracy. Unfortunately, not all research methods can be replaced at this time, but it is an ongoing endeavour. More information about replacement, reduction and refinement can be found at www.nc3rs.org.uk.

1.1.2 What protections are in place?

Researchers and teachers must apply to an AEC for every project they conduct using animals. Before giving their approval, the AEC must be convinced that the animal use is justified. They weigh the predicted scientific or educational value of the projects against the potential effects on the welfare of the animals.

Applicants must demonstrate to the AEC that their project fulfils the principles of the 3 R's (Replacement, Reduction and Refinement):

1. Replacement: methods that either partially or completely replace the use of animals must be sought. The use of animals is prohibited if a valid, non-animal alternative exists.

2. Reduction: animal numbers must be statistically calculated to be the minimum necessary to achieve the results, and not so low as to render the exercise invalid.

3. Refinement: every effort must be made to minimise the impact on the animals involved, e.g. applying technology that allows an earlier conclusion to the study; ensuring best-practice anaesthesia and analgesia; by providing care and husbandry that meets the animal's psychological and physical needs.

AECs have a legal obligation to refuse to approve any project they consider unjustified or lacking scientific merit.

1.1.3 Who is on an Animal Ethics Committee?

There are 4 categories of membership on an AEC. At least one member of each category must be present to make a decision about a new project. The categories are:

Category A   veterinarian.

Category B   researcher or teacher with substantial and recent experience in the use of animals for scientific purposes relevant to the business of the AEC.

Category C   person with demonstrable commitment to, and established experience in, furthering the welfare of animals, who is not employed by or otherwise associated with the institution, and who is not currently involved in the care and use of animals for scientific purposes.

Category D   person not employed by or otherwise associated with the institution and who has never been involved in the use of animals in scientific or teaching activities, bringing a completely independent view to the AEC, and must not fit the requirements of any other category.

1.2 Reporting process

1.2.1 How is the data collected?

Organisations and individuals licensed to use animals for research and teaching are responsible for providing the data to Animal Welfare Victoria by 31 March every year, for the previous calendar year.

1.2.2 Why is this data collected?

The reporting process collates data in the same areas that are the major considerations for the AEC when assessing an application. The broad outcomes of project purposes must be achieved by the more specific project benefits outlined in the application. The potential benefits are compared with the likely welfare impacts in a cost benefit analysis. Each member of the AEC must decide, according to their own judgement, if the project is justified in an ethical sense. This information informs policy decisions and is used to direct risk-based inspections and educational programs.

1.2.3 What types of animals are counted?

The types of animals counted in the statistics for research, teaching or testing projects are:

- mammals at and above the mid-point of gestation. This means that if research or teaching projects use a pregnant animal at or past the halfway point of gestation, she and all in utero offspring must be included in the statistics.
- birds and reptiles at and above the mid-point of incubation or gestation. This means eggs that are used for research or teaching must be reported in the statistics, if they are at or past the halfway point of incubation. For live bearing reptiles, the same rule applies as for mammals.
- fish and amphibians capable of independent feeding.
- adult decapod crustaceans and cephalopods.

Reporting of breeding groups kept by scientific procedures and specified animal breeding licence holders is slightly different. The number of animals used as breeders and the number of stock animals produced must be reported.

1.2.4 Where are animals sourced from?

Specified animals must only be sourced from:

- Victorian suppliers holding a specified animals breeding licence
- an in-house breeding colony kept by a scientific procedures licence holder, or
- an interstate or overseas supplier who meets all relevant requirements of their local jurisdiction for the breeding of these animals.

Other animals may be sourced from:

- an in-house breeding colony kept by a scientific procedures licence holder
- a commercial supplier
- private donation – this may include animals that continue to stay in the custody of the owners for the duration of the project (except farm animals)
- farms, where the animals do not leave the property
- their natural habitat – these animals may be sampled in the field and immediately released, or brought into captivity
- a captive colony or zoo
- a council pound – these animals must be treated in accordance with the Victorian code of practice for the use of animals from municipal pounds in scientific procedures, or
- another source, not specified above.

1.2.5   What is meant by the project purpose?

Animals must only be used when there is no other alternative and only for a limited number of reasons. These are:

- to obtain and establish significant information relevant to the understanding of humans and/or animals, or
- to maintain and improve human and/or animal health and welfare, or
- to improve animal management or production, or
- to obtain and establish significant information relevant to the understanding, maintenance or improvement of the natural environment, or
- to achieve educational outcomes in science, as specified in the relevant curriculum or competency requirements.

1.2.6   What is meant by the project benefit?

These categories refine and add definition to the broader project outcomes reported above. The reporting categories include:

- fundamental biology/physiology
- diseases - human
- diseases - animal
- diseases - zoonotic
- environmental monitoring/ecology
- domestic animal management/production
- wildlife management/conservation
- vertebrate pest management
- production of biological products
- development of techniques
- education
- training (student use of animals)
- regulatory product testing.

1.2.7   What is meant by the impact of activities?

These reporting categories represent the highest level of impact experienced by the animal during its involvement in research, teaching or testing. An AEC must consider the well-being of animals used for scientific purposes in terms of the cumulative effects of an animal's lifetime experience. The categories are defined in Appendix 1.

1.2.8   What is meant by the number of deaths?

The fate of the animals at the conclusion of a project depends on the aims of the project. Some projects require analysis of the animal's tissues to conclude the experiment, and they are humanely killed to obtain these results. Occasionally, an unexpected adverse event, for example an unexpected reaction, surgical complication or unrelated illness will require an animal to be euthanised. Animals must be monitored with enough frequency to promptly detect any pain or distress, whether anticipated as a result of the study or not.

Animals may be reported as used but not recorded as dead because they have been, for example:

- captured then released back to the wild
- recruited to a study while kept in the care of their owner, for example on a farm or through a vet clinic
- rehomed at the conclusion of the project.

1.3   Understanding the 2022 statistics

1.3.1   How does the number of animals used compare to previous years?

There was a 196% increase in animal use in 2022 compared to 2021. This is primarily due to a single project using approximately 3.65 million poultry sourced from a commercial supplier. These animals were used for regulatory product testing, for the purposes of improving animal management/ production.

The number of animals reported fluctuates each year due to variables such as changes to the focus of funded projects, technological advances, and economic factors.

1.3.2   Why are 62,560,896 embryonated eggs reported in 2022?

A total of 62,560,896 embryonated eggs were reported in 2022. This is a 35% decrease in embryonated egg use in 2022 compared to 2021. These embryonated eggs are reported distinct from other animal use given the scale, and as the category was first reported in 2018, to prevent the skewing of historical data. The embryonated eggs were primarily used for vaccine production.

To generate vaccine, early-stage embryonated chicken eggs are seeded with the current seasonal strain of the flu virus. Viral replication occurs in the embryonated eggs. The eggs are then harvested in the days following the midpoint of their incubation period.

Part 2: Number of animals reported as used in 2022

In 2022, a total of 5,092,001 animals were reported to be used for research, teaching and testing (scientific procedures) in Victoria. The table below shows the number of animals used by type. There was a 196% increase in animal use in 2022 compared to the reported 1,720,638 animals in 2021.

This total number of animals reported excludes 62,560,896 embryonated eggs. The majority of these eggs were sourced from a commercial supplier. These eggs were primarily used for the production of influenza vaccines.

2.1   Reported by animal type

Table 2.1 Number of animals reported as used by animal type

Animal type	Number of animals
*Guinea pig (lab)	3,823
*Macaques	99
*Marmosets	63
*Mouse (lab)	440,370
*Primates other	6
*Rabbit (lab)	1,314
*Rat (lab)	10,724
Amphibians	14,563
Bird exotic captive	20
Bird exotic wild	5,536
Bird native captive	816
Bird native wild	91,984
Bird other	370
Cats (non-wild)	533
Cats (wild)	956
Cattle (domestic)	6,060
Cephalopods	241
Crustaceans	21,858
Dasyurids	1,177
Deer (domestic)	649
Dogs (non-wild)	3,979
Dogs, foxes (wild)	990
Exotic feral mammal other	549
Exotic Zoo mammal	83
Ferret (lab)	514
Fish	335,971
Goats (domestic)	420
Hares (wild)	6

Animal type	Number of animals
Horses (domestic)	1,444
Koalas	240
Laboratory mammal (non-specified)	8
Lizards	3,446
Macropods	43,102
Mice (wild)	3,057
Monotremes	167
Native mammal other	31,304
Native Rats, Mice	2,827
Other domestic mammals	263
Pigs (domestic)	7,870
Pigs (wild)	111
Possums, Gliders	8,310
Poultry	3,963,525
Rabbits (wild)	493
Rats (wild)	15,968
Reptile other	860
Seals, Sealions	694
Sheep (domestic)	54,459
Snakes	334
Turtles, tortoises	3,273
Whales, dolphins	527
Wombats	6,045
Total	**5,092,001**

Specified animals

Table 2.2 Number of animals reported as used by animal type and project purpose

Animal Type	Educational objectives	Environmental objectives	Improve animal management/ production	Maintenance/ improvement human/animal health/welfare	Understand human/animal biology	Total
*Guinea pig (lab)	172			3,597	54	**3,823**
*Macaques				81	18	**99**
*Marmosets				7	56	**63**
*Mouse (lab)	29,978	4,657	18,762	122,353	264,620	**440,370**
*Primates other					6	**6**
*Rabbit (lab)	163			873	278	**1,314**
*Rat (lab)	649		36	3,814	6,225	**10,724**
Amphibians	386	12,164		802	1,211	**14,563**
Bird exotic captive	20					**20**
Bird exotic wild		5,536				**5,536**
Bird native captive	29	35		126	626	**816**
Bird native wild	1,032	80,226	9,430	596	700	**91,984**
Bird other	44			197	129	**370**
Cats (non-wild)	486			28	19	**533**
Cats (wild)		956				**956**
Cattle (domestic)	754	104	3,814	1,384	4	**6,060**
Cephalopods			241			**241**
Crustaceans	3,025	7,636	11,167		30	**21,858**

Animal Type	Educational objectives	Environmental objectives	Improve animal management/ production	Maintenance/ improvement human/animal health/welfare	Understand human/animal biology	Total
Dasyurids	25	841	6	14	291	**1,177**
Deer (domestic)		646		3		**649**
Dogs (non-wild)	3,752	10	4	78	135	**3,979**
Dogs, foxes (wild)		990				**990**
Exotic feral mammal other		383	143	14	9	**549**
Exotic Zoo mammal				19	64	**83**
Ferret (lab)				459	55	**514**
Fish	1,001	243,355	7,829	13,966	69,820	**335,971**
Goats (domestic)	12		77	327	4	**420**
Hares (wild)		6				**6**
Horses (domestic)	118			1,312	14	**1,444**
Koalas		130	26	74	10	**240**
Laboratory mammal (non-specified)					8	**8**
Lizards	324	1,676	1	6	1,439	**3,446**
Macropods	77	39,809	18	3,088	110	**43,102**
Mice (wild)	36	2,775	246			**3,057**
Monotremes	2	146		1	18	**167**
Native mammal other	25	29,547	1,471		261	**31,304**

Animal Type	Educational objectives	Environmental objectives	Improve animal management/ production	Maintenance/ improvement human/animal health/welfare	Understand human/animal biology	Total
Native Rats, Mice	78	2,749				**2,827**
Other domestic mammals	13	200		32	18	**263**
Pigs (domestic)	40		318	7,508	4	**7,870**
Pigs (wild)		111				**111**
Possums, Gliders	43	7,884	359	9	15	**8,310**
Poultry	564		3,959,472	2,899	590	**3,963,525**
Rabbits (wild)	12	481				**493**
Rats (wild)	18	15,950				**15,968**
Reptile other		858		2		**860**
Seals, Sealions		694				**694**
Sheep (domestic)	14,918	79	35,558	3,680	224	**54,459**
Snakes	123	95		46	70	**334**
Turtles, tortoises	1	3,022		7	243	**3,273**
Whales, dolphins		526			1	**527**
Wombats		6,042		2	1	**6,045**
Total	**57,920**	**470,319**	**4,048,978**	**167,404**	**347,380**	**5,092,001**

Specified animals.

Table 2.3 Number of non-specified animals used by animal type by source

Animal Type	Animals in their natural habitat	Australian captive colony/zoo	Commercial supplier	Other source	Own derivation	Private companion animals	Private donation	Privately owned animals on a farm	Removed from Aust. natural habitat	Total
Amphibians	12,084	1,656	135	50		1			637	**14,563**
Bird exotic captive			20							**20**
Bird exotic wild	5,536									**5,536**
Bird native captive		51	29		616	120				**816**
Bird native wild	91,943	24							17	**91,984**
Bird other	63		239			14	54			**370**
Cats (non-wild)			23	8	7	495				**533**
Cats (wild)	956									**956**
Cattle (domestic)			314	122	2,250			3,374		**6,060**
Cephalopods	241									**241**
Crustaceans	18,482								3,376	**21,858**
Dasyurids	872	10		289		6				**1,177**
Deer (domestic)	646					3				**649**
Dogs (non-wild)		2	6	12	2	3,935		22		**3,979**
Dogs, foxes (wild)	990									**990**
Exotic feral mammal other	535				14					**549**
Exotic Zoo mammal		83								**83**
Ferret (lab)		18	281	215						**514**
Fish	249,548	50	113	146	68,576				17,538	**335,971**

Animal Type	Animals in their natural habitat	Australian captive colony/zoo	Commercial supplier	Other source	Own derivation	Private companion animals	Private donation	Privately owned animals on a farm	Removed from Aust. natural habitat	Total
Goats (domestic)	150		4	6				260		**420**
Hares (wild)	6									**6**
Horses (domestic)	756		98	2	67	32	40	449		**1,444**
Koalas	230	5							5	**240**
Laboratory mammal (non-specified)					8					**8**
Lizards	2,918		6			286			236	**3,446**
Macropods	42,999				103					**43,102**
Mice (wild)	2,811								246	**3,057**
Monotremes	148	9							10	**167**
Native mammal other	31,107			52				18	127	**31,304**
Native Rats, Mice	2,827									**2,827**
Other domestic mammals	218		32	13						**263**
Pigs (domestic)			189		7,681					**7,870**
Pigs (wild)	111									**111**
Possums, Gliders	8,307								3	**8,310**
Poultry			3,962,351	176	804	164	15	15		**3,963,525**
Rabbits (wild)	479					12		2		**493**
Rats (wild)	15,968									**15,968**
Reptile other	848			2					10	**860**
Seals, Sealions	694									**694**

Animal Type	Animals in their natural habitat	Australian captive colony/zoo	Commercial supplier	Other source	Own derivation	Private companion animals	Private donation	Privately owned animals on a farm	Removed from Aust. natural habitat	Total
Sheep (domestic)		75	3,959	119	1,720	4		48,582		**54,459**
Snakes	258	2	3			63			8	**334**
Turtles, tortoises	3,246					1			26	**3,273**
Whales, dolphins	527									**527**
Wombats	6,043								2	**6,045**
Total	**502,547**	**1,985**	**3,967,802**	**1,212**	**81,848**	**5,136**	**109**	**52,722**	**22,241**	**4,635,602**

Table 2.4 Number of specified animals used by animal type by source

Animal Type	*Other	*Own Derivation	*Imported from overseas	*Interstate institution authorised to distribute specified animals	*Victoria – Specified Animals Breeding Licenced Supplier	Total
*Guinea pig (lab)	96	3,565		112	50	**3,823**
*Macaques					99	**99**
*Marmosets		6			57	**63**
*Mouse (lab)	1,255	277,062	3,388	95,979	62,686	**440,370**
*Primates other	6					**6**
*Rabbit (lab)	165	879		267	3	**1,314**
*Rat (lab)	254	2,994		1,607	5,869	**10,724**
Total	**1,776**	**284,506**	**3,388**	**97,965**	**68,764**	**456,399**

Specified animals.

2.2 Reported by project benefit

Table 2.5 Number of animals reported as used by animal type, by project benefits

Animal Type	Development of techniques	Domestic animal management/ production	Education (demonstration)	Environmental monitoring/ecology	Fundamental biology/physiology	Production of biological products	Regulatory product testing	Training (student use of animals)	Vertebrate pest management	Wildlife management/ conservation	Diseases-animal	Diseases-human	Diseases-zoonotic	Total
*Guinea pig (lab)	36		18		33		3,477	154			20	85		**3,823**
*Macaques					2	38						59		**99**
*Marmosets					43	6						14		**63**
*Mouse (lab)	4,974	12,994	2,320		170,011	563	11,361	27,658			7,663	201,419	1,407	**440,370**
*Primates other													6	**6**
*Rabbit (lab)			10			208	728	153			28	187		**1,314**
*Rat (lab)	1		100		3,722	15	96	549			196	6,045		**10,724**
Amphibians			276	8,492	837			110	1,563	2,494	664		127	**14,563**
Bird exotic captive			20											**20**
Bird exotic wild				5,534						2				**5,536**
Bird native captive	3		29		626					38	120			**816**
Bird native wild			1,012	47,352	208			20		43,392				**91,984**
Bird other		138	39		24			5		63	101			**370**
Cats (non-wild)	3		2		19			484			3	22		**533**
Cats (wild)				757					3	196				**956**
Cattle (domestic)	95	4,561	131	104				623			546			**6,060**
Cephalopods										241				**241**
Crustaceans			3,025	7,639						11,194				**21,858**

Animal Type	Development of techniques	Domestic animal management/ production	Education (demonstration)	Environmental monitoring/ecology	Fundamental biology/physiology	Production of biological products	Regulatory product testing	Training (student use of animals)	Vertebrate pest management	Wildlife management/ conservation	Diseases-animal	Diseases-human	Diseases-zoonotic	Total
Dasyurids				357	289			25		483	23			**1,177**
Deer (domestic)				146						500	3			**649**
Dogs (non-wild)	58	18	34	12	56		3	3,718		2	78			**3,979**
Dogs, foxes (wild)				684						306				**990**
Exotic feral mammal other				190					19	326		14		**549**
Exotic Zoo mammal					19								64	**83**
Ferret (lab)					45							374	95	**514**
Fish	146	13,936	1,001	237,715	56,208				212	15,818		10,935		**335,971**
Goats (domestic)		157	6					6			201		50	**420**
Hares (wild)				6										**6**
Horses (domestic)	6	15	6		8	54	20	112			1,187	36		**1,444**
Koalas				45						175	20			**240**
Laboratory mammal (non-specified)					8									**8**
Lizards			10	213	45			314		2,858	6			**3,446**
Macropods			57	5,274	103			20		34,612	3,035		1	**43,102**
Mice (wild)				1,976				36	324	721				**3,057**
Monotremes				29	5			2		131				**167**
Native mammal other				28,040				25		3,239				**31,304**

Animal Type	Development of techniques	Domestic animal management/ production	Education (demonstration)	Environmental monitoring/ecology	Fundamental biology/physiology	Production of biological products	Regulatory product testing	Training (student use of animals)	Vertebrate pest management	Wildlife management/ conservation	Diseases-animal	Diseases-human	Diseases-zoonotic	Total
Native Rats, Mice			14	612				64		2,137				**2,827**
Other domestic mammals				18		32		13		200				**263**
Pigs (domestic)	55	7,681				4	66	40			16		8	**7,870**
Pigs (wild)				9						102				**111**
Possums, Gliders			16	818				27		7,431	7		11	**8,310**
Poultry		519	327		430	1,360	3,958,418	237			938	501	795	**3,963,525**
Rabbits (wild)			12	281						200				**493**
Rats (wild)				15,423				18		527				**15,968**
Reptile other				858									2	**860**
Seals, Sealions				6						688				**694**
Sheep (domestic)	18	35,463	1,764	79	400	8	1,008	13,154			594	1,971		**54,459**
Snakes			59	13				64		154	44			**334**
Turtles, tortoises				1,050	64			1		2,158				**3,273**
Whales, dolphins				12						515				**527**
Wombats				22						6,021	2			**6,045**
Total	**5,395**	**75,482**	**10,288**	**363,766**	**233,205**	**2,288**	**3,975,177**	**47,632**	**2,121**	**136,924**	**15,495**	**221,662**	**2,566**	**5,092,001**

Specified animals.

Table 2.6 Number of animals used, by project impact by project benefit

Project Impact	Development of techniques	Domestic animal management/ production	Education (demonstration)	Environmental monitoring/ecology	Fundamental biology/physiology	Production of biological products	Regulatory product testing	Training (student use of animals)	Vertebrate pest management	Wildlife management/ conservation	Diseases-animal	Diseases-human	Diseases-zoonotic	Total
Observational study involving minor interference	95	26,738	7,359	131,633	45,906	461	48	18,819	97	109,240	4,861	17,560		**362,817**
Animal unconscious without recovery	538	48	567	421	36,779	110	2	3,984	1,772	5,839	897	27,715	69	**78,741**
Minor conscious intervention	74	42,442	2,060	168,949	31,416	225	1,606	23,323	142	20,042	6,202	57,786	1,185	**355,452**
Minor operative procedures with recovery		28	14	193	11,425	85		1,375		308	598	24,156	114	**38,296**
Minor physiological challenge		6,130	100	62,280	67,947	971	3,959,830	93		666	1,580	40,521	128	**4,140,246**
Surgery with recovery	31		8	50	5,851			9		27	426	17,386		**23,788**
Moderate to major physiological challenge		96		240	33,881	436	11,785	29		802	931	36,196	1,070	**85,466**
Death as an end point	4,657		180					1,906		110		342		**7,195**
Total	**5,395**	**75,482**	**10,288**	**363,766**	**233,205**	**2,288**	**3,975,177**	**47,632**	**2,121**	**136,924**	**15,495**	**221,662**	**2,566**	**5,092,001**

Table 2.7 Number of animals reported as used by project purpose

Project purpose	Number of animals
Educational objectives	57,920
Environmental objectives	470,319
Improve animal management/production	4,048,978
Maintenance/improvement human/animal health/welfare	167,404
Understand human/animal biology	347,380
Total	**5,092,001**

2.3   Number of animals used and animal deaths

Investigators must plan for animals at the conclusion of a project. If appropriate, animals are returned to normal husbandry conditions or their natural habitat. When results rely on tissue analysis, this usually requires the humane killing of the animals. Opportunities to rehome animals that are not needed for tissue analysis are considered wherever possible. Under certain conditions, with special justification, an AEC may approve an animal to be used in a subsequent project.

Table 2.8 Number of animals used and deaths by type

Animal type	Number of animals	Number of deaths
*Guinea pig (lab)	3,823	3,687
*Macaques	99	4
*Marmosets	63	36
*Mouse (lab)	440,370	384,942
*Primates other	6	0
*Rabbit (lab)	1,314	1,056
*Rat (lab)	10,724	10,196
Amphibians	14,563	2,573
Bird exotic captive	20	20
Bird exotic wild	5,536	2
Bird native captive	816	127
Bird native wild	91,984	12
Bird other	370	293
Cats (non-wild)	533	27
Cats (wild)	956	4
Cattle (domestic)	6,060	22
Cephalopods	241	71
Crustaceans	21,858	374
Dasyurids	1,177	126
Deer (domestic)	649	0
Dogs (non-wild)	3,979	0
Dogs, foxes (wild)	990	1
Exotic feral mammal other	549	14
Exotic Zoo mammal	83	4
Ferret (lab)	514	317
Fish	335,971	43,150
Goats (domestic)	420	4
Hares (wild)	6	0
Horses (domestic)	1,444	3
Koalas	240	4
Laboratory mammal (non-specified)	8	8
Lizards	3,446	52

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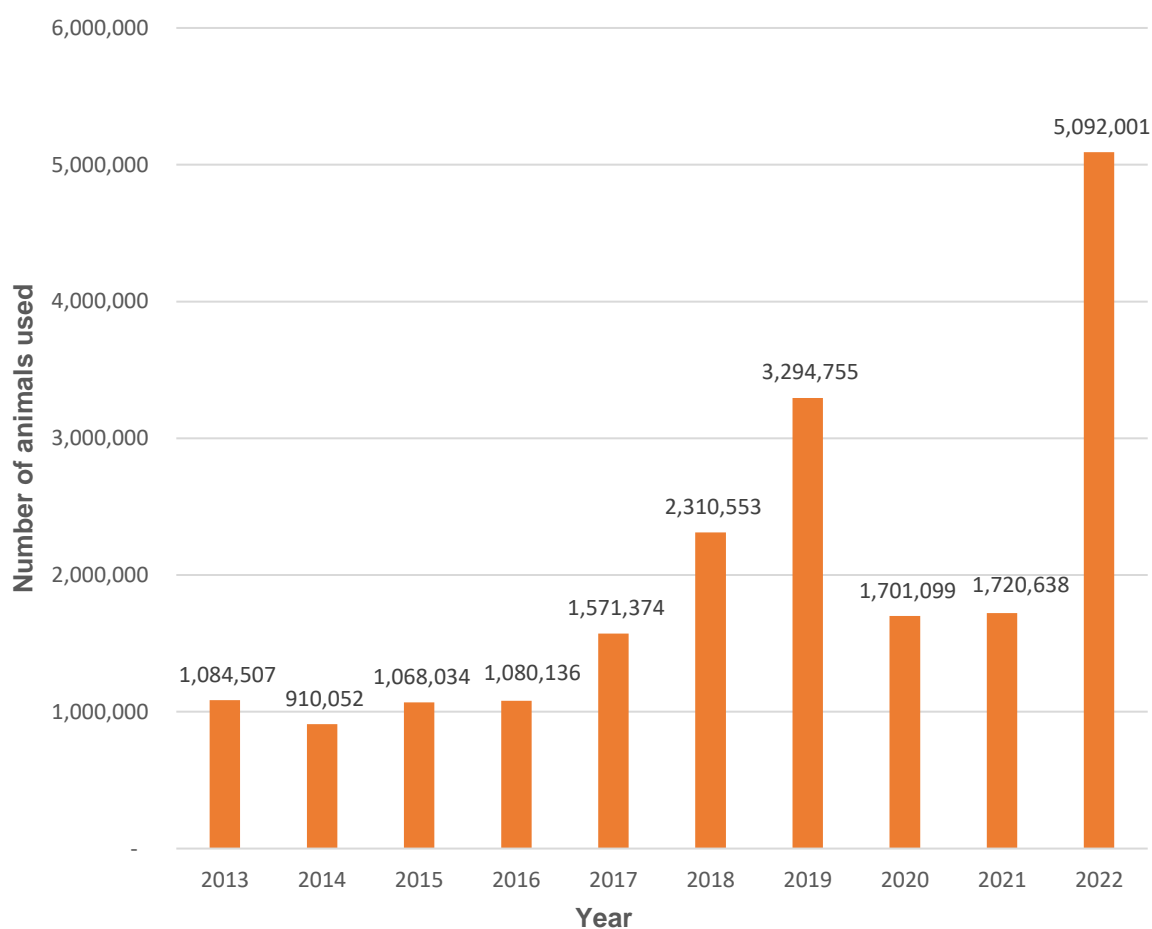| Animal type	Number of animals	Number of deaths
Macropods	43,102	145
Mice (wild)	3,057	111
Monotremes	167	1
Native mammal other	31,304	10
Native Rats, Mice	2,827	5
Other domestic mammals	263	1
Pigs (domestic)	7,870	1,480
Pigs (wild)	111	5
Possums, Gliders	8,310	10
Poultry	3,963,525	5,114
Rabbits (wild)	493	0
Rats (wild)	15,968	0
Reptile other	860	2
Seals, Sealions	694	0
Sheep (domestic)	54,459	1,825
Snakes	334	0
Turtles, tortoises	3,273	12
Whales, dolphins	527	0
Wombats	6,045	0
Total	**5,092,001**	**455,850**

Specified animals.

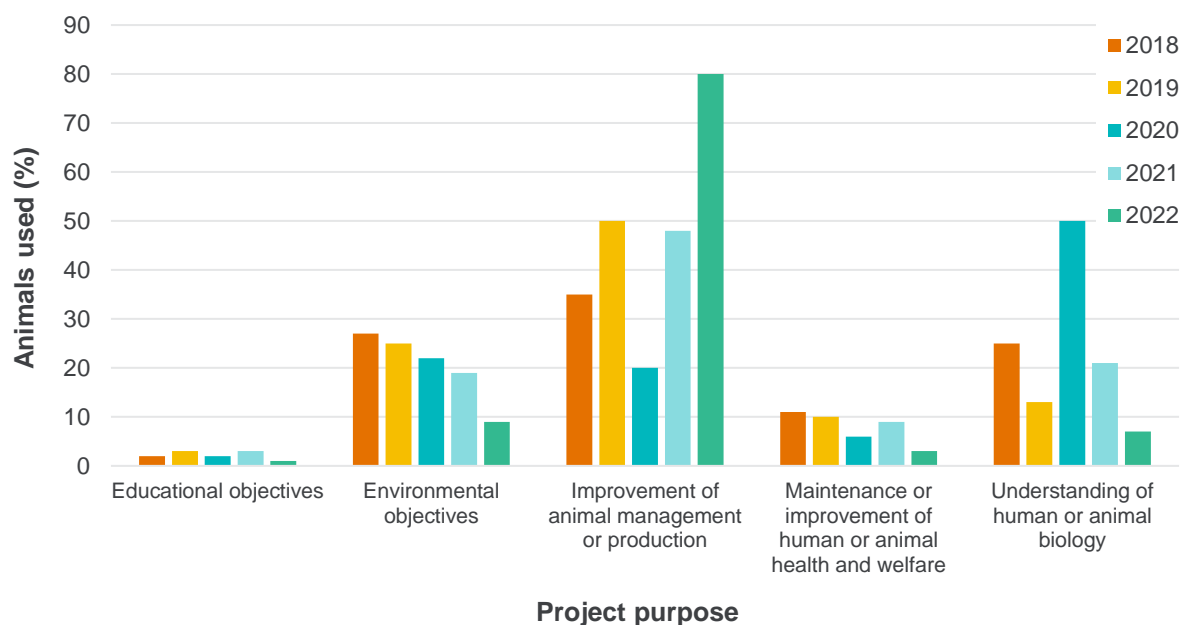OFFICIAL

Part 3: Animal use statistics from 2013 to 2022

3.1 Number of animals used in research, teaching and testing from 2013 – 2022

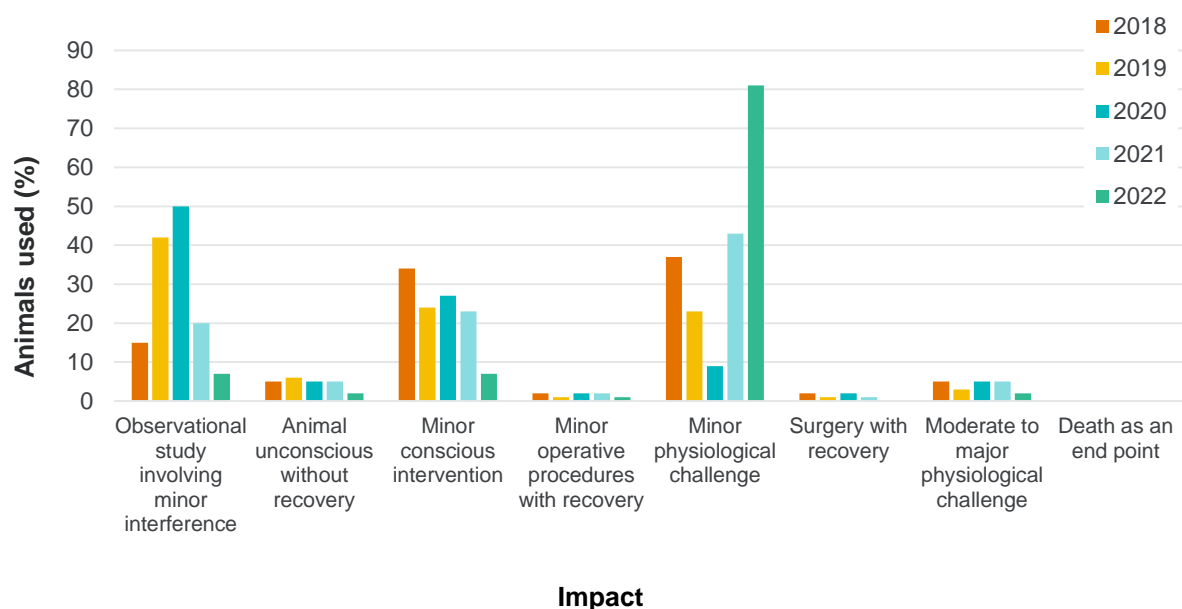The number of animals used in research, teaching and testing in 2022 was 5,092,001.

Figure 3.1 Number of animals used, 2013 – 2022

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Figure 3.2 Percentage of animals used by project purpose, 2018 – 2022

Figure 3.3 Percentage of animals used by impact type, 2018 – 2022

Note: Less than 0.6% of animals experienced death as an endpoint each year over the last 5 years.

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3.2 Number of specified animals used from 2013 – 2022
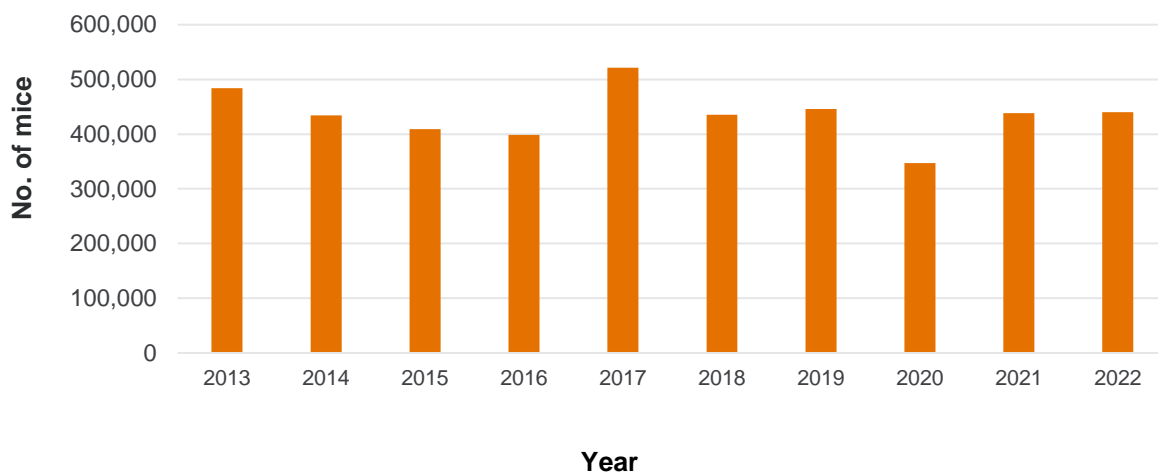
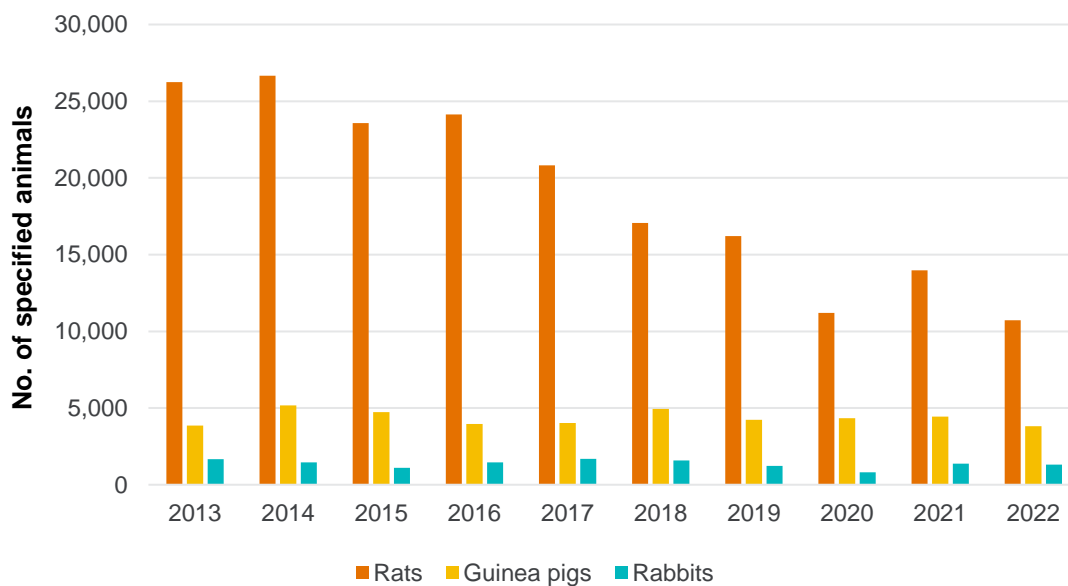**Figure 3.4 Number of specified mice used, 2013 – 2022**
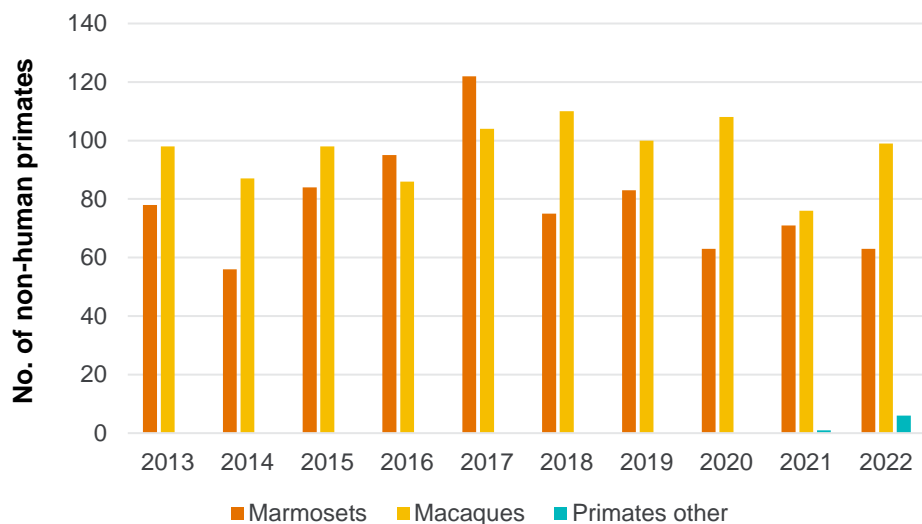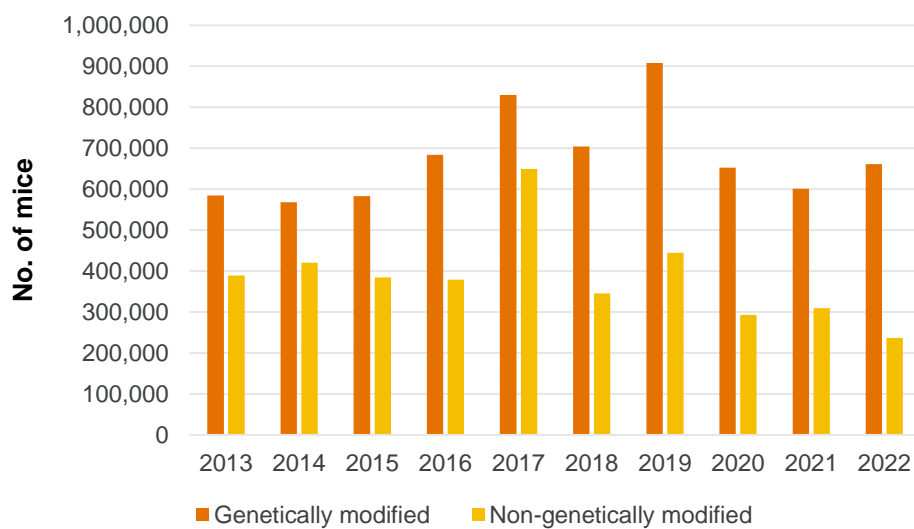

Figure 3.5 Number of specified animals, excluding mice and non-human primates 2013-2022

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Figure 3.6 Number of non-human primates, 2013 – 2022

Figure 3.7 Number of specified mice in breeding colonies, 2013 – 2022

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3.3 Number of animals used in breeding colonies from 2013 – 2022

Table 3.1 Number of non-genetically modified specified animals in breeding colonies by animal type, 2013 – 2022

Animal type	Year									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Guinea pigs	244	345	294	96	48	3,202	1,543	1,207	2,183	1,344
Macaques	226	263	282	274	476	258	271	175	158	175
Marmosets	273	305	440	463	744	309	228	231	210	228
Mice	389,049	420,126	384,762	379,198	649,519	345,107	444,733	292,840	309,679	237,073
Rabbits	197	133	179	159	86	793	46	531	540	1,370
Rats	33,308	25,546	23,744	27,754	40,719	20,606	28,319	24,089	30,040	23,561
Total	**423,297**	**446,718**	**409,701**	**407,944**	**691,592**	**370,275**	**475,140**	**319,073**	**342,810**	**263,751**

Table 3.2 Number of genetically modified specified animals in breeding colonies by animal type, 2013 – 2022

Animal type	Year									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Mice	584,660	568,495	582,925	683,769	829,940	704,297	908,083	652,671	600,716	661,064
Rats	1,992	4,271	2,714	2,286	2,907	2,160	2,073	1,408	1,570	1,383
Total	**586,652**	**572,766**	**585,639**	**686,055**	**832,847**	**706,457**	**910,156**	**654,079**	**602,286**	**662,447**

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In 2020 a new reporting category was introduced, to capture non-specified animals in breeding colonies. This was designed to improve data accuracy for these animals. Previously, these animals may have been reported as domestic animal management/production.

Table 3.3 Number of non-genetically modified non-specified animals in breeding colonies by animal type, 2020-2022

Animal type	2020	2021	2022
Amphibians	274	287	1,846
Bird native captive	0	31	23
Bird other	0	0	23
Cats (non-wild)	21	58	25
Cattle (domestic)	338	0	0
Dasyurids	8	0	0
Exotic feral mammal other	393	99	84
Fish	87,636	38,340	12,536
Horses (domestic)	19	52	29
Lizards	0	0	16
Macropods	53	100	42
Native Rats, Mice	0	0	33
Poultry	52	337	434
Reptile other	0	12	6
Sheep (domestic)	1,136	230	258
Laboratory mammal (non-specified)	344	707	0
Total	**90,274**	**40,253**	**15,355**

Table 3.4 Number of genetically modified non-specified animals in breeding colonies by animal type, 2020-2022
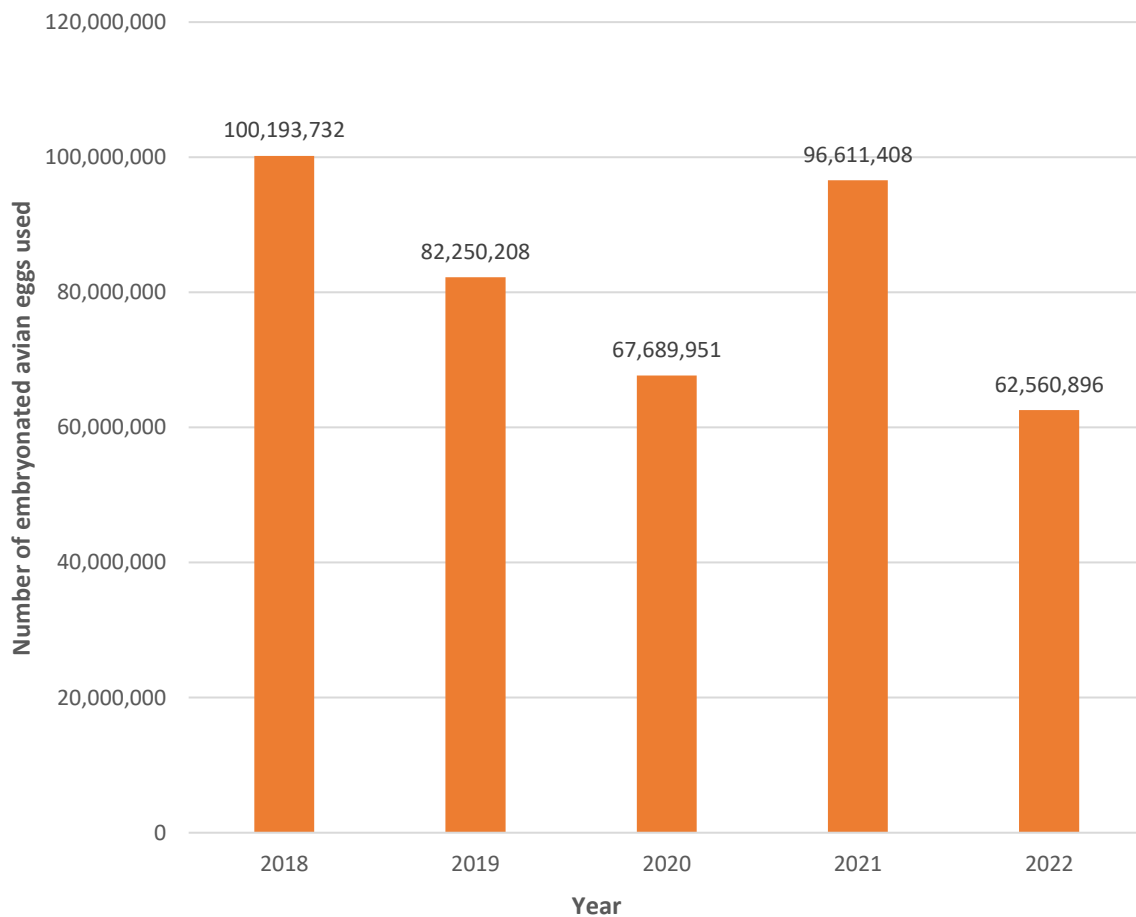
Animal type	2020	2021	2022
Amphibians	175	67	0
Bird other	34	0	0
Fish	59,248	196,335	174,710
Pigs (domestic)	55	0	0
Poultry	270	441	65
Laboratory mammal (non-specified)	0	0	558
Total	**59,782**	**196,843**	**175,333**

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3.4 Number of embryonated avian eggs used in research, teaching and testing from 2018 – 2022

The number of embryonated avian eggs used in research, teaching and testing in 2022 was 62,560,896.

Figure 3.8 Number of embryonated avian eggs used, 2018 – 2022

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Appendices

Appendix 1

Table 4.1 Reporting categories

Category	Description
Observation involving minor interference	Studies in which the normal activities of animals are minimally impacted on. For example, laboratory animals held in cages for acclimatisation; a feeding trial, such as Digestible Energy determination of feed in a balanced diet; behavioural or growth study with minor environmental manipulation; or teaching of normal, non-invasive husbandry such as handling, grooming, etc.
Unconscious without recovery	Studies in which animals are humanely rendered unconscious under controlled circumstances (i.e. not in a field situation) with as little pain or distress as possible. Capture methods are not required. Any pain is minor and brief and does not require analgesia. Procedures are carried out on the unconscious animal that is then killed without regaining consciousness. Examples include animals (including fish) in laboratory killed painlessly for dissection, biochemical analysis, etc.; or teaching of surgical techniques using live, anaesthetised patients that are not allowed to recover following the procedure.
Minor conscious intervention	Studies in which animals are subjected to minor procedures that would normally not require anaesthesia. Any pain is minor, although some distress may occur as a result of trapping or handling. For example, capture and release (with or without tagging) of animals (including fish) in the wild; trapping and humane euthanasia for collection of specimens; ear notching for identification of new line GM animals; injections, blood sampling in conscious animal; minor dietary or environmental deprivation or manipulation, such as feeding nutrient-deficient diets for short periods; or stomach tubing, branding, disbudding, shearing, etc.
Minor operative procedure with recovery	Studies in which animals are anaesthetised for a minor procedure such as cannulation or skin biopsy. Animals are allowed to recover. Depending on the procedure, pain may be minor or moderate and post-operative analgesia may be appropriate. For example, biopsies or blood sampling under anaesthesia or sedation; cannulations under anaesthesia or sedation; sedation/anaesthesia for relocation, examination or injections/blood sampling; field capture using chemical restraint methods.

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Category	Description
Minor physiological challenge	Studies in which there is interference with the animals' physiological or psychological processes. The challenge may cause mild or short-lived pain/distress, or any pain/distress is quickly and effectively alleviated. For example, electrofishing; minor infection, minor or moderate phenotypic modification, early oncogenesis; arthritis studies with pain alleviation; prolonged deficient diets, induction of metabolic disease; polyclonal antibody production; or antiserum production.
Surgery with recovery	Studies in which animals are anaesthetised for a major procedure such as abdominal or orthopaedic surgery following which the animal is allowed to recover. Post-operative pain should be managed with analgesia. For example, orthopaedic surgery; abdominal or thoracic surgery; transplant surgery; or surgery under anaesthesia for implantation of telemetry tags.
Moderate to major physiological challenge	Studies in which there is interference with the animals' physiological or psychological processes. The procedure/s may cause moderate or longer lasting pain/distress. Pain or distress may not be able to be entirely alleviated, either due to the nature of the process (e.g., neurological impairment) or because of the experimental question (e.g., pain studies). Other examples include: severe infection, significant disability due to genetic modification, induction of cancer without pain alleviation; arthritis studies without pain alleviation, uncontrolled metabolic disease; isolation or environmental deprivation for extended periods.
Death as an endpoint	Studies where the death of the animal is essential for the scientific result, such as for efficacy of some antivenoms, development of pest control agents and studies of acutely fatal conditions. In these studies, death is a deliberate measure in the procedure and there can be no intervention to kill the animal humanely before death occurs in the course of the procedure. 'Death as an endpoint' procedures must be approved by the Minister for Agriculture. They do not include studies where animals are humanely killed at the conclusion of the experiment.

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