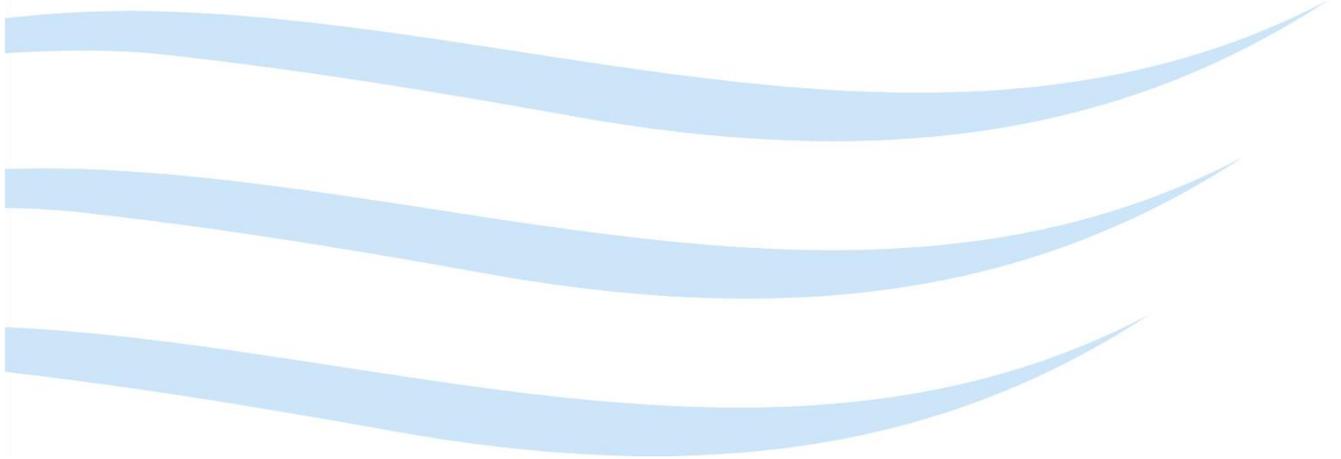


# Animal Research Statistics Tasmania

## Annual Report

Number 22 (2017)

**September 2018**



This report has been compiled in accordance with Section 35 of the *Animal Welfare Act 1993* from animal usage statistics submitted by institutions licensed under the Act for the period 1 January 2017 to 31 December 2017.

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Biosecurity Tasmania  
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## Summary

This report details animal use for research and teaching purposes in Tasmania from 1<sup>st</sup> January to 31<sup>st</sup> December 2017. The summaries and analyses in this report are compiled from project data submitted by licensed institutions as required by the *Animal Welfare Act 1993*. The report complies with the nationally agreed definitions for the collation of statistics of animal use for scientific purposes and includes data collected on live, non-human vertebrates and cephalopods

Of the 44 licensed institutions required to report, 22 used animals during the reporting period comprising 7 Tasmanian resident institutions and 15 interstate institutions.

A total of 199 individual projects were reported in 2017 which is a small increase of 4 projects on the previous year. Within those projects, 288,386 animals or sightings were reported; recording a substantial increase of over 27% on 2016 figures. The reporting of 93,343 camera trap sightings, up from 2,558 in 2016 accounted for this increase.

There were 2 animal ethics committees (AECs) resident in Tasmania supervising projects within the Tasmanian jurisdiction during 2017 – the Department of Primary Industries, Parks, Water and Environment's (DPIPWE) AEC and the University of Tasmania's (UTas) AEC.

The DPIPWE AEC provided project assessment and monitoring services to 20 licensed external institutions. Nine of these external institutions reported animal use in 2017 in 13 projects. The DPIPWE AEC also supervised 15 internal departmental projects during the reporting period.

UTas continued to be the most active research institution using animals in Tasmania, reporting data from 143 projects representing 73% of projects reported. The number of animals reported by UTas increased from 171,619 in 2016 to 249,503 in 2017. The major contributor to the increased animal use for UTas were 93,323 camera trap sightings of various species of which most (72,438) were reported in exotic feral mammal projects.

Aquatic animals were the most numerous category reported in 2017 accounting for 46.4% (or 133,828) of all animal use reported. The vast majority of aquatic animals were reported in 17 observational projects involving 102,950 animals. Exotic feral mammals was the second largest animal category used in 2017 with 72,618 animals.

Laboratory rodent use decreased by over 41% during 2017 compared to 2016. Birds also recorded a substantial decline with 25.3% fewer individuals being reported. Very few amphibians were used (23).

Environmental studies accounted for 84% of animal use and over 34% of projects reported in 2017. This was a very large increase on 2016's 30% of animals and 20% of projects. Although the large contributions of camera trap sightings affect comparisons within this purpose, the increased number of environmental projects from 40 to 69 indicate a genuine rise in current activity in this area of animal research.

Over 93% of animals were subjected to relatively low impact procedures in 2017. Observation with minor interference procedures were applied to the majority of animals (52.1%) and in the majority of projects (54.3%). This was followed by projects using camera traps only (32.4% of animals and 3.5% of projects). Eight sheep were subjected to Death as the end point during 2017 in a professional development training project for registered veterinarians that included training in the application of a particular method of euthanasia.

## I Introduction

This report details animal use for research and teaching purposes in Tasmania from 1st January to 31st December 2017. Section 1 provides background information about the legislative requirements for reporting and how the data is compiled each year, noting any significant changes to the procedures that may affect comparisons. Section 2 outlines the animal use in Tasmania during the reporting period. Summary statistics are provided in Section 3.

### I.1 Regulation of animal research in Tasmania

Animal research in Tasmania is regulated via several mechanisms.

#### (a) *Animal Research Legislation*

Part 4 of the *Animal Welfare Act 1993* (the Act) deals with animal research including teaching. Since its proclamation on 1<sup>st</sup> April 1996, institutions are required to be licensed by the Minister if they wish to use animals in research and teaching in Tasmania.

The Act allows licensed institutions to conduct animal research as approved by Animal Ethics Committees (AECs) in a self-regulatory environment. The institutions are, however, subject to inspection by Inspectors of Animal Research at least on an annual basis. In practice this is applied as an ongoing monitoring program with emphasis on ensuring the respective AECs are compliant and functioning and institutions are fulfilling their responsibilities according to the approved Code of practice.

The definition of 'animal research' in the *Animal Welfare Act 1993* is:

'a procedure, test, experiment, inquiry or study on an animal which –

- (a) is undertaken to develop, demonstrate or acquire knowledge, or techniques, in an area of science or teaching; and
- (b) is likely to have a significant adverse effect on the welfare of the animal.'

Regulation 7 of the *Animal Welfare (General) Regulations 2013* provides for an inspector to determine whether an activity is or is not animal research. A precautionary approach is used in these determinations to ensure research and teaching activities that are likely to cause significant adverse effects on animals are approved and monitored by an AEC. It should be noted that an institution may permit their AEC to approve projects that use procedures that have been determined not to be research but that require approval, for example for funding, or publishing.

There is also provision for the inclusion of additional species by regulation within the meaning of 'animal' under the Act for particular purposes under the Act. The class *Cephalopoda* which includes octopus, cuttlefish, nautilus and squid, was included as 'animals' for the purposes of research in January 2009. The reporting of cephalopods has been mandatory since then.

#### (b) *The Code*

A core condition of licensing is compliance with the approved Code of practice. Currently this is the nationally agreed *Australian Code for the Care and Use of Animals for Scientific Purposes 8<sup>th</sup> edition (2013)* (the Code). The Code and associated reference documents are published by the National Health and Medical Research Council (NHMRC) and provide specific requirements and guidance for the use of animals for scientific purposes to investigators, teachers, institutions and AECs. The eighth edition of the Code received Ministerial approval in October 2013, superseding the seventh edition. No change in statistical reporting came about as a result of the new Code coming into operation.

The Code requires that a decision to use animals must be properly justified, and animals may only be used after due consideration of the '3Rs' (replacement, reduction and refinement). The principles of the '3Rs' are, in brief, that animals may be used where there are no alternatives enabling **replacement** of animals with other methods; where

**reduction** is applied such that the number of animals used is absolutely necessary to achieve the aims of the project; and **refinement** of techniques used reduce the welfare impact on animals approved for use and promote the animals' wellbeing.

Provided research and teaching activities are properly approved and monitored within a licensed institution by its AEC, and the institution, its AEC and researchers and teachers comply with the Code, the use of animals for research and teaching is protected from sections 8 and 9 of the Act (cruelty and aggravated cruelty). While sections 8, 9 and 10 of the Act do not apply to the reasonable use of fish in commercial and recreational activities, the research provisions do apply to aquatic vertebrates and cephalopods as well as terrestrial vertebrates.

Research project proposals are examined, approved and monitored by an AEC that has been constituted and authorised by the Institution in compliance with the approved Code. Institutions that have too few projects or are not sufficiently resourced to have their own AEC may use the services of another institution's AEC. For instance, in 2017, 20 external institutions were approved to use the DPIPW's AEC services for project assessment and monitoring; of these institutions, 9 used animals in the reporting period.

#### *(c) Licensing*

Any individual or organisation may apply to be a licensed 'institution' for the purposes of conducting animal research in Tasmania. The conditions of the licence require compliance of the institution and any persons under its auspices with the Tasmanian animal welfare legislation and the approved Code.

Licence applicants from outside Tasmania must agree to comply with the Code and provide evidence that they are equivalently licensed in their resident jurisdiction to ensure adequate monitoring of their AEC's compliance with the Code by an equivalent regulator.

Institutions that share another institution's AEC must do so via a formal sharing agreement that complies with the principles set down in the Code and that also address any other issue specific to the host or external institution.

#### *(d) Annual reporting*

Institutions are required to provide an annual report to the Minister on their activities in relation to animal research under section 35 of the *Animal Welfare Act 1993*. The report is to contain *the numbers and types of animals used and the types of animal research carried out*. A report summarising the institutional reports (this document) is to be tabled in both Houses of Parliament prior to the 30<sup>th</sup> September each year.

#### *(e) Inspectors*

The Minister appoints inspectors under section 36 of the Act. Inspectors advise the Minister on matters relating to the granting and cancellation of licenses, the conduct of the AECs and general compliance with the approved research Code of Practice. The monitoring of compliance includes the inspection of animal holding facilities within each institution, attending meetings of AECs and the collation of the annual State report. Inspectors have specific powers to investigate suspect non-compliance with the animal research provisions of the Act.

#### *(f) Scientific Permits for wildlife and fisheries*

Institutions intending to use wildlife, including native fish, must also apply to the Natural and Cultural Heritage Division, DPIPW and the Inland Fisheries Service for appropriate permits.

## **1.2 Annual reporting in Tasmania**

A reporting format was developed by the then Code Liaison Group (now known as the Code Reference Group or CRG) of the NHMRC for the purpose of compiling annual national statistics. It was endorsed by the Tasmanian Animal Welfare Advisory Committee as suitable for State reports to avoid NHMRC-funded institutions having to duplicate reporting effort.

During 2007, regulators from all States and Territories agreed on an amended animal category and type list with animals grouped into more logical categories. This list was supported by the CRG and was used for the 2007 report in Tasmania and nationally from 2008. The calendar year reporting period is used as it is consistent with most other agencies collecting animal use statistics.

Data is submitted by the responsible investigator for each project during the calendar year and collated into a standard spread sheet by their institution.

Meaningful reporting of wild animals used in what may be described as an indirect way, such as the collection of feathers from vacated nests, remains a contentious area and is best resolved on a case by case basis by the AEC involved during the project approval process.

Only animals used in the Tasmanian jurisdiction are required to be noted in this report. There are however, animals used in other jurisdictions or Commonwealth waters that are reported by institutions where they have no alternative means of reporting. Where these reports impact significantly on the data or interpretations presented here they are noted.

Each jurisdiction collects data on animals that fall within its legislative scope. If comparing data across jurisdictions, it should be noted that, for example, fish or cephalopods may not be required to be reported in some jurisdictions. Similarly, Tasmania does not require reporting of decapod crustaceans although crustaceans are included if reported.

Most jurisdictions also publish a summary report at least. A national repository of animal use statistics is no longer maintained. The Tasmanian statistics are published on the DPIPWE web site once they have been tabled in Parliament.

### **1.2.1 Explanation of the reporting format**

The reporting spread sheet requires the selection of one option from a drop-down list in each of the three main areas listed below (purposes, procedures and animals). Where animals are used in multiple projects, each project is reported separately. While a project rarely has multiple purposes, it is quite common to have multiple procedures and animal categories. Examples of the types of procedures that should be reported in each procedure category have been listed in the reporting spread sheet to improve reporting precision.

The term 'animal uses' would be a more accurate description of much of the data presented to account for the repeated use or observation of animals as mentioned above. For the sake of readability the terms 'use' and 'uses' are employed interchangeably in this report.

Like previous reports, the reuse of animals leads to a degree of double counting that cannot be avoided and therefore the overall number of individual animals used is an overestimate. Where possible, investigators are queried where there are indications double counting may have occurred. The numbers reported against purposes and procedures are considered accurate however.

The inclusion of comments within the reporting format enables some contextualisation of the animal use and assists with resolving double counting issues.

### **1.2.2 Application of categories**

**Animal categories** - within each animal category there are several types. Sub-types may also be included where it is considered they are of particular interest to the State. For reporting purposes, the term 'animal' covers fully metamorphosed juveniles, embryos in the latter half of gestation, eggs in the latter half of incubation and larval fish that can feed independently. This definition complies with the National Statistics of Animal Use for Scientific Procedures.

The available categories are:

- Amphibians

- Aquatic animals (non-mammalian)

Birds  
Domestic mammals (including livestock species)  
Exotic feral mammals  
Exotic zoo animals  
Laboratory mammals  
Native mammals (including marine mammals)  
Primates  
Reptiles

Projects involving exotic zoo animals or primates have not been conducted in Tasmania for some time, therefore these categories do not routinely appear in this report although those options remain available.

**Purpose of Project** – categorises the reason/s for the study.

*Understanding Biology* eg comparative anatomy studies, animal physiology, adaptations of wild animals, wildlife survival studies.

*Health and Welfare* eg cancer research, drug therapy, residue and toxin testing, vaccine development.

*Management or Production* eg effect of nutrition supplements, evaluating husbandry techniques, animal production trials.

*Education* eg classroom studies on animal behaviour or physiology.

*Environmental Study* eg population surveys, acquisition of museum specimens.

**Procedures used** – broadly describes the severity of the procedures used (ie the impact on the animal).

The following procedures are reported on:

*Camera Trapping Only:* (This category was introduced in the 2014 report – previously included in *Observation Involving Minor Interference*) studies exclusively using continuous or motion-triggered photographic recording of animals via fixed cameras with or without lures/baits in the aquatic or terrestrial environment. Note that camera trap numbers relate to sightings rather than individual animals as it is usually not possible to differentiate between individuals of the same species.

*Observation Involving Minor Interference:* studies in which the normal activities of animals are impacted on in a minor way.

Examples of Observation Involving Minor Interference:

- Wildlife studies involving repeated spotlighting or intrusion into groups of animals or nursing animals.
- Feeding trial, such as Digestible Energy determination of feed in a balanced diet.
- Behavioural study with minor environmental manipulation.
- Teaching of normal, non-invasive husbandry such as handling, grooming, etc.
- Production of products, such as hormones or drugs, in milk or eggs from genetically modified animals that are subject to normal husbandry procedures only.

*Minor Conscious Procedure:* animal is subjected to minor procedures that 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.

Examples of Minor Conscious Procedure:

- Tail tipping and toe clipping 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.
- Trapping and release as used in species impact studies, etc.
- Trapping and humane euthanasia for collection of specimens.
- Stomach tubing, branding, disbudding, shearing, etc.

*Minor Operative Procedure with Recovery:* animal is rendered unconscious, with as little pain or distress as possible. A minor procedure such as cannulation or skin biopsy 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.

Examples of Minor Operative Procedure with Recovery:

- Biopsies under anaesthesia or sedation.
- Cannulations under anaesthesia or sedation.
- Sedation/anaesthesia for relocation, examination or injections/blood sampling.

*Major Surgery With Recovery:* generally 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 allowed to recover. Post-operative pain is usually considerable and at a level requiring analgesia.

Examples of Major Surgery with Recovery:

- Orthopaedic surgery.
- Abdominal or thoracic surgery.
- Transplant surgery.
- Mulesing, surgical castration without anaesthesia.

*Minor Physiological Challenge:* animal remains conscious for some or all of the procedure. 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.

Examples of Minor Physiological Challenge:

- Minor infection, minor or moderate phenotypic modification, early oncogenesis.
- Arthritis studies with pain alleviation.
- Prolonged deficient diets, induction of metabolic disease.
- Polyclonal antibody production.
- Antiserum production.

*Major Physiological Challenge:* animal remains conscious for some or all of the procedure. 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.

Examples of Major Physiological Challenge:

- Major infection, major phenotypic modification, oncogenesis without pain alleviation.
- Arthritis studies with no pain alleviation, uncontrolled metabolic disease.
- Isolation or environmental deprivation for extended periods.
- Monoclonal antibody raising in mice.

*Animal Unconscious Without Recovery:* the animal is rendered unconscious under controlled circumstances with as little pain or distress as possible. 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 of Animal Unconscious Without Recovery:

- Laboratory animals killed humanely for dissection, biochemical analysis.
- Teaching surgical techniques on live, anaesthetised animals that are not allowed to recover following the procedure.

Note that in Tasmania research involving trawling of wild fisheries is included within this procedure category as it is considered to describe more accurately the impact on the individual animal captured this way. Although trawling results in the death of most animals captured, death is not a measure in itself and is thus not considered to be a 'death as the end point' activity (see below).

*Death as the End Point*: the aim of the experiment requires the animal to die unassisted, ie not euthanased, as death is a critical measure of the experimental treatment.

Examples of Death as the End Point:

- Toxicological experiments (eg ascertaining LD50s)
- Assessing the relative resistance to the effects of infections if euthanasia cannot be provided at any stage to achieve the aim of the experiment.

## **2 Animal research activities for 2017**

### **2.1 Institutions**

There were 44 licensed institutions required to report animal use during 2017. They are listed below.

Australian National University (ANU), Australian Capital Territory  
Bayview Bush Babies Inc, Tasmania (no animal use in 2017)  
Biosis Pty Ltd (Biosis), Victoria (no animal use in 2017)  
Birdlife Tasmania, (Birdlife), Tasmania  
Bonorong Wildlife Sanctuary, Tasmania (no animal use in 2017)  
Brett Lane and Associates, Victoria (no animal use in 2017)  
Central Queensland University, Queensland (no animal use in 2017)  
Charles Sturt University, (CSU), New South Wales  
CSIRO, National - Tasmanian projects only  
Deakin University, (Deakin), Victoria  
Department of Primary Industries, Parks, Water and Environment (includes the Inland Fisheries Service), (DPIPWE) Tasmania  
Elanco (Novartis), New South Wales (no animal use in 2017)  
Entura (Hydro Tasmania Group), (Entura), Tasmania  
Eurofins Agrisearch Pty Ltd, New South Wales (no animal use in 2017)  
Fearn, Mr Simon (Independent researcher), Tasmania (no animal use in 2017)  
Federation University, Victoria (no animal use in 2017)  
FloatPac Pty Ltd (FloatPac), Victoria  
Freshwater Systems Pty Ltd, (Freshwater), Tasmania  
Friends of Maatsuyker Island, (FoMI), Tasmania  
Huon Aquaculture Co Pty Ltd, (HAC), Tasmania (no animal use in 2017)  
Intervet Australia Pty Ltd, (Intervet), Victoria (no animal use in 2017)  
Jurox Pty Ltd, New South Wales (no animal use in 2017)  
King Island Natural Resource Management Group, Tasmania (no animal use in 2017)  
Macquarie University (MacqUni), New South Wales (no animal use in 2017)  
McIntyre, Nathan (Independent researcher), Queensland

Monash University, (Monash), Victoria  
Murdoch University, (Murdoch), Western Australia  
Natural Resource Management – South (NRM Sth), Tasmania (no animal use in 2017)  
Robertson, Dr Bruce Ingram, (Independent researcher), Victoria (no animal use in 2017)  
Scibus, New South Wales  
Tasmanian Irrigation Pty Ltd, Tasmania (no animal use in 2017)  
Troidlia Biovet Pty Ltd, (Troidlia), New South Wales  
Tassal Operations Pty Ltd (Tassal), Tasmania  
University of Adelaide (UAdelaide), South Australia  
University of Canberra, Australian Capital Territory (no animal use in 2017)  
University of New England, New South Wales (no animal use in 2017)  
University of New South Wales (UNSW), New South Wales  
University of Queensland (UQld), Queensland  
University of the Sunshine Coast, (USC), Queensland  
University of Sydney (USyd), New South Wales  
University of Tasmania, (UTas), Tasmania  
University of Technology Sydney, New South Wales (no animal use in 2017)  
Victorian Wader Study Group Inc, (VWSG), Victoria  
Virbac (Australia) Pty Ltd, Victoria (no animal use in 2017)

There were two AECs resident in Tasmania (DPIPWE and UTas) in 2017. While the Australian Antarctic Division's AEC is also resident in Tasmania, the Division was not licensed in Tasmania during 2017 as it was not conducting research within the Tasmanian jurisdiction.

Of the 44 licensed institutions, 22 used animals in Tasmania in 2017 as was the case in 2016 and within the usual range for the past six years (18-24). There were 15 interstate and 7 Tasmanian resident institutions using animals in Tasmania during 2017.

The number and variety of institutions conducting animal research in Tasmania fluctuates according to academic and commercial interests for the period. Of the 7 Tasmanian resident institutions using animals in 2017, there was 1 academic institution (UTas), 1 government, 2 commercial entities and 3 not-for-profit organisations. Interstate institutions using animals comprised 10 academic institutions, 4 commercial entities (including CSIRO), and 1 Independent researcher organisation. There were no overseas institutions active in the state during 2017.

Table 1 lists the institutions that used animals and the categories and numbers of animals involved, including a comparison with 2016 figures. Table 3 provides detail on the types of animals used by each institution. In 2017, 288,386 animal 'uses' were reported (compared to 225,994 in 2016), within 199 projects (compared to 195 in 2016).

The substantial 27% increase in animal numbers over 2016 figures is largely due to the 93,343 camera trap sightings reported, leaving a total of 195,043 individual animals used in 2017. In 2016, a total of 2,558 camera trap sightings were reported, thus leaving 223,436 individual animals used. It can therefore be concluded that there has been a relative decline in conventional animal use over the past 12 months.

This year's report includes figures illustrating the relative level of activity over the past five years in terms of project number per categories of animals (Figure 2), purposes (Figure 4) and procedures (Figure 6).

UTas continued to be the most active institution in Tasmania during 2017 with 143 or 73% of all projects (Table 1). There was also a 45% increase in the number of animals used by UTas in 2017 (249,503 or 83% compared to

171,619 or 76% in 2016). The total number of animals reported by UTas includes 93,323 camera trap sightings, and therefore 156,188 animals were reported in the more conventional use categories.

Another academic institution, Monash University, was the next largest animal user in Tasmania with 17,989 animals reported in 2 observational studies of seabirds. This represented 6.24% of all animals reported. In 2017, all reporting not-for-profit organisations were also active in wild bird research. Commercial organisations were either involved in production animal research or conducting ecological surveys.

The DPIPWE Divisions of Natural and Cultural Heritage and Biosecurity Tasmania conducted 8 and 7 projects respectively reported under DPIPWE as internal projects. A total of 1,984 animals or 0.69% of all animals reported in 2017 were used in DPIPWE projects addressing a wide variety of subjects from shy albatross conservation to the development of fish vaccines and feral cat control.

Of the 20 external licensees using the DPIPWE AEC in 2017, 9 reported animal use totalling 11,765 animals involved in 13 projects. Entura used the largest number of animals for external licensees with 6,489 fish surveyed in a single project. Other commercial enterprises using the DPIPWE AEC (CSIRO, Freshwater, FloatPac and Treidlia) reported a total of 2,182 animals across 7 projects.

Note that CSIRO uses both the DPIPWE AEC and its own interstate AECs. The interstate monitored CSIRO projects reported a total of 276 animals in 2017.

The inspector attended a total of 10 AEC meetings (5 for DPIPWE and 5 for UTas), inspected 1 facility and supported a formal training seminar for the Tasmanian animal research community as well as relevant conference attendance for AEC members.

## **2.2 Animal categories**

Tables 1 and 2.1 summarise the number of animals and projects reported within animal categories for 2017; Table 3 provides detail on the types of animals within each category used by each institution. Figures 1 and 2 illustrate a rolling 5 year distribution of animals and projects respectively within animal categories.

*Aquatic animals* was the most commonly reported category with 46.41% or 133,828 animals used in 67 or 33.67% projects. Similar numbers were reported in 2016. This is expected in Tasmania, given the proportion of projects in wild fisheries and aquaculture research (Figure 2) and the very large numbers of animals that may be used in those areas. Similar situations occur on occasion for wildlife and livestock projects.

*Exotic feral mammals* was the second largest category in 2017 with 72,618 uses although 72,438 of these were camera trap sightings.

*Birds* accounted for 42,758 (or 14.83%) animals which is a 25.6% reduction from 2016 figures. Birds featured in 48 or 24.12 % of projects which is a slight decrease on 2016. The largest contributors were the two previously mentioned population surveys of seabirds totalling 17,989 observations by Monash University.

*Native mammal* use increased substantially in 2017 with 20,830 (or 7.22%) uses compared to 6,940 (or 3.07%) in 2016 (Table 1). The number of projects also increased to 64 – a level of activity not seen for 3 years (Figure 2). Camera trap sightings accounted for 17,137 of the native mammals reported however.

*Laboratory mammal* use involved 11,846 or 4.11% mice and rats in biomedical research. This was a 41.3% reduction on 2016 figures (Table 1). Sixty-six projects used laboratory animals (or 33.17%) reflecting continued interest in the area (Figure 2) in Tasmania. The number of animals used in establishing and maintaining breeding colonies (7,573) was over 35% less than that noted in 2016 however this area continues to account for the majority of laboratory mammal use.

*Domestic mammal* use remained comparatively low in 2017 with 5,201 head used although this was more than double that used in 2016 (2,255, Table 1) in a higher number of projects (22 compared with 13 in 2016) (Figure 2).

Reptile use in 2017 involved 1,282 animals in 15 projects. This is similar to 2016 figures (1,327 reptiles) although with a slight increase in project number (15 compared to 12 in 2016).

Amphibian use in 2017 involved a single project using just 23 frogs, down from 111 in 2 projects in 2016 (Table 1).

## 2.3 Purposes

Table 2.2 summarises the research and teaching purposes for which animals were used during 2017. Figure 3 and 4 illustrates a rolling 5 year distribution of animals and projects respectively within purposes. Table 4 presents detail on the purposes and procedures applied to animal types within categories.

*Environmental studies* used 242,497 animals or 84.09% of total use reported in 2017 representing over 3.5 times the number of animals reported for this purpose in 2016 (Table 2.2 and Figure 4). There were 69 environmental projects reported in 2017 compared to 40 in 2016 indicating a continuing interest in this area. Observational studies (139,615 animals) and camera trapping (93,343 sightings) accounted for 96% of reported uses for this purpose.

*Understanding biology* projects used 21,631 animals, a 44% reduction on 2106 figures although there were 26% more projects in this area of research (125 compared to 99 in 2016).

*Education* projects used more than twice as many animals in 2017 (8,404) than in 2016 (3,977). There were 14 educational projects (10 in 2016). Animal use in education remains relatively low in comparison with other purposes in Tasmania (Figures 3 and 4), however there has been a steady rise in the number of projects over the past 5 years with varying numbers of animals used within those projects during the same time period (Figures 3 and 4).

*Health and welfare* studies reported a dramatic decrease in the number of animals used from 106,171 down to 8,331 in 2017 (Table 2.2 and Figure 3). However, the number of projects conducted for this purpose increased to 41 compared to 27 in 2016 (Table 2.2 and Figure 4). The vast majority of projects and animals used in this area were aimed at improving Atlantic salmon health and welfare.

*Management and production* research use of animals continued to decline in 2017 with 7,519 animals used in 29 projects compared to 9,198 animals in 23 projects in 2016 (Table 2.2 and Figures 3 and 4). As with the Health and welfare purpose, these management and production projects were mainly in the area of Atlantic salmon research.

## 2.4 Procedures

Table 2.3 summarises the procedures used on animals during 2016. Figures 5 and 6 illustrate rolling 5 year distributions of animals and projects respectively, according to various procedural categories. The procedures are listed below in descending order of animal use.

*Observation with Minor Interference* was applied to 150,284 animals in 108 projects in 2017 (Table 2.3). While slightly fewer animals were reported than in 2016 (167,276) there were over 38% more projects in 2017 using observational procedures compared to 2016. Fish and bird surveys contributed large numbers of animals to this category in 2017 with 102,950 and 39,853 respectively or 95% of the total use reported for this procedure (Table 4).

*Camera Traps Only* projects increased slightly from 6 reported in 2016 to 7 in 2017, within which 93,343 sightings were reported (Table 2.3), a very substantial increase in reported use. The projects utilising this procedure exclusively were all environmental in nature.

*Minor Conscious Procedures* were applied to 19,367 (or 6.72%) animals across 58 projects (Table 2.3). This was a 20% reduction in animals but a 38% increase in projects on 2016 figures. This procedure was applied mainly to laboratory animals in breeding projects (7,548) and wild fish survey projects (6,489) (Table 4).

*Animal Unconscious, No Recovery* procedures were applied to 13,645 (or 4.73%) animals in 2017 (Table 2.3). This is a relatively small increase of 11.54% on 2016 figures. The procedure was used in 47 (or 23.62%) projects compared to 43 projects in 2016. The procedure was applied mainly in fish projects (9,031) with laboratory animals (3,268) the other major category involved (Table 4).

*Minor Physiological Challenge* was applied to 6,833 (or 2.37%) of animals in 2017 (Table 2.3), of which 93% were fish (Table 4). This is almost 3 times the number subjected to this procedure in 2016 (2,380 in total). Seventeen projects used this procedure in 2017 compared to 15 in 2016 (Figure 6).

*Minor Operative Procedures With Recovery* were applied to 2,861 animals in 2017 (Table 2.3), a substantial decline on the numbers reported in 2016 (12,953 animals). There were 18 projects overall using this procedure in 2017, (up from 14 in 2016 and 2015) involving a wide range of animals (Table 4). Over 87% of animals in this category were Atlantic salmon used in 5 projects addressing specific disease issues.

*Major Physiological Challenge* was applied to 1,653 animals (0.57%) in 10 projects in 2017 (Table 2.3). This was less than half the number of animals involved in 2016 (3,791 animals). As for 2016, the vast majority (6) of projects using this procedure were concerned with farmed fish disease prevention, accounting for 91% of animals. There were 377 mice subjected to this procedure in 2017, compared with 244 mice in 2016.

*Major Surgery With Recovery* procedures were applied to 392 animals in 2017 in 12 projects (Table 2.3); mainly to laboratory animals involving 377 mice. A single wild fish project involving 15 skate used this procedure. The total number of animals subjected to this procedure is over 22% less than that reported in 2016 (Figure 5).

*Death as the End Point* was used in a single continuing professional development training project for registered veterinarians involving 8 sheep. The objectives of the training included specific updates and practical application of euthanasia methodology as well as necropsy techniques thus satisfying the definition of the *Death as the end point* category. This is the first time in 6 years this procedure has been reported in Tasmanian projects.

The relatively low impact procedures of *Camera traps only*, *Observation with Minor Interference*, *Minor Conscious Procedures* and *Minor Physiological Challenge* were applied to 93.56% (or 269,827) animals in 2017.

### 3 Tables and figures

All summarised data is displayed in this section.

**Table I Summary of animal categories used by institutions in 2017**

Institution	Project number	Amphibia	Aquatic animals	Birds	Domestic mammals	Exotic feral mammals	Lab mammals	Native mammals	Reptiles	Total	% of all animals
ANU	3			98				42		140	0.05
Birdlife	2			1719						1719	0.60
CSU	2			25						25	0.01
CSIRO	6		1839							1839	0.64
Deakin	2	23		398						421	0.15
DPIPWE	15		1564	187	8	11		214		1984	0.69
Entura	1		6489							6489	2.25
FloatPac	1		94							94	0.03
FoMI	1			933						933	0.32
Freshwater	1		316							316	0.11
McIntyre	1			29						29	0.01
Monash	2			17989						17989	6.24
Murdoch	3		2	1	973			35		1011	0.35
Scibus	1				621					621	0.22
Treidlia	2				209					209	0.07
U Adelaide	2		13		1850					1863	0.65
U NSW	1							52		52	0.02
U Qld	2			212				12		224	0.08
U SC	1		1780							1780	0.62
U Syd	6				22			710		732	0.25
U Tas	143		121731	20754	1518	72607	11846	19765	1282	249503	86.52
VWVG	1			413						413	0.14
Total	199	23	133828	42758	5201	72618	11846	20830	1282	288386	100.00
% of categories	N/A	0.01	46.41	14.83	1.80	25.18	4.11	7.22	0.44	100.00	
2016 numbers	195	111	137092	57504	2255	581	20184	6940	1327	225994	
% Change	2.1	-79.3	-2.4	-25.6	130.6	12398.8	-41.3	200.1	-3.4	27.6	

**Table 2 Animal categories, purposes and procedures in 2017****2.1 Animal categories used in 2017**

Animal category	Animals per category	Projects per category	% Animals	% Projects (n= 199* )
Amphibia	23	1	0.01%	0.50%
Aquatic animals	133828	67	46.41%	33.67%
Birds	42758	48	14.83%	24.12%
Domestic mammals	5201	22	1.80%	11.06%
Exotic Feral animals	72618	13	25.18%	6.53%
Lab mammals	11846	66	4.11%	33.17%
Native mammals	20830	64	7.22%	32.16%
Reptiles	1282	15	0.44%	7.54%
<b>Total</b>	<b>288386</b>	<b>296*</b>	100.00%	

\*A project may use multiple animal categories.

**2.2 Research and teaching purposes used in 2017**

Purpose	Animals per purpose	Projects per purpose	% Animals	% Projects (n= 199* )
Education	8408	14	2.92%	7.04%
Environmental study	242497	69	84.09%	34.67%
Health & welfare	8331	41	2.89%	20.60%
Management & production	7519	29	2.61%	14.57%
Understanding biology	21631	125	7.50%	62.81%
<b>Total</b>	<b>288386</b>	<b>278*</b>	100.00%	

\*A project may use multiple purposes.

### 2.3 Research and teaching procedures used in 2017

Procedure	Animals per procedure	Projects per procedure	% Animals	% Projects (n= 199* )
Camera Traps only	93343	7	32.37%	3.52%
Observation with minor interference	150284	108	52.11%	54.27%
Minor conscious procedure	19367	58	6.72%	29.15%
Minor physiological challenge	6833	17	2.37%	8.54%
Minor operative procedure with recovery	2861	18	0.99%	9.05%
Major physiological challenge	1653	10	0.57%	5.03%
Major surgery with recovery	392	12	0.14%	6.03%
Animal unconscious no recovery	13645	47	4.73%	23.62%
Death as end point	8	1	0.00%	0.50%
<b>Total</b>	<b>288386</b>	<b>278*</b>	<b>100.00%</b>	

\*Projects may use several procedures except for *Camera Trap only*

**Table 3 Summary of animal types used by institutions in 2017**

Institution	ANU	Birdlife	CSU	CSIRO	Deakin	DPIPWE	Entura	FloatPac	FoMI	Freshwater	McIntyre
<b>Amphibians</b>											
Native wild					23						
<b>Aquatic animals</b>											
Cephalopods											
Fish				1839		1564	6489	94		316	
Other Aqs											
<b>Birds</b>											
Exotic wild	4										
Native wild	94	1719	25		398	187			933		29
Other birds											
Poultry											
<b>Domestic mammals</b>											
Cats											
Cattle											
Dogs											
Horses											
Sheep						8					
<b>Exotic Feral mammals</b>											
Cats						11					
Mice											
Rabbits											
<b>Lab mammals</b>											
Mice											
Rats											
<b>Native mammals</b>											
Cetaceans						1					
Echidna											
Macropods											
Native Rats and Mice											
Other native mammals	3										
Platypus											
Possums and gliders	7										
Quolls	32					26					
Seals											
Tas Devils						187					
Wombats											
<b>Reptiles</b>											
Lizards											
Other Reptiles											
<b>Total</b>	<b>140</b>	<b>1719</b>	<b>25</b>	<b>1839</b>	<b>421</b>	<b>1984</b>	<b>6489</b>	<b>94</b>	<b>933</b>	<b>316</b>	<b>29</b>

**Table 3 Summary of animal types used by institutions in 2017 continued**

Institution	Monash	Murdoch	Scibus	Treidlia	U Adel- aide	U NSW	U Qld	U SC	U Syd	U Tas	VWSG
<b>Amphibians</b>											
Native wild											
<b>Aquatic animals</b>											
Cephalopods										1564	
Fish		2			13			1780		105167	
Other Aqs										15000	
<b>Birds</b>											
Exotic wild										123	
Native wild	17989	1					212			15555	413
Other birds										4678	
Poultry										398	
<b>Domestic mammals</b>											
Cats									5		
Cattle		620	621		1850					881	
Dogs		353							17	7	
Horses										600	
Sheep				209						30	
<b>Exotic Feral mammals</b>											
Cats										70737	
Mice										1853	
Rabbits										17	
<b>Lab mammals</b>											
Mice										11149	
Rats										697	
<b>Native mammals</b>											
Cetaceans										338	
Echidna										13	
Macropods										7636	
Native Rats and Mice										212	
Other native mammals							12			401	
Platypus		35									
Possums and gliders										6377	
Quolls									81	2574	
Seals										349	
Tas Devils						52			629	1324	
Wombats										541	
<b>Reptiles</b>											
Lizards										954	
Other Reptiles										328	
<b>Total</b>	<b>17989</b>	<b>1011</b>	<b>621</b>	<b>209</b>	<b>1863</b>	<b>52</b>	<b>224</b>	<b>1780</b>	<b>732</b>	<b>249503</b>	<b>413</b>

**Table 4 Purposes and procedures used for animal types in 2017**

Purpose	Amphibians	Aquatic animals			Birds			
	Native wild	Cephalopods	Fish	Other Aqs	Exotic wild	Native wild	Other Birds	Poultry
Education			5769			313		
Environmental study		20	94859	15000	4	34783	4678	
Health & welfare			6076			41		
Management & production	23		5047			167		
Understanding biology		1544	5513		123	2251		398
<b>Procedure</b>								
Camera Traps only			2000			1768		
Observation with minor interference	23	20	87930	15000	123	34654	4678	398
Minor conscious procedure			7929		4	1133		
Minor physiological challenge		207	6350					
Minor operative procedure with recovery			2502					
Major physiological challenge			1507					
Major surgery with recovery			15					
Animal unconscious no recovery		1337	9031					
Death as End Point								

**Table 4 Purposes and procedures used for animal types in 2017 continued**

Purpose	Domestic mammals					Exotic Feral Mammals			Lab mammals	
	Cats	Cattle	Dogs	Horses	Sheep	Cats	Mice	Rabbits	Mice	Rats
	Education		1900							
Environmental study				600		70625	1853	13		
Health & welfare	5	10	370		209				1346	174
Management & production		2032	7		30	120		4	6	
Understanding biology		30			8	3			9797	478
<b>Procedure</b>										
Camera Traps only						70572	1853	13		
Observation with minor interference		3223	7	600	30	140			47	17
Minor conscious procedure	5	620	370		209	33		4	7548	95
Minor physiological challenge		129							112	
Minor operative procedure with recovery						3			142	94
Major physiological challenge									146	
Major surgery with recovery									377	
Animal unconscious no recovery									2777	491
Death as End Point					8					

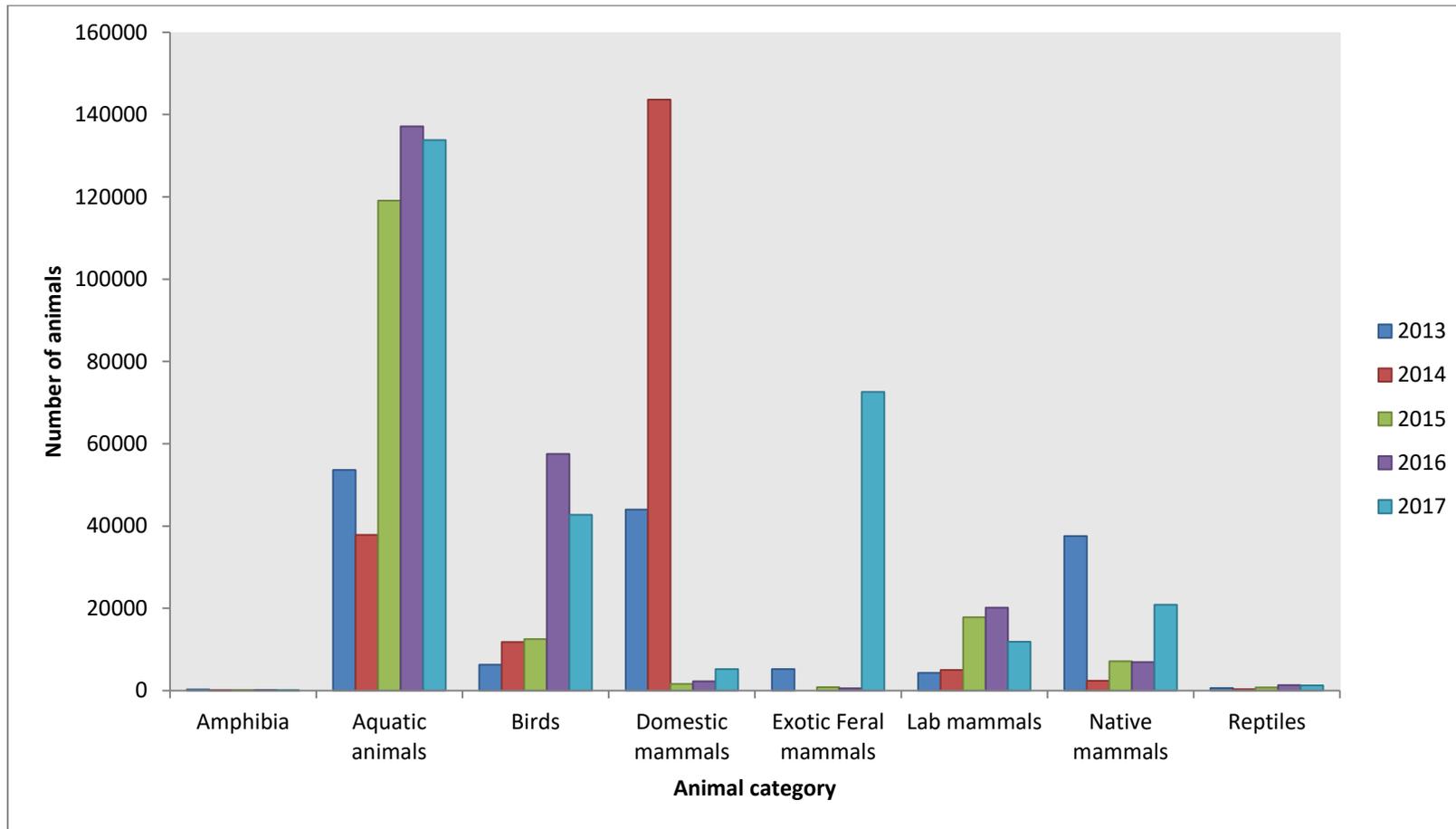
**Table 4 Purposes and procedures used for animal types in 2017 continued**

Purpose	Native mammals						
	Cetaceans	Echidnas	Macropods	Native Rats and Mice	Other native mammals	Platypus	Possoms and gliders
Education	66		1	17			12
Environmental study	267	13	7635	195	400		6372
Health & welfare	1				12	35	
Management & production					4		
Understanding biology	5						
Procedure							
Camera Traps only			6857	195	397		6305
Observation with minor interference	338	5	779	17	15	15	72
Minor conscious procedure	1	8			4	10	7
Minor physiological challenge							
Minor operative procedure with recovery						10	
Major physiological challenge							
Major surgery with recovery							
Animal unconscious no recovery							
Death as End Point							

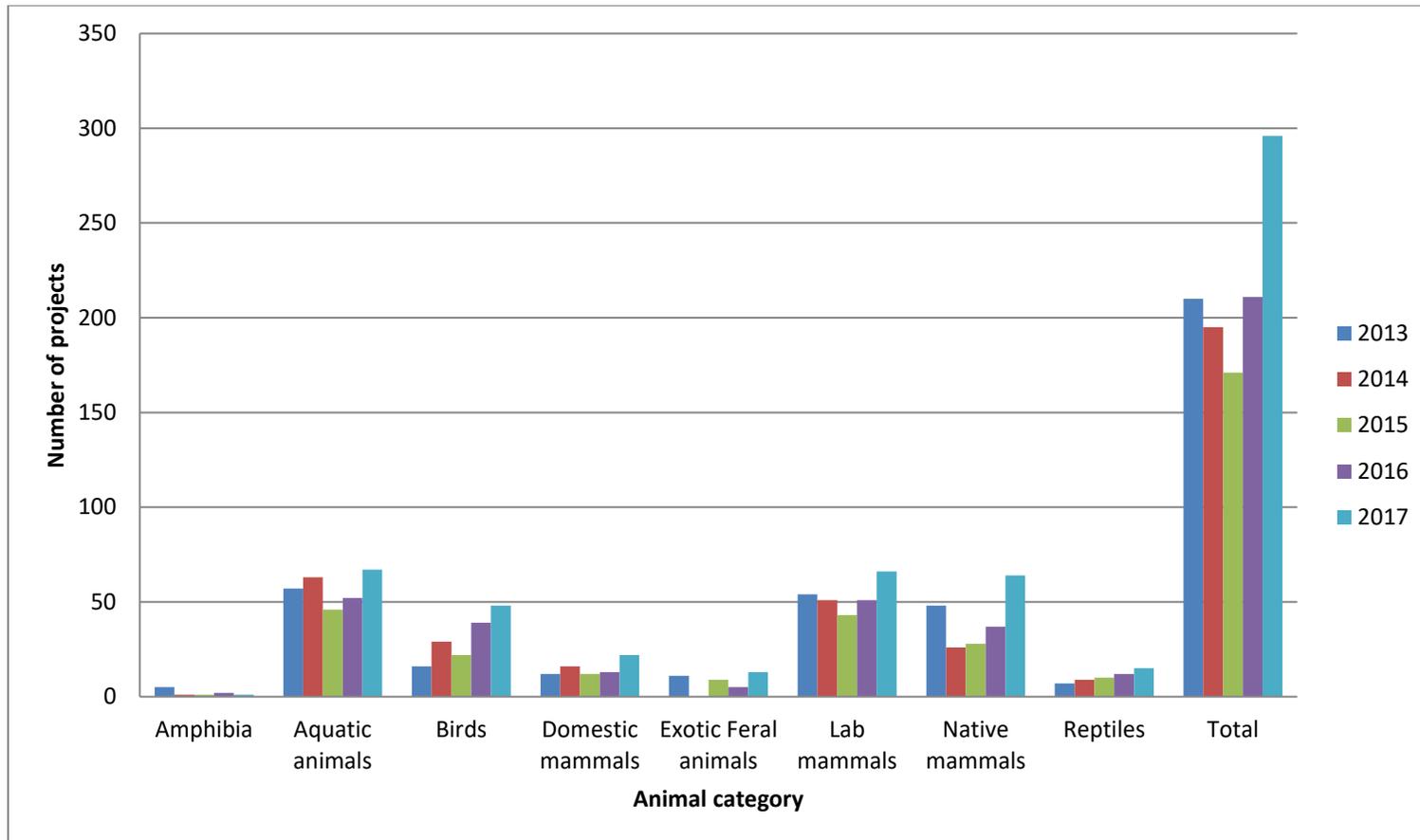
**Table 4 Purposes and procedures used for animal types in 2017 continued**

Purpose	Native animals continued				Reptiles	
	Quolls	Seals	Tas Devils	Wombats	Lizards	Other Reptiles
Education		225				60
Environmental study	2673	53	1920	531		3
Health & welfare			52			
Management & production			79			
Understanding biology	40	71	141	10	954	265
<b>Procedure</b>						
Camera Traps only	2491	5	767	120		
Observation with minor interference	83	298	69	421	954	328
Minor conscious procedure	139	28	1220			
Minor physiological challenge			35			
Minor operative procedure with recovery		18	92			
Major physiological challenge						
Major surgery with recovery						
Animal unconscious no recovery			9			
Death as End Point						

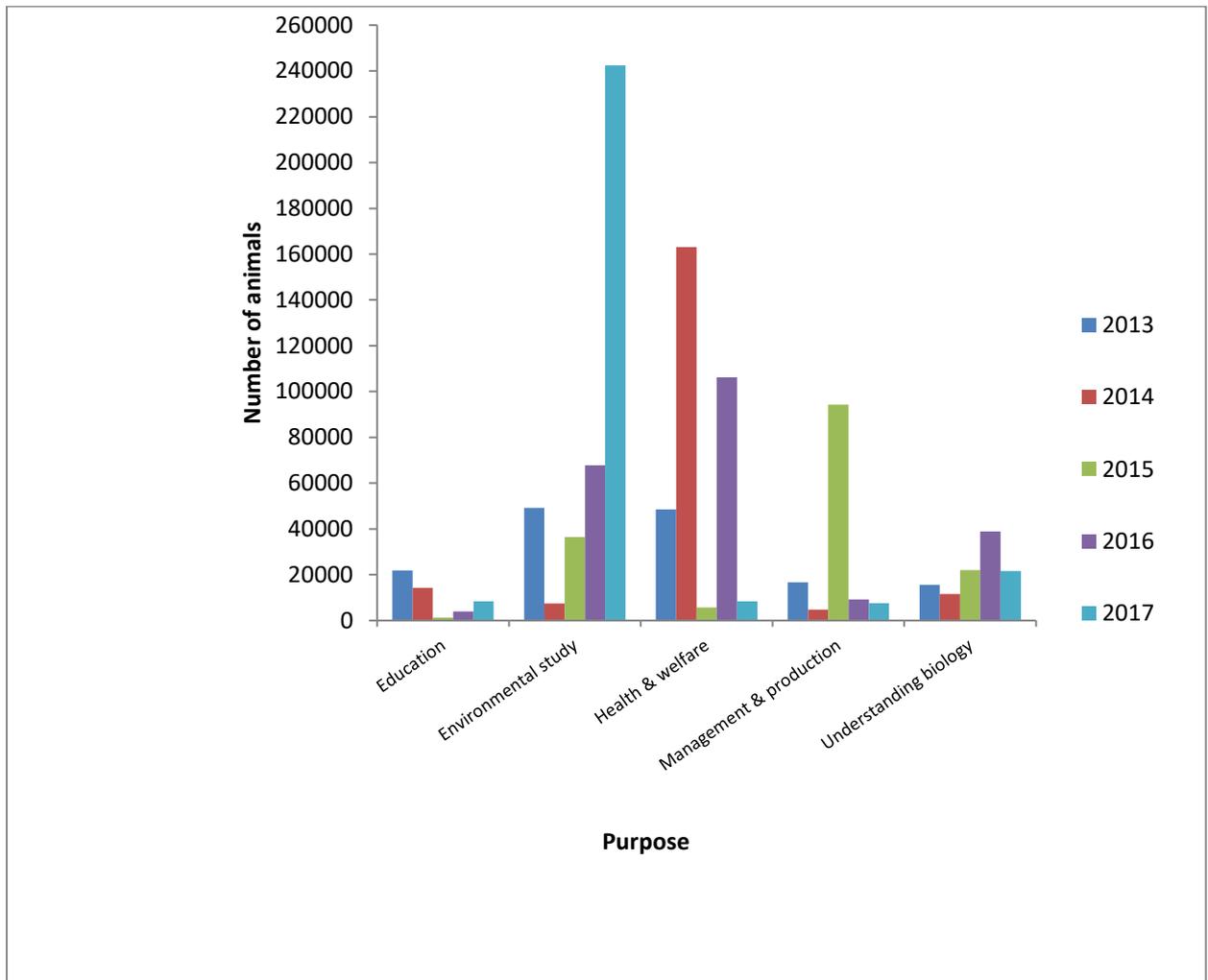
**Figure I Animal categories used between 2013 and 2017**



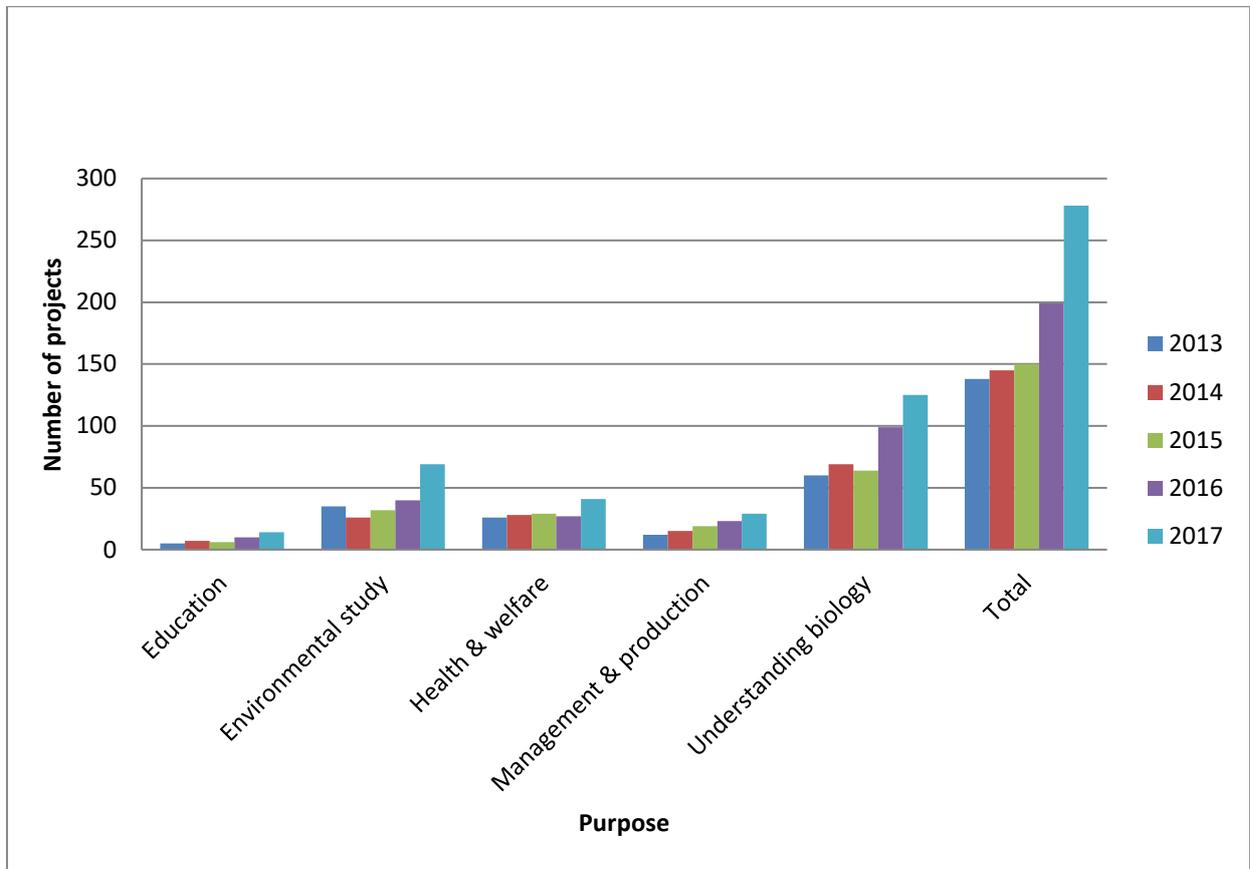
**Figure 2 Projects per animal category between 2013 and 2017**



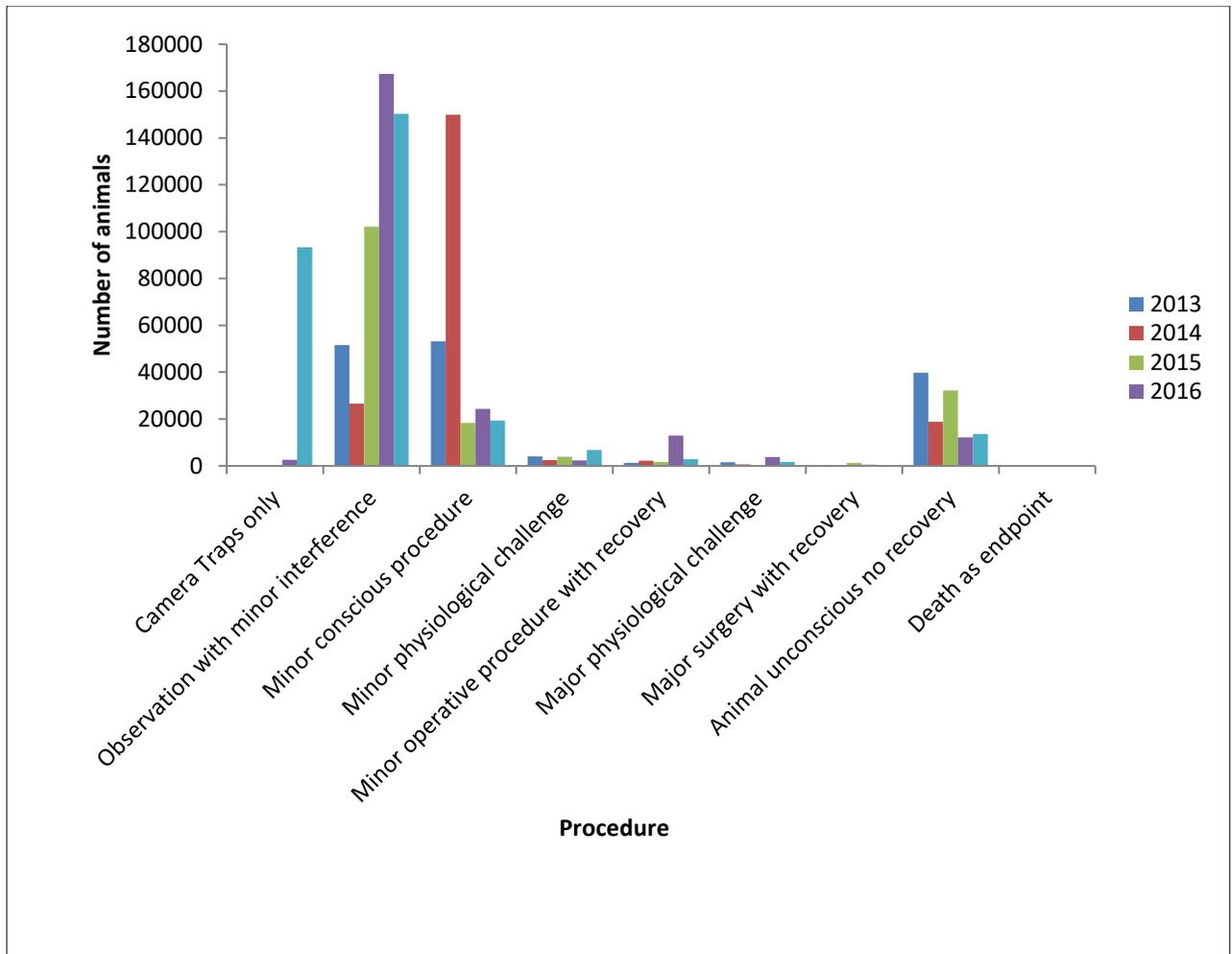
**Figure 3 Purposes for which animals were used between 2013 and 2017**



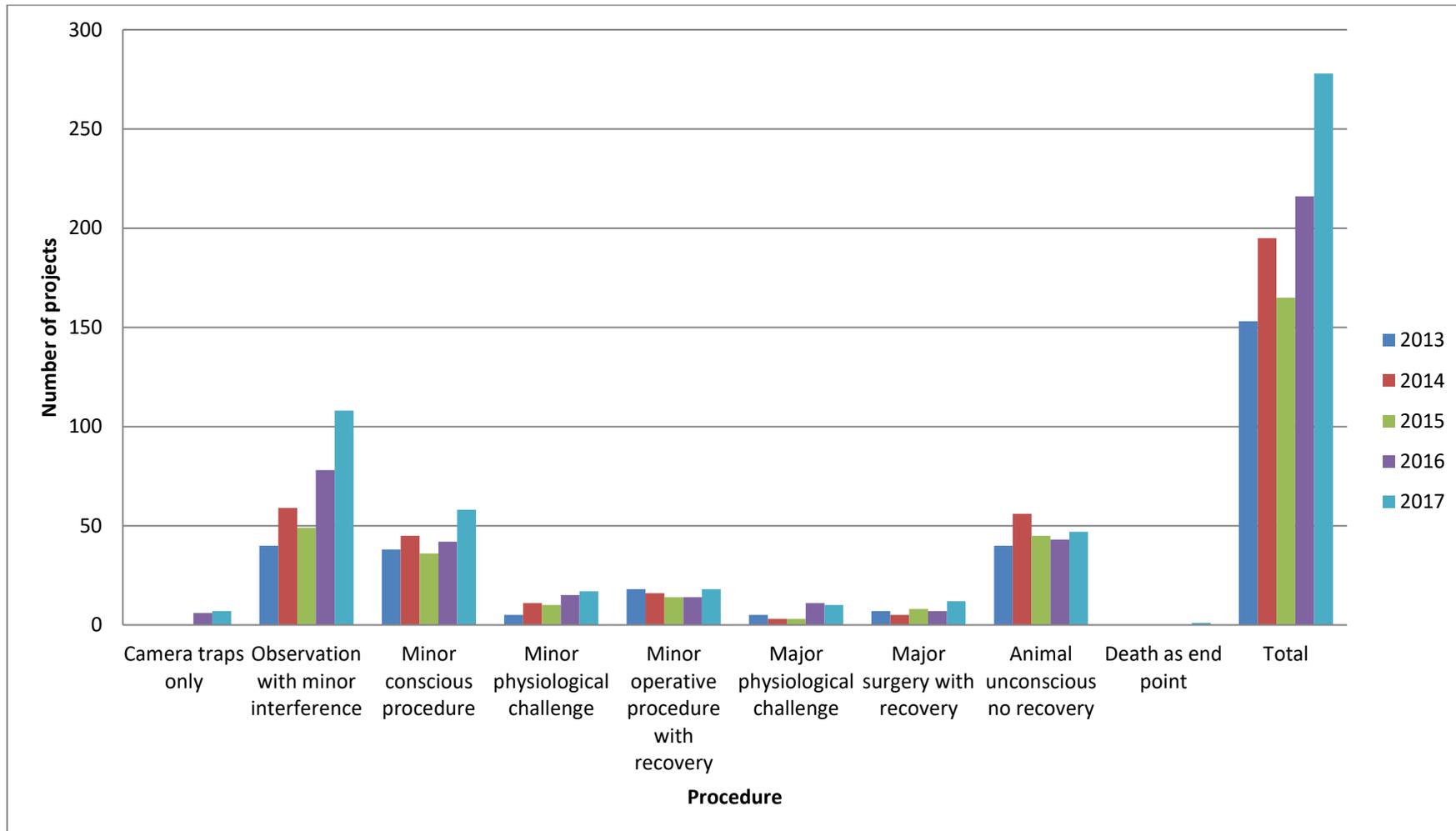
**Figure 4 Projects per purposes between 2013 and 2017**



**Figure 5 Procedures used between 2013 and 2017**



**Figure 6 Projects per procedures used between 2013 and 2017**



## **ABBREVIATIONS**

AEC	Animal Ethics Committee
ANU	Australian National University
Biosis	Biosis Pty Ltd
Birdlife	Birdlife Tasmania
CRG	Code Reference Group (NHMRC)
CSU	Charles Sturt University
Deakin	Deakin University, Victoria
DPIPWE	Department of Primary Industries, Parks, Water and Environment
Entura	Entura (Hydro Tasmania Group)
FloatPac	FloatPac Pty Ltd
FoMI	Friends of Maatsuyker Island
Freshwater	Freshwater Systems Pty Ltd
McIntyre	McIntyre, Nathan; Independent researcher
Monash	Monash University
Murdoch	Murdoch University
NHMRC	National Health and Medical Research Council
Treidlia	Treidlia Biovet Pty Ltd, New South Wales
Tassal	Tassal Operations Pty Ltd
UAdelaide	The University of Adelaide, South Australia
UNSW	The University of New South Wales
UQld	The University of Queensland
USC	The University of the Sunshine Coast
USyd	University of Sydney, New South Wales
UTas	University of Tasmania
VWSG	Victorian Wader Study Group Inc
3Rs	Replacement, Reduction and Refinement

End