

Murdoch University Annual Use Report for 2025

Assessing the Invasiveness of Scientific Procedures on Animals

The [Australian Code for the Care and Use of Animals for Scientific Purposes](#) (2013) requires that research or teaching projects that wish to use live animals must be reviewed and approved by an institutional Animal Ethics Committee (AEC). Investigators submitting project applications to the AEC, must provide details about the species and number of individual animals being requested for use in a project. The number of animals requested must be as low as possible without compromising the ability to achieve statistically relevant data from any analyses.

Applications must also provide detailed information about the proposed methods or procedures that animals will experience over the entire duration of the project. With this information the AEC can then assesses the use of the requested animal species and number, and whether the invasiveness or impact of the procedures on animal wellbeing is ethically justifiable in relation to the project's objectives.

The *WA Regulator* (DPIRD) classifies the invasiveness, or potential invasiveness, of methods or protocols adopted in research and teaching projects on a scale of 1 to 9 (*DPIRD Annual Animal Use Report: Guidelines 2023*, p14). The Animal Ethics Office assigns the categories to a permit and the number of animals impacted by each category is reported annually to DPIRD and to the Institution (Murdoch University). In Western Australia*, the invasiveness categories are:

Invasiveness Category	Definition	Examples
1. Observation involving no, or minor, interference	Animal is monitored physically or using technology in such a way that there is no impact on the animal's natural behaviour or physiology.	<i>Use of remote camera traps with infrared flash to detect animals, observation of animal behaviour from a distance using binoculars.</i>
2. Animal unconscious without recovery	Animal is rendered unconscious under controlled circumstances with little or no pain or distress. Any pain is minor and brief and does not require analgesia. Procedures are carried out on the unconscious animal which is then killed without regaining consciousness. For example, teaching surgical techniques on live, anaesthetised patients which are not allowed to recover following the procedure.	<i>Trial of a surgical technique/s followed by euthanasia without regaining consciousness, organ transplants followed by euthanasia.</i>
3. Minor conscious intervention	Animal is subjected to minor procedures which would normally not require anaesthesia or analgesia. Any pain is minor and analgesia usually unnecessary, although some distress may occur as a result of trapping or handling.	<i>Use of baited cameras, traps and remoted underwater vehicles to attract animals, physically trapping an animal, administering injections, blood and DNA sampling.</i>
4. Minor surgery with recovery	Animal is rendered unconscious with as little pain or distress as possible. A minor procedure is carried out and the animal is allowed to recover. Depending on the procedure, pain may be minor or moderate and post-operative analgesia may be appropriate. Field capture using chemical restraint methods is also included here.	<i>Tissue biopsies, cannulation, radiography, ultrasound scans and scopes under sedation followed by full recovery.</i>
5. Minor physiological challenge	Animal remains conscious during some or all of the procedures. There is interference with the animal's physiological or psychological processes. The challenge may cause only a small degree of pain/distress or any pain/distress is quickly and effectively alleviated.	<i>Exposure to a minor infection, early oncogenesis, diet trials, pain studies and assessment of antiserum production.</i>

6. Major surgery with recovery	Animal is rendered unconscious with as little pain or distress as possible. A major procedure, such as abdominal or orthopaedic surgery, is carried out and the animal is allowed to recover. Post-operative pain is usually considerable and at a level requiring analgesia.	<i>Intracoelomic surgeries, intracranial procedures.</i>
7. Major physiological challenge	Animal remains conscious during some or all of the procedures. There is interference with the animal's physiological or psychological processes. The challenge causes a moderate or large degree of pain/distress which is not quickly or effectively alleviated.	<i>Assessing the progression or regression of a disease, infection or virus with no pain alleviation, placing an animal in isolation or in an environment of deprivation for extended periods.</i>
8. Death as an endpoint	This procedure only applies where the death of the animal is a deliberately planned part of the scientific activity or project. Death as an endpoint <u>does not</u> include death by natural causes, animals humanely euthanased, animals euthanised for dissection or for use as museum specimens or unexpected deaths.	<i>Assessing LD50s or LC50s (Lethal Dose or Lethal Concentrations of substances that kill 50% of animal subjects as an assessment of lethality/efficacy).</i>
9. Production of genetically modified animals	This category is intended to allow for the variety of procedures which occur during the production of genetically modified (GM) animals. As animals in this category may be subjected to both minor and major physiological challenges and surgical procedures, this category reflects the varied nature of the procedures carried out. It includes ALL animals used in GM production, other than the final progeny which are used in a different category of the procedure.	<i>Includes the production of GM animals via breeding, culling, transplant and rederivation processes.</i>

*For research projects operating in other states or territories where Murdoch University holds a scientific license, the impact categories vary slightly.

Overview of Animal Use by Murdoch University Investigators

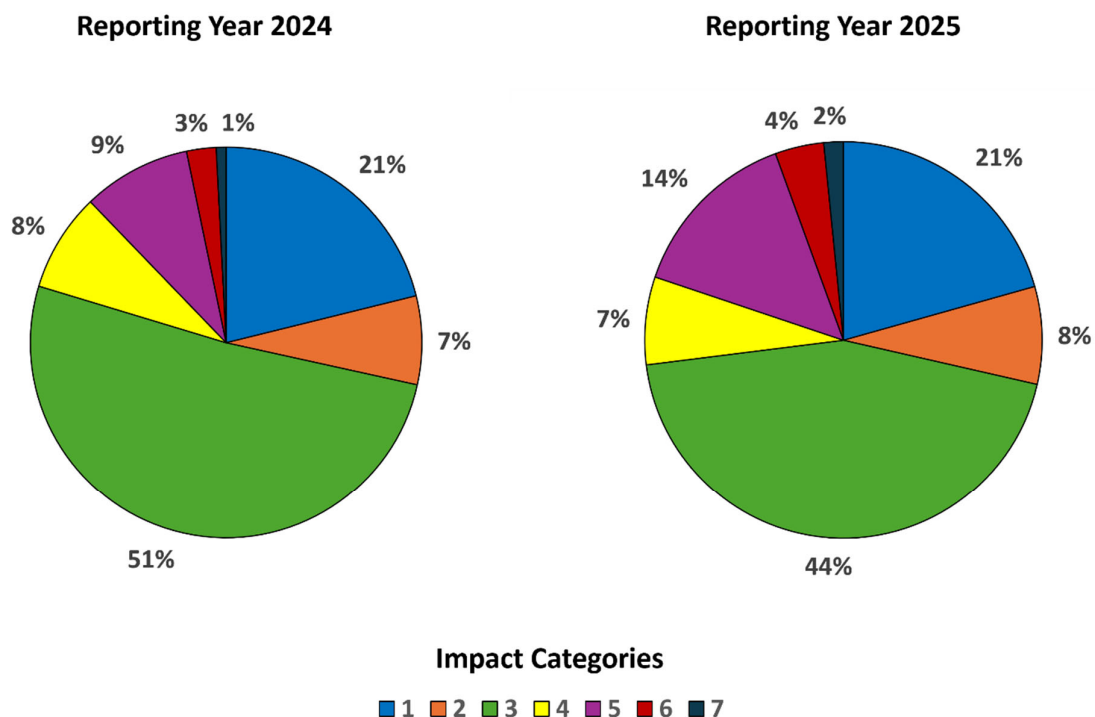
As a signatory of the [Australian Openness Agreement](#), Murdoch University is committed to reporting animal use and procedural invasiveness of teaching and research conducted by its investigators and external collaborators.

At the end of every calendar year, investigators must report the number of animals used under each permit to the Animal Ethics Office, which then reports the entire University's animal use to DPIRD. During 2025, Murdoch University was registered to use animals for scientific purposes in WA, Victoria, New South Wales, Queensland, South Australia, Tasmania and the Northern Territory. Murdoch University is the only university in WA that provides investigators with the option to carry out scientific work across the country. Investigators also have the option of working in select countries using animals if their proposed projects meet stringent criteria. Animal use and the invasiveness of all procedures to be conducted on animals are reported for all permits in all locations.

In 2025, there were 165 active research and teaching permits operating under Murdoch University's *Scientific License* in Australia, and in six other countries (Bangladesh, China, Laos, Maldives, Seychelles and Sri Lanka).

More than three-quarters of the permits reported using animals during 2025 (76.4% of 165 permits). The impact categories that were approved for projects reporting animal use in 2025 are presented in **Figure 1**.

Figure 1: Figure of the percentage of approved research and teaching permits in 2024 and 2025 reporting some animal use ($n = 172$ and $n = 126$ respectively) against procedures categorised by DPIRD into nine categories of invasiveness. There were no active permits with an invasiveness category of 8. or 9. in either 2024 or 2025.



Animal Use in Teaching at Murdoch University

The number of animals used for scientific teaching at Murdoch University increased by 40% from 2024 to 2025 (**Table 1**). The large number of cartilaginous and bony fish reported in 2024 and 2025 (**Figure 2**) was because students in oceanographic and marine science are given multiple opportunities to survey fish populations using real techniques and identifying real fish, throughout their degrees. In the School of Agricultural Sciences and the School of Veterinary Medicine, common livestock species ('domestic mammals') are used to demonstrate best practices for husbandry, low-stress handling and care throughout their degrees. The total number of domestic mammals used for teaching increased in number between 2024 and 2025, however between years, the proportion of domestics to overall animal use for teaching dropped by 10%. A larger number of birds were reported at the end of 2025 as a result of students conducting new in-field bird surveys (observational teaching permit) in a final year conservation unit.

Table 1: Annual number of animals used for scientific teaching with approval of the Murdoch University Animal Ethics Committee in 2024 and 2025. Data include permits active in other states of Australia and overseas.

Animal Category	Total Animal No.		Percentage of Animal Use	
	2024	2025	2024	2025
Domestic Mammals	1,297	2,617	6.15	8.86
Native Mammals	0	0	0.00	0.00
Non-endemic Pest Mammals	0	0	0.00	0.00
Marine Mammals	0	0	0.00	0.00
Birds	1,744	3,323	8.27	11.25
Reptiles	36	35	0.17	0.12
Amphibians	0	0	0.00	0.00
Fish	18,002	23,548	85.38	79.73
Zoo Animals*	6	12	0.03	0.04
Cephalopods & Decapods	0	0	0.00	0.00
TOTAL	21,085	29,535	100.00	100.00

*The majority of zoo animals are reported to the *WA Regulator* by the Perth Zoo AEC. Exotic/Zoo animals reported as used by MU researchers, generally originate from other facilities capable of providing long-term captivity of animals e.g. animal rehabilitation centres.

Oversight of research and teaching that uses primates and/or laboratory animal species for science is not the responsibility of the Murdoch University AEC, as the university does not have facilities for these animals. Investigators must apply to the relevant facility and its governing AEC for permission to use these species for scientific work.

Please note that simple comparisons of animal numbers between projects or years can be misleading due to differences in the application of categories and the work being undertaken.

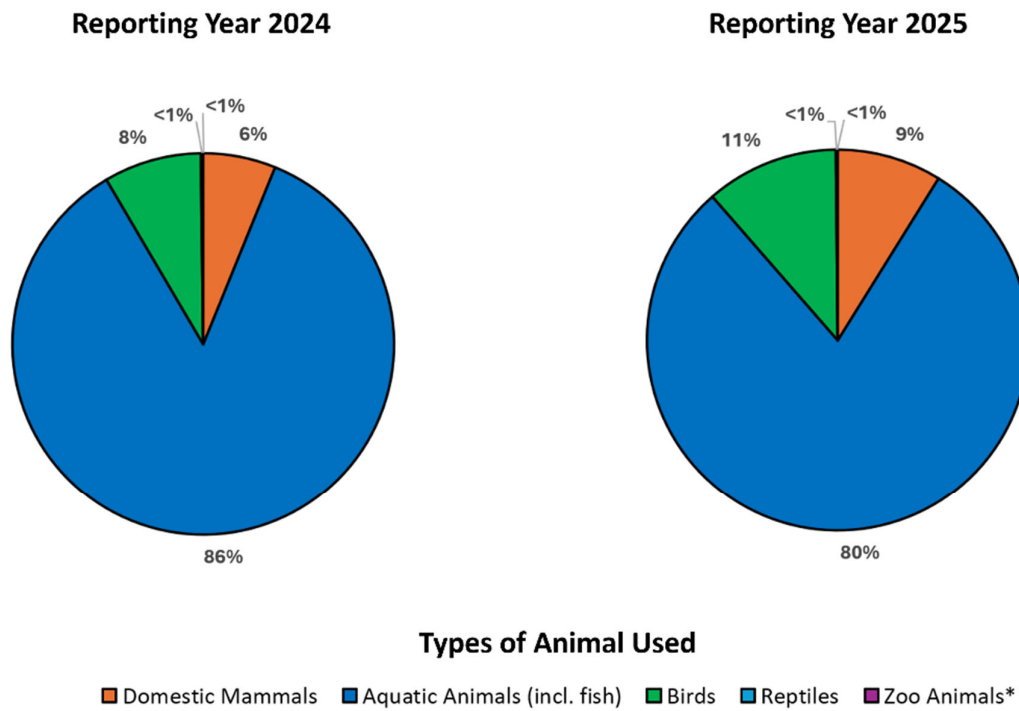


Figure 2: The total number of animals used for teaching under Murdoch University AEC permits in 2024 ($n=21,085$) and 2025 ($n=29,535$), presented as percentages according to animal type.

Animal Use in Research at Murdoch University

Compared with 2024, there was a three-fold increase in the number of animals used for research at Murdoch University in 2025 (**Table 2**).

Cartilaginous and bony fish represented the largest number of animals used for research in 2024 (**Figure 3**), with the total number of fish used increasing by 36% in 2025. The university has several active research groups who survey/capture/tag target marine, estuarine and freshwater fish throughout the state of WA and elsewhere. These investigators are also required to report any non-target or other vertebrate bycatch to the AEC, leading to large numbers reported annually.

The number of domestic mammals used for research purposes increased by 25% between 2024 and 2025. Domestic mammals used in research were mostly sheep (80%) as the university has a very successful sheep research group who are active in many states in Australia conducting large scale production and husbandry trials.

The number of native mammals used in research permits reduced in 2025 by 73%. The majority were captured on motion-activated cameras in observational/low impact studies (70%). The remaining native mammals were trapped for surveys/monitoring, with 96 animals undergoing anaesthesia for assessment of physical health.

Similarly, 52% fewer marine mammals were tracked for movement across the ocean for research in 2025 vs. 2024.

Bird use increased by 98% as a result of investigators conducting extensive observational bird surveys ($n=200,922$), particularly with cameras, at multiple remote sites across WA.

A research permit using wild-caught blue-swimmer crabs was approved in 2024, making it the first study to be included under the Murdoch University scientific licence that solely used decapods. At present, the *Animal Code* does not require AEC permits for decapod crustaceans, however, the investigators asked for ethical oversight of the process and the MU AEC agreed to review the project and will consider others in the future.

Table 2: Annual number of animals used for scientific research with approval of the Murdoch University Animal Ethics Committee in 2024 and 2025. Data include permits active in other states of Australia and overseas.

<i>Animal Category</i>	<i>Total Animal No.</i>		<i>Percentage of Animal Use</i>	
	<i>2024</i>	<i>2025</i>	<i>2024</i>	<i>2025</i>
Domestic Mammals	36,040	45,191	23.85	11.90
Native Mammals	7,265	1,940	4.81	0.51
Non-endemic Pest Mammals	5,978	181	3.96	0.05
Marine Mammals	1,215	584	0.80	0.15
Birds	3,092	200,922	2.05	52.91
Reptiles	3,200	1,870	2.12	0.50
Amphibians	2,661	923	1.76	0.24
Fish	91,556	124,353	60.60	32.75
Zoo Animals*	0	0	0.00	0.00
Cephalopods & Decapods	80	3,751	0.05	0.99
TOTAL	151,087	379,715	100.00	100.00

*The majority of zoo animals are reported to the *WA Regulator* by the Perth Zoo AEC. Exotic/Zoo animals reported as used by MU researchers, generally originate from other facilities capable of providing long-term captivity of animals e.g. animal rehabilitation centres.

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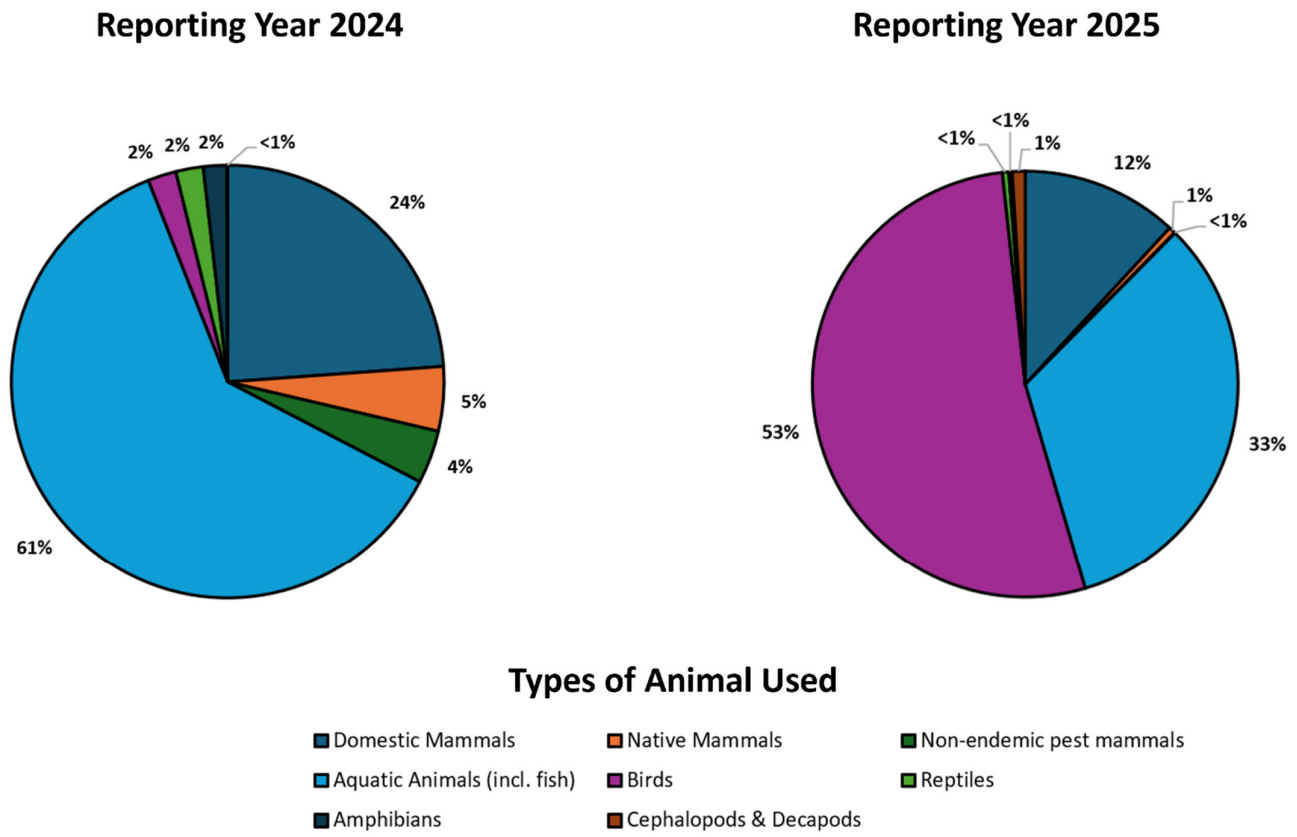


Figure 3: The total number of animals used for research under Murdoch University AEC permits in 2024 ($n=151,087$) and 2025 ($n=379,715$) presented as percentages according to animal type.

Animal use in other States or Territories of Australia

Scientific use of animals in other states of Australia totalled 25,484 animals (**Table 4**). The majority of animals used were domestic sheep (94.4%, $n=24,049$), that were located primarily in New South Wales (63.3%). Native mammals were primarily captured on camera images (83.6%, $n=915$), especially in Queensland. The most impactful procedures were carried out in Tasmania, where 84 possums and native rodents were physically trapped during surveys/monitoring, and 96 bandicoots and platypus were trapped and then assessed for physical health under anaesthesia.

Procedural invasiveness and animal use in each state or territory is reported annually to the relevant State/Territory *Regulator*.

Table 4: Annual number of animals used for scientific teaching and research in other states and territories of Australia where Murdoch University was licensed in 2025.

State/Territory	Domestic Mammals	Native Mammals	Introduced Mammals	Aquatic Mammals	Reptiles	Amphibians	Fish	Total
New South Wales	15,232	0	0	0	0	0	0	15,232
Northern Territory	3	0	0	0	0	0	0	3
Queensland	409	900	0	0	2	0	140	1,451
South Australia	227	0	0	162	0	0	0	389
Tasmania	0	195	11	0	0	0	2	208
Victoria	8,181	0	20	0	0	0	0	8,201
Total	24,052	1,095	31	162	2	0	142	25,484

Animal use in countries other than Australia

Only three permits with permission to conduct research in countries other than Australia reported any animal use for 2025 (**Table 5**). Animal use comprised mostly domestic animals on farms – specifically blood and skin samples collected from cows, water buffalo and sheep for assessment of disease (89.9%,). Wildlife use was limited to cartilaginous and bony fish (10.1%), which were surveyed for parasites and disease or had their movement and activities in the ocean tracked.

Table 5: Annual number of animals used for scientific teaching and research in countries other than Australia in 2025.

Country	Domestic Mammals	Fish	Total
Bangladesh	626	0	626
China	0	0	0
Laos	0	0	0
Maldives	0	0	0
Seychelles	0	8	8
Sri Lanka	0	62	62
Total	626	70	696