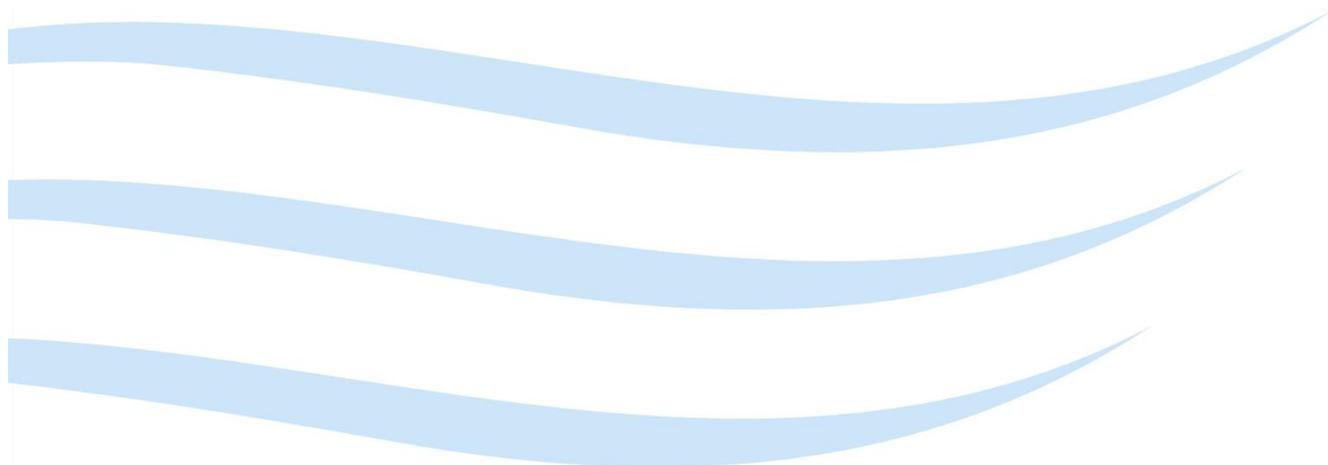


# Animal Research Statistics Tasmania

## Annual Report

Number 23 (2018)

**September 2019**



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 2018 to 31 December 2018.

Animal Research Statistics Tasmania Annual Report Number 23 (2018)

Animal Biosecurity and Welfare Branch

Biosecurity Tasmania

Department of Primary Industries, Parks, Water and Environment

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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 2018. 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 46 licensed institutions required to report, 26 used animals during the reporting period comprising 8 Tasmanian resident institutions and 18 interstate institutions.

A total of 216 individual projects were reported in 2018 which is a small increase of 17 projects (or 8.5%) on the previous year. Within those projects, 255,015 animals or sightings were reported, recording an 11% decline from the 288,386 reported in 2017. Fewer bird and exotic feral animals were reported in 2018 accounting for a large proportion of the reduction in total numbers.

There were 2 animal ethics committees (AECs) resident in Tasmania supervising projects within the Tasmanian jurisdiction during 2018 – 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 21 licensed external institutions. Ten of these external institutions reported animal use in 2018 in 18 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 for scientific purposes in Tasmania. UTas reported data from 140 projects representing 65% of projects reported. The number of animals reported by UTas decreased from 249,503 (or 83% of the annual total) in 2017 to 116,906 (or 46% of the annual total). The major contributor to the change in animal use for UTas was a dramatic decline in animals reported in exotic feral mammal projects. Such significant fluctuations in specific animal use from one year to the next is usual in a dynamic research context.

As for 2017, aquatic animals were the most numerous category reported in 2018 accounting for 72% (or 184,369) of animal use in 75 projects. The vast majority of aquatic animals were reported in a single project involving 106,486 fish. Despite an almost 43% reduction on 2017 numbers, birds were the second most numerous category reported in 2018 with 24,531 animals in 53 projects; mainly observational studies. A 16.8% increase in native mammals was reported, of which a large proportion were camera trap sightings.

Laboratory rodent use increased by over 45% during 2018 compared to 2017 with 17,204 being reported. Comparatively small numbers of domestic mammals, reptiles and amphibians were reported in 2018.

Management or production projects accounted for over half of animal use, however the highest number of projects were for Environmental purposes in 2018. This indicates the continued high level of interest in environmental projects noted in the 2017 report.

Over 86% of animals were subjected to relatively low impact procedures in 2018. Interestingly, minor physiological challenge procedures were applied to the largest number of animals. However, the previously mentioned large fish project accounted for most of that use despite there being 13 other projects also using those procedures.

Observation with minor interference procedures were applied in the majority of projects (116), in which 75,420 animals or sightings were recorded. The number of projects only using camera traps increased dramatically in 2018 from 7 to 23 although the number of sightings declined just as dramatically from 93,343 to 15,018.

There was an increase in the number of animals subjected to higher impact procedures in 2018, however no animals were subjected to procedures where death was an end point or deliberate measure.

## I Introduction

This report details animal use for research and teaching purposes in Tasmania from 1st January to 31st December 2018. 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 proclamation of the Act 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 Act 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 only 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 where **refinement** of techniques is used to 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 2018, 21 external institutions were approved to use the DPIPW's AEC services for project assessment and monitoring; of these institutions, 10 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 Act. 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) Permits for wildlife and fisheries*

Institutions intending to use wildlife, including native fish, for scientific purposes 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 animal use 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 licensees where they have no alternative means of reporting. Where these reports impact significantly on the data or interpretations presented in this report 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 DPIPWWE web site once they have been tabled in Parliament (<https://dPIPWE.tas.gov.au/biosecurity-tasmania/animal-biosecurity/animal-welfare/animal-research#Annualreportingofanimalusestatistics> ).

### **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 it is less likely a project 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 group 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. All life forms are included under the Act however.

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. It was 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 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.

Note some observational data collection has no conceivable impact on animals. For instance, the detection of bat species by recording echolocation calls or collection of scats in the wild environment. Where an institution identifies and reports such activity it is recorded against their name but no further reference is made in the report. An example appears in this report (see Section 2.1, Gray, Paul).

*Minor Conscious Procedure:* animal is subjected to minor procedures that would normally not require anaesthesia. Any pain is minor and analgesia is considered usually unnecessary although it may be applied eg mulesing; some distress may occur as a result of trapping or handling.

Examples of Minor Conscious Procedure:

- Tail tipping and toe clipping for identification of 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.
- Shearing and similar livestock management practices.

*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 expected to be considerable and requiring analgesia if possible.

Examples of Major Surgery with Recovery:

- Orthopaedic surgery.
- Abdominal or thoracic surgery.
- Transplant surgery.

*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 mammals 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 procedural group 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 2018**

### **2.1 Institutions**

There were 47 licensed institutions required to report animal use during 2018. They are listed below.

Australian National University (ANU), Australian Capital Territory  
 Bayview Bush Babies Inc, Tasmania (no animal use in 2018)  
 Biosis Pty Ltd (Biosis), Victoria (no animal use in 2018)  
 Birdlife Tasmania, (Birdlife), Tasmania  
 Bonorong Wildlife Sanctuary, Tasmania (no animal use in 2018)  
 Brett Lane and Associates, Victoria (no animal use in 2018)  
 Central Queensland University, Queensland (no animal use in 2018)  
 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 2018)  
 Entura (Hydro Tasmania Group), (Entura), Tasmania  
 Eurofins Agrisearch Pty Ltd, New South Wales (no animal use in 2018)  
 Federation University, Victoria (no animal use in 2018)  
 FloatPac Pty Ltd (FloatPac), Victoria  
 Freshwater Systems Pty Ltd, (Freshwater), Tasmania  
 Friends of Maatsuyker Island, (FoMI), Tasmania  
 GHD Pty Ltd (GHD), New South Wales  
 Gray, Paul, (Independent researcher), Tasmania (no animal use in 2018 apart from recording bat echolocation calls)  
 Huon Aquaculture Co Pty Ltd, (HAC), Tasmania (no animal use in 2018)  
 Jurox Pty Ltd, New South Wales (no animal use in 2018)  
 Macquarie University (MacqUni), New South Wales

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 2018)  
 Robertson, Dr Bruce Ingram, (Independent researcher), Victoria (no animal use in 2018)  
 Scibus, New South Wales  
 Sustainable Timber Tasmania, Tasmania (no animal use in 2018)  
 Tasmanian Irrigation Pty Ltd, Tasmania (no animal use in 2018)  
 TasNature (Peter Tonelli), Tasmania  
 Tassal Operations Pty Ltd (Tassal), Tasmania  
 Treidlia Biovet Pty Ltd, (Treidlia), New South Wales  
 University of Adelaide (UAdel), South Australia  
 University of Canberra, Australian Capital Territory (no animal use in 2018)  
 University of New England, New South Wales (no animal use in 2018)  
 University of New South Wales, New South Wales (no animal use in 2018)  
 University of Queensland (UQld), Queensland  
 University of South Australia (USA), South Australia  
 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 2018)  
 Victorian Wader Study Group Inc, (VWSG), Victoria  
 Virbac (Australia) Pty Ltd, Victoria (no animal use in 2018)

There were two AECs resident in Tasmania (DPIPWE and UTas) in 2018. While the Australian Antarctic Division's AEC is also resident in Tasmania, the Division was not licensed in Tasmania during 2018 as it was not conducting research within the Tasmanian jurisdiction.

Of the 47 licensed institutions, 26 reported animal use in Tasmania in 2018. This was 4 more than in 2017 and outside the usual range for the previous six years (18-24). There were 18 interstate and 8 Tasmanian resident institutions using animals in Tasmania during 2018.

The number and variety of institutions conducting animal research in Tasmania fluctuates according to academic and commercial interests for the period. Licensed institutions include the CSIRO, environmental consultants, corporate farmers, individuals or not-for-profit organisations as well as the conventional academic and government research entities.

The 8 Tasmanian resident institutions using animals in 2018 comprised 1 academic institution (UTas), 1 government, 3 commercial entities (not including CSIRO projects approved by the DPIPWE AEC) and 3 not-for-profit organisations. Interstate institutions using animals comprised 11 academic institutions, 5 commercial entities (including CSIRO), and 2 not-for-profit organisations. There were no overseas institutions active in the state during 2018.

Table 1 lists the institutions that used animals and the categories and numbers of animals involved, including a comparison with 2017 data. Table 3 provides detail on the types of animals used by each institution. In 2018, 255,015 animal 'uses' were reported (compared to 288,386 in 2017), within 216 projects (compared to 199 in 2017).

This represents a decline of over 11% in animal use over 2017 figures. The major contributors to the change were declines in the numbers of bird and exotic feral animals (see sections 2.2 and 2.4) reported.

Changes in the number of individual projects provides a rough guide to the level of activity an institution is engaged in or level of interest an animal category is attracting from one reporting period to the next. This 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). Care should be taken interpreting this data on an institutional basis as projects may be the result of a licensed institution contracting or otherwise collaborating with another licensee ('lead' institution) to provide the research service entirely or for some projects. The data is therefore reported by the 'lead' institution to avoid double counting and maintain commercial-in-confidence.

Historically, institutions that are particularly active in the aquatic animal space in Tasmania will have proportionately higher animal use numbers, and 2018 was typical in this regard.

UTas continued to be the most active institution in Tasmania during 2018 with 140 or 65% of all projects reported (Table 1) involving all animals categories except amphibians, and using 116,906 or 46% animals. However, this was a significant reduction in the number of animals used by UTas compared to the 249,503 or 83% reported in 2017. The other major contributor to the total number of animal uses reported in 2018 was a single fish project conducted by Tassal utilising 106,486 (or 42%) animals. DPIPW E reported on 15 projects which was the same number as for 2017.

Research by commercial entities mainly involved aquatic animals either in the farmed fish context or in ecological surveys of waterways for various development or monitoring purposes. In 2018, all reporting not-for-profit organisations were active in wild bird research.

Twelve academic institutions were active in Tasmania during 2018. Apart from UTas, academic institutions tended to have 1 to 5 projects, each targeting a small range of animal categories, with aquatic animals, birds and native mammals featuring most frequently.

The DPIPW E Divisions of Natural and Cultural Heritage and Biosecurity Tasmania reported 6 and 9 active projects respectively under the supervision of the DPIPW E AEC. A total of 2,398 animals or 1.13% of all animals reported in 2018 were used in DPIPW E projects addressing as in 2017, a wide variety of subjects from shy albatross conservation to the development of fish vaccines and feral cat control.

Of the 21 external licensees using the DPIPW E AEC in 2018, 10 reported animal use totalling 114,533 animals in 18 projects. Tassal used the largest number of animals for external licensees with 106,486 fish in a single project. Other commercial enterprises using the DPIPW E AEC (CSIRO, Entura, Freshwater, FloatPac and Treidlia) reported a total of 3,965 animals across 10 projects. All not-for-profit organisations reporting animal use in 2018 (Birdlife, FoMI, McIntyre, TasNature and VWSG) were supervised by the DPIPW E AEC and accounted for 4,082 animals in 7 projects.

Note that CSIRO uses both the DPIPW E AEC and its own interstate AECs. For simplicity, the tables in this report present combined figures for CSIRO. The interstate monitored CSIRO projects reported a total of 893 animals in 5 projects, and the DPIPW E AEC monitored projects reported 2000 animals also in 5 projects.

## **2.2 Animal categories**

Tables 1 and 2.1 summarise the number of animals and projects reported within animal categories for 2018; 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 72.3% or 184,369 animals used in 75 or 34.7% projects. This was a 37.8% increase in animals compared to 2017. A single salmonid project accounted for 106,486 (or 58%) of the aquatic animal total. The large number of projects using aquatic animals is expected in Tasmania, given the relative size of the salmonid aquaculture industry and importance of the wild

fishery. Both contexts involve the handling or at least observation of very large numbers of animals. Similar situations occur on occasion for broad scale wildlife and livestock projects.

A small number of cephalopods are reported annually. In 2018 1,731 were reported in 6 projects. All were concerned with improving the understanding of the role and adaptability of cephalopods in their environments. Crustaceans are not a reportable animal category, however 153 animals in 2 projects were reported in 2018. Both projects were associated with ecological assessments.

*Birds* accounted for 24,531 (or 9.6%) animals which is a 42.6% reduction from 2017 figures. Birds featured in 53 or 24.5 % of projects. The largest contributors were population surveys of seabirds totalling over 18,000 sightings by Birdlife, DPIPW, FoMI, Monash, UTas and VWSG.

*Native mammal* use increased 16.8% in 2018 with 24,327 (or 9.5%) uses compared to 20,830 (or 7.22%) in 2017 (Table 1). Despite the number of projects declining to 53 (from 63 in 2017) the level of interest in native mammals is still relatively high compared to previous years (Figure 2). UTas projects accounted for 23,449 animals of which Camera trap sightings accounted for 14,023 of the native mammals reported.

*Laboratory mammal* use involved 17,204 (or 6.75%) animals (mice and rats) in biomedical research in 2018. This was a 45.23% increase on 2017 figures (Table 1). There were 66 projects using laboratory mammals (or 30.6% of all projects) reflecting continued interest in the area (Figure 2) in Tasmania. The number of animals used in establishing and maintaining breeding colonies (3,026) was about 40% of those used for the same purpose in 2017 (7,573). The number of animals maintained in breeding colonies fluctuates with specific project requirements and is therefore highly unpredictable.

*Domestic mammal* use remained comparatively low in 2018 with 2,707 head (or 1.06%) (Table 1) used in 28 projects. The vast majority were reported by UTas in observational livestock management projects, aimed, for instance, at grazing behaviour or breeding success of terrestrial livestock species.

*Reptile* use in 2018 involved 1,467 animals in 17 projects. This is similar to 2017 figures (1,282 reptiles in 15 projects). UTas projects involving various species of skinks were the main contributors to this category (1,451).

*Exotic feral mammal* use declined sharply from 72,618 in 2017 to 321 in 2018. Of these, 213 were camera trap sightings.

*Amphibian* use in 2018 involved 89 frogs in 2 projects (Table 1). One project was an ecological survey, the other involved developing forestry practices that support threatened frog populations.

### 2.3 Purposes

Table 2.2 summarises the research and teaching purposes for which animals were used during 2018. 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.

*Management and production* research accounted for almost half of all animals reported in 2018, with a total of 125,061 animals used in 20 projects, compared to 7,519 in 2017 in 29 projects (Table 2.2 and Figures 3 and 4). The vast majority of animals used for this purpose were farmed salmonids (123,338), followed by cattle (1,465).

*Environmental studies* used 71,054 animals (or 27.86%) in 96 projects; less than a third of that reported in 2017 (242,497 animals or 84.09% of total use in 69 projects) (Table 2.2 and Figure 4). While fish and native wild birds were the largest contributors to this purpose, most animal categories were represented.

*Understanding biology* projects used 39,883 animals in 117 projects in 2018 compared to 21,631 animals, and 125 projects in 2017. The allocation of more fish and laboratory mammals to this area of research accounted for the increase.

*Education* projects used a similar number of animals in 2018 (9,699) to that used in 2017 (8,408). There were 21 projects with education as a purpose compared to only 14 in 2017. 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 educational projects over the past 5 years with varying numbers of animals used within those projects (Figures 3 and 4).

*Health and welfare* studies also reported a similar level of animal use in 2018 (9,318) to that used in 2017 (8,331) (Table 2.2 and Figure 3). However, the number of projects conducted for this purpose continued to increase - to 50 compared to 41 in 2017 (Table 2.2 and Figure 4). The vast majority of projects and animals used in this area were fish and laboratory mice and rats aimed at improving salmonid or human health and welfare respectively.

## **2.4 Procedures**

Table 2.3 summarises the procedures used on animals during 2018. 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; procedures are listed in the tables in ascending order of welfare impact.

*Minor Physiological Challenge* was applied to 109,188 animals (or 42.82%) in 2018 (Table 2.3), of which 98% were fish (Table 4). A single field project was responsible for most of the fish and the overall large number of animals subjected to this procedure compared to previous years (Figure 5). Fourteen projects used this procedure in 2018 compared to 17 in 2017 (Figure 6).

*Observation with Minor Interference* procedures were applied to 75,420 animals in 116 projects in 2018 (Table 2.3). This represents half of the animals reported against these procedures in 2017 (150,284), although in a similar number of projects (108). As for previous years, fish and bird surveys were the main users of observational procedures in 2018, with 41,649 fish and 21,898 native wild birds contributing 84% of the total observational use reported (Table 4).

*Minor Conscious Procedures* were applied to 21,745 (or 8.53%) animals across 55 projects (Table 2.3) in 2018, which were reasonably similar to 2017 figures. These procedures were applied mainly to laboratory mammals (12,276), of which 3,026 were part of breeding projects, and aquatic animals (5,278) of which an invasive fish project accounted for 3,331 (Table 4). Minor conscious procedures were also applied in projects addressing population monitoring (eg via bird banding and telemetry), domestic and wild animal disease and genetic surveillance, and habitat use.

*Animal Unconscious, No Recovery* procedures were applied to 16,985 (or 6.66%) animals in 2018 (Table 2.3). This was a 24% increase on the 2017 use of these procedures (13,645 or 4.73%). The procedures were used in a similar number of projects (48 compared to 47 in 2017). These procedures were applied mainly to fish (12,778) and laboratory mammals (3,932) (Table 4) as has been the case for several years. With regard to aquatic animals, these procedures were applied in wild fisheries and aquaculture educational projects utilising shore-based sampling and commercial vessels and techniques. The large representation of laboratory mammals is consistent with the invasive nature of some biomedical research where recovery is not in the interests of the animal.

*Camera Traps Only* use increased dramatically during 2018 with 23 projects reported compared to only 7 projects in 2017. However, the number of sightings diminished, with 15,018 reported in 2018, which was only 16% of that reported in 2017 (93,343 sightings) (Table 2.3). The projects utilising this procedure exclusively were all environmental in nature. The vast majority of sightings were of native mammals (14,023) of which 12,622 were macropods (Table 4).

*Minor Operative Procedures With Recovery* were applied to 12,974 animals in 2018 (Table 2.3), a substantial increase on 2017 figures (2,861) and back to similar levels seen in 2016. There was also a large increase in the number of projects, with 27 utilising the procedures compared to 18 projects in 2017. These procedures are generally applied to a wide range of animals (Table 4) as they include anaesthesia with recovery – a common procedure for restraining wild mammals, fish and birds. Despite this however, in 2018 over 94% of

animals subjected to these procedures were Atlantic salmon used in 10 projects addressing specific disease issues.

*Major Physiological Challenge* was applied to 3,359 animals (1.32%) in 7 projects in 2018 (Table 2.3). This was almost double the number subjected to these procedures in 2017 (1,653 animals in 10 projects). As for previous years the vast majority (6 in 2018) of projects using these procedures were concerned with farmed salmonid disease prevention, accounting for 3,290 or 98% of animals reported. There were 69 mice subjected to these procedures in 2018, compared with 377 in 2017. The project involved aimed to improve the understanding of anti-inflammatory mechanisms in treating pneumonia in mice and other mammals.

*Major Surgery With Recovery* procedures were applied to 326 animals in 2018 in 14 projects. This is very similar to 2017 figures (392 animals in 12 projects) (Table 2.3). As for the previous year, the majority of animals subjected to these procedures were mice (291 or 89%) involved in neuropathology research. A single wild fish project involving 35 Maugean skates also utilising these procedures.

*Death as the End Point* procedures were not utilised during 2018. These procedures are rarely used in Tasmania.

The relatively low impact procedures of *Camera traps only*, *Observation with Minor Interference*, *Minor Conscious Procedures* and *Minor Physiological Challenge* were applied to 86.81% (or 221,371) animals in 2018.

### 3 Tables and figures

All summarised data is displayed in this section.

**Table I Summary of animal categories used by institutions in 2018**

Institution	Project number	Amphibia	Aquatic animals	Birds	Domestic mammals	Exotic feral mammals	Lab mammals	Native mammals	Reptiles	Total	% of all animals
ANU	5			591				103		694	0.27
Birdlife	2			2544						2544	1.00
CSIRO	10		2893							2893	1.13
CSU	1			6						6	0.00
Deakin	5	84	2194	402						2680	1.05
DPIPWE	15		1901	415		7		75		2398	0.94
Entura	1		1298							1298	0.51
FloatPac	1		94							94	0.04
FoMI	2			1010						1010	0.40
Freshwater	1		318							318	0.12
GHD	12	5	171	190		1		8	1	376	0.15
Macquarie	1		13							13	0.01
McIntyre	1			29						29	0.01
Monash	1			2789						2789	1.09
Murdoch	1		7	2				16		25	0.01
TasNature	1			6						6	0.00
Tassal	1		106486							106486	41.76
Treidlia	2				255					255	0.10
U Adel	3				30				15	45	0.02
U Qld	2			2642		100		50		2792	1.09
U SA	1				3					3	0.00
U SC	1		9974							9974	3.91
U Syd	4				61			626		687	0.27
UTas	140		59020	13412	2157	213	17204	23449	1451	116906	45.84
Virbac	1				201					201	0.08
VWSG	1			493						493	0.19
<b>Total</b>	<b>216</b>	<b>89</b>	<b>184369</b>	<b>24531</b>	<b>2707</b>	<b>321</b>	<b>17204</b>	<b>24327</b>	<b>1467</b>	<b>255015</b>	<b>100.00</b>
% of categories	N/A	0.03	72.30	9.62	1.06	0.13	6.75	9.54	0.58	100	
2017 numbers	199	23	133828	42758	5201	72618	11846	20830	1282	288386	
% Change	8.5	286.96	37.77	-42.63	-47.95	-99.56	45.23	16.79	14.43	-11.57	

**Table 2 Animal categories, purposes and procedures in 2018****2.1 Animal categories used in 2018**

Animal category	Animals per category	Projects per category	% Animals	% Projects (n= 216)
Amphibia	89	5	0.03%	2.31%
Aquatic animals	184369	75	72.30%	34.72%
Birds	24531	53	9.62%	24.54%
Domestic mammals	2707	28	1.06%	12.96%
Exotic Feral animals	321	7	0.13%	3.24%
Lab mammals	17204	66	6.75%	30.56%
Native mammals	24327	53	9.54%	24.54%
Reptiles	1467	17	0.58%	7.87%
<b>Total</b>	<b>255015</b>	<b>304*</b>	<b>100.00%</b>	

\*A project may use multiple animal categories.

**2.2 Research and teaching purposes used in 2018**

Purpose	Animals per purpose	Projects per purpose	% Animals	% Projects (n= 216)
Education	9699	21	3.80%	9.72%
Environmental study	71054	96	27.86%	44.44%
Health & welfare	9318	50	3.65%	23.15%
Management & production	125061	20	49.04%	9.26%
Understanding biology	39883	117	15.64%	54.17%
<b>Total</b>	<b>255015</b>	<b>304*</b>	<b>100.00%</b>	

\*A project may use multiple purposes.

### 2.3 Research and teaching procedures used in 2018

Procedure	Animals per procedure	Projects per procedure	% Animals	% Projects (n= 216)
Camera Traps only	15018	23	5.89%	10.65%
Observation with minor interference	75420	116	29.57%	53.70%
Minor conscious procedure	21745	55	8.53%	25.46%
Minor physiological challenge	109188	14	42.82%	6.48%
Minor operative procedure with recovery	12974	27	5.09%	12.50%
Major physiological challenge	3359	7	1.32%	3.24%
Major surgery with recovery	326	14	0.13%	6.48%
Animal unconscious no recovery	16985	48	6.66%	22.22%
Death as end point	0	0	0.00%	0.00%
<b>Total</b>	<b>255015</b>	<b>304</b>	<b>100.00%</b>	

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

**Table 3 Summary of animal types used by institutions in 2018**

Institution	ANU	Birdlife	CSIRO	CSU	Deakin	DPIPWE	Entura	FloatPac	FoMI	Fresh-water
<b>Amphibia</b>										
Amphibians					84					
<b>Aquatic Animals</b>										
Cephalopods			6							
Crustaceans										
Fish			2887		2194	1901	1298	94		318
Other Aqs										
<b>Birds</b>										
Exotic wild										
Native non-endemic										
Native wild	352	2544		6	402	415			1010	
Other birds	239									
<b>Domestic Mammals</b>										
Cats										
Cattle										
Deer										
Dogs										
Horses										
Sheep										
<b>Exotic Feral Mammals</b>										
Cats						7				
Mice										
Rabbits										
Rats										
<b>Lab Mammals</b>										
Mice										
Rats										
<b>Native Mammals</b>										
Bats										
Cetaceans						7				
Echidnas										
Macropods										
Native Rats and Mice										
Other Native Animal										
Platypus										
Possums and Gliders	15									
Quoll	88									
Seals										
Tasmanian Devils						68				
Wombats										
<b>Reptiles</b>										
Lizards										
Other Reptiles										
Snakes										
<b>Total</b>	<b>694</b>	<b>2544</b>	<b>2893</b>	<b>6</b>	<b>2680</b>	<b>2398</b>	<b>1298</b>	<b>94</b>	<b>1010</b>	<b>318</b>

**Table 3 Summary of animal types used by institutions in 2018 continued**

Institution	GHD	Mac-quarie	McIntyre	Monash	Murdoch	Tas-Nature	Tassal	Treidlia	U Adel	U Qld
<b>Amphibia</b>										
Amphibians	5									
<b>Aquatic Animals</b>										
Cephalopods										
Crustaceans	151				2					
Fish	11	13			5		106486			
Other Aqs	9									
<b>Birds</b>										
Exotic wild	4									
Native non-endemic										
Native wild	186		29	2789	2	6				2642
Other birds										
<b>Domestic Mammals</b>										
Cats										
Cattle										
Deer										
Dogs										
Horses									30	
Sheep								255		
<b>Exotic Feral Mammals</b>										
Cats	1									
Mice										50
Rabbits										
Rats										50
<b>Lab Mammals</b>										
Mice										
Rats										
<b>Native Mammals</b>										
Bats										
Cetaceans										
Echidnas	1									
Macropods	1									
Native Rats and Mice										50
Other Native Animal										
Platypus	1				16					
Possums and Gliders										
Quoll										
Seals										
Tasmanian Devils	5									
Wombats										
<b>Reptiles</b>										
Lizards										
Other Reptiles										
Snakes	1								15	
<b>Total</b>	<b>376</b>	<b>13</b>	<b>29</b>	<b>2789</b>	<b>25</b>	<b>6</b>	<b>106486</b>	<b>255</b>	<b>45</b>	<b>2792</b>

**Table 3 Summary of animal types used by institutions in 2018 continued**

<b>Institution</b>	U SA	U SC	UTas	Virbac	VWSG
<b>Amphibia</b>					
Amphibians					
<b>Aquatic Animals</b>					
Cephalopods			1725		
Crustaceans					
Fish		9974	57295		
Other Aqs					
<b>Birds</b>					
Exotic wild			41		
Native non-endemic			20		
Native wild			13351		493
Other birds					
<b>Domestic Mammals</b>					
Cats	3				
Cattle			1445	201	
Deer			160		
Dogs					
Horses					
Sheep			552		
<b>Exotic Feral Mammals</b>					
Cats			6		
Mice					
Rabbits			207		
Rats					
<b>Lab Mammals</b>					
Mice			15701		
Rats			1503		
<b>Native Mammals</b>					
Bats			20		
Cetaceans			29		
Echidnas			191		
Macropods			15178		
Native Rats and Mice			833		
Other Native Animal			506		
Platypus			1		
Possums and Gliders			3334		
Quoll			2207		
Seals			185		
Tasmanian Devils			938		
Wombats			27		
<b>Reptiles</b>					
Lizards			1410		
Other Reptiles			41		
Snakes					
<b>Total</b>	<b>3</b>	<b>9974</b>	<b>116906</b>	<b>201</b>	<b>493</b>

**Table 4 Purposes and procedures used for animal types in 2018**

Purpose	Amphibians	Aquatic animals				Birds	
	Amphibians	Cephalopods	Crustaceans	Fish	Other Aqs	Exotic wild	Native wild
Education				8493			522
Environmental study	89	26	151	25496	9	14	21037
Health & welfare			2	6377			297
Management & production				123338			172
Understanding biology		1705		18772		31	2458
<b>Procedure</b>							
Camera traps only						10	289
Observation with minor interference	63	33		41649		35	21898
Minor conscious procedure	26		153	5116	9		2267
Minor physiological challenge		1465		107383			
Minor operative procedure with recovery				12225			32
Major physiological challenge				3290			
Major surgery with recovery				35			
Animal unconscious no recovery		233		12778			
Death as End Point	0	0	0	0	0	0	0

**Table 4 Purposes and procedures used for animal types in 2018 continued**

	Domestic mammals						Exotic Feral Mammals			
	Cats	Cattle	Deer	Dogs	Horses	Sheep	Cats	Mice	Rabbits	Rats
<b>Purpose</b>										
Education		65				210				
Environmental study		41	160			282	7	50	207	50
Health & welfare	57			4	30	255				
Management & production	3	1465				60				
Understanding biology		75					7			
<b>Procedure</b>										
Camera traps only		41	160			282	6		207	
Observation with minor interference	3	1329		4		270	1	50		50
Minor conscious procedure	57	201			30	255				
Minor physiological challenge		75								
Minor operative procedure with recovery							7			
Major physiological challenge										
Major surgery with recovery										
Animal unconscious no recovery										
Death as End Point	0	0	0	0	0	0	0	0	0	0

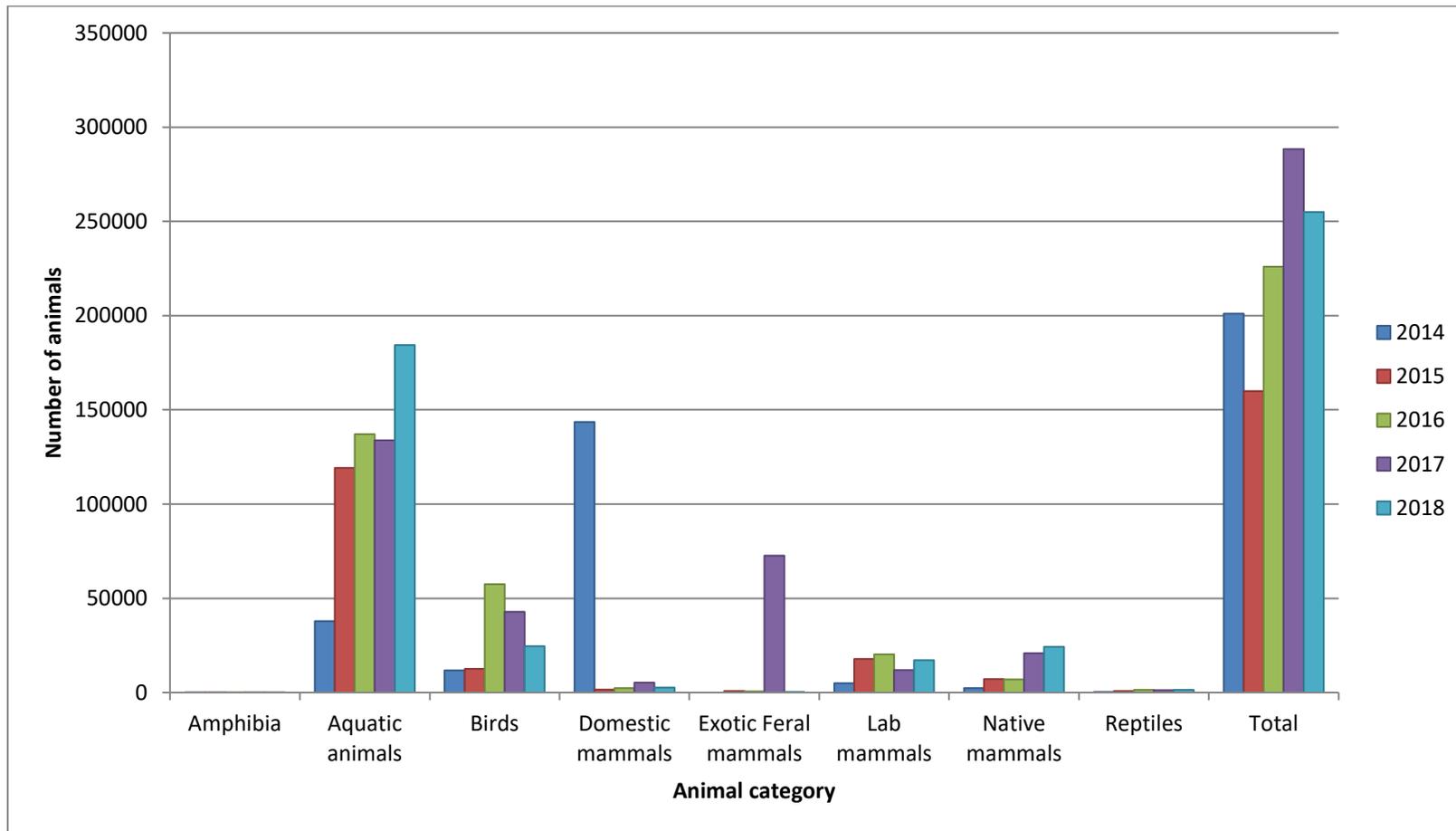
**Table 4 Purposes and procedures used for animal types in 2018 continued**

Purpose	Lab mammals		Native mammals					
	Mice	Rats	Cetaceans	Echidnas	Macropods	Native Rats and Mice	Other native mammals	Platypus
Education	212	32			1	12		
Environmental study				192	15073	871	526	2
Health & welfare	1975	296	7					16
Management & production								
Understanding biology	13514	1175	29		105			
<b>Procedure</b>								
Camera traps only					12622	7	425	1
Observation with minor interference	107		29	192	2557	866	101	1
Minor conscious procedure	11399	877	7			10		
Minor physiological challenge	91	76						
Minor operative procedure with recovery	230	132						16
Major physiological challenge	69							
Major surgery with recovery	291							
Animal unconscious no recovery	3514	418						
Death as End Point	0	0	0	0	0	0	0	0

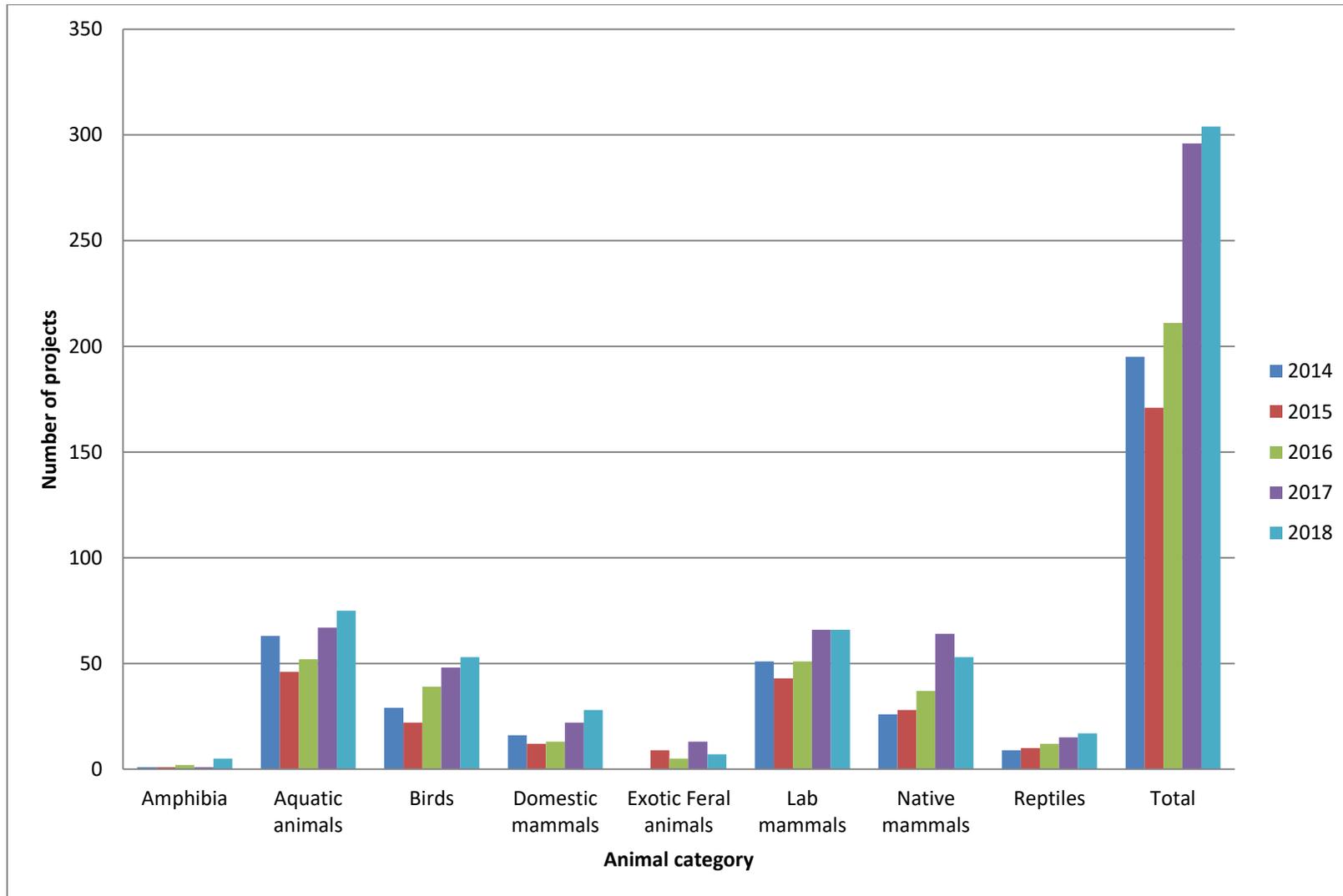
**Table 4 Purposes and procedures used for animal types in 2018 continued**

Purpose	Native mammals continued					Reptiles		
	Possums and gliders	Quolls	Seals	Tas Devils	Wombats	Lizards	Other Reptiles	Snakes
Education	11		141					
Environmental study	3338	2210	2	1174	20	26		1
Health & welfare				2				
Management & production		23						
Understanding biology		125	42	398	7	1384	41	15
<b>Procedure</b>								
Camera traps only	927	21			20			
Observation with minor interference	2407	2251	149	163		1170	41	1
Minor conscious procedure	15	86		1237				
Minor physiological challenge						89		9
Minor operative procedure with recovery			36	163	7	120		6
Major physiological challenge								
Major surgery with recovery								
Animal unconscious no recovery				11		31		
Death as End Point	0	0	0	0	0	0	0	0

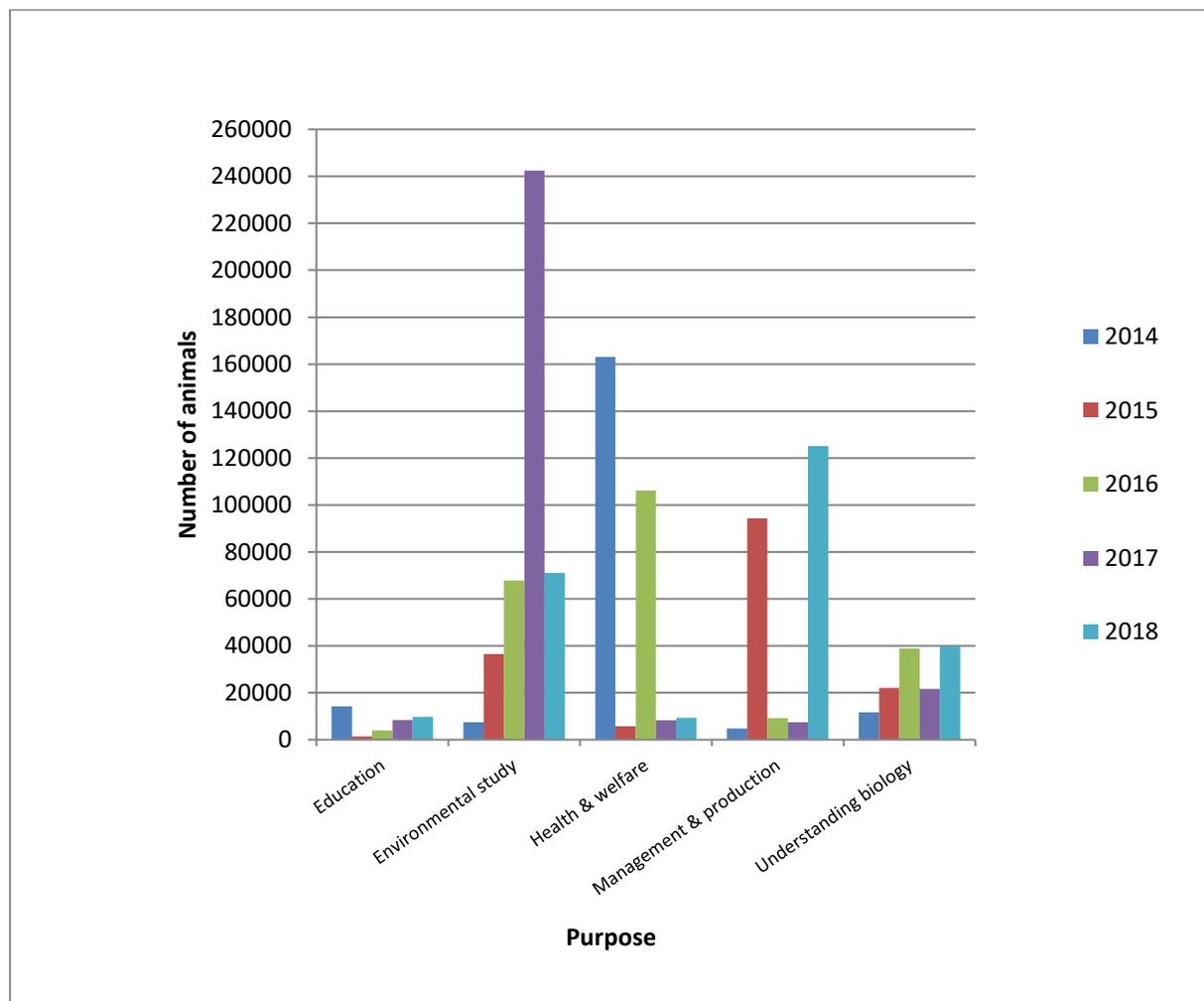
**Figure I Animal categories used between 2014 and 2018**



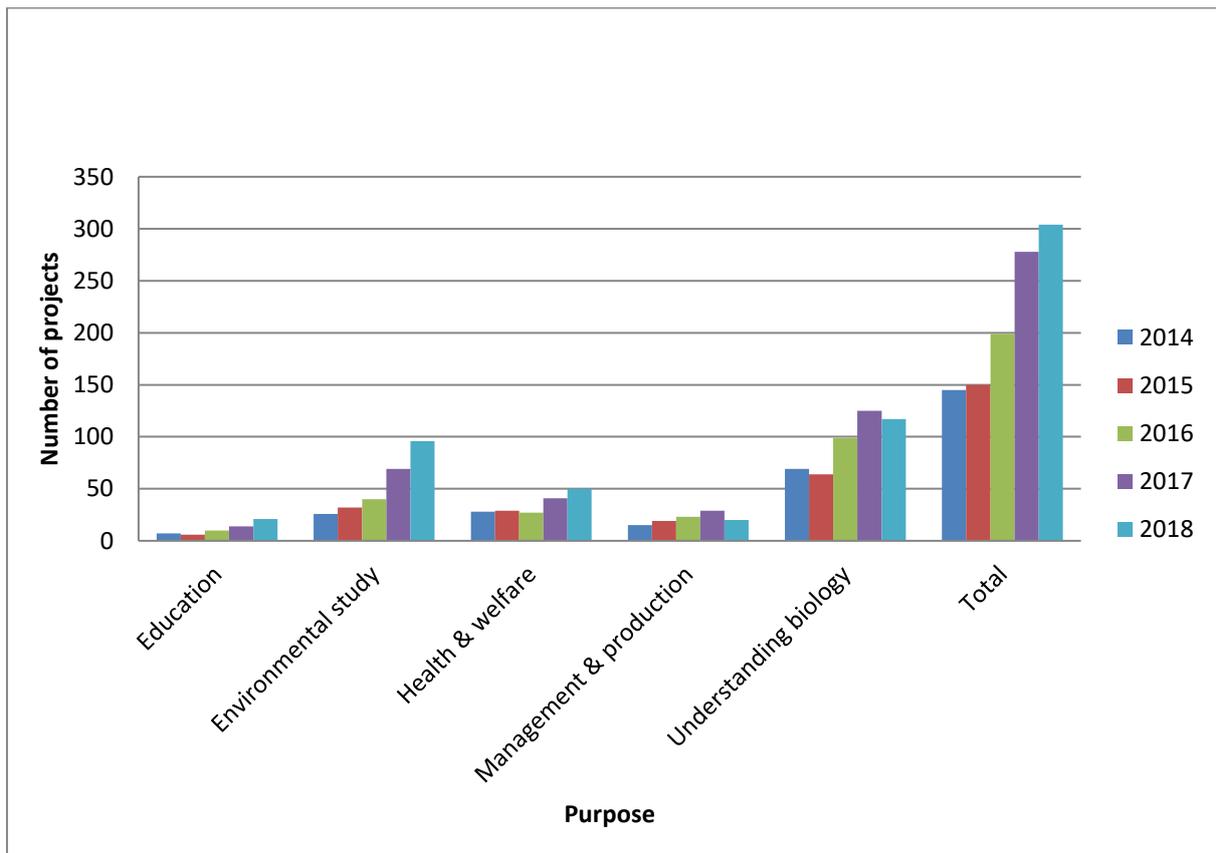
**Figure 2 Projects per animal category between 2014 and 2018**



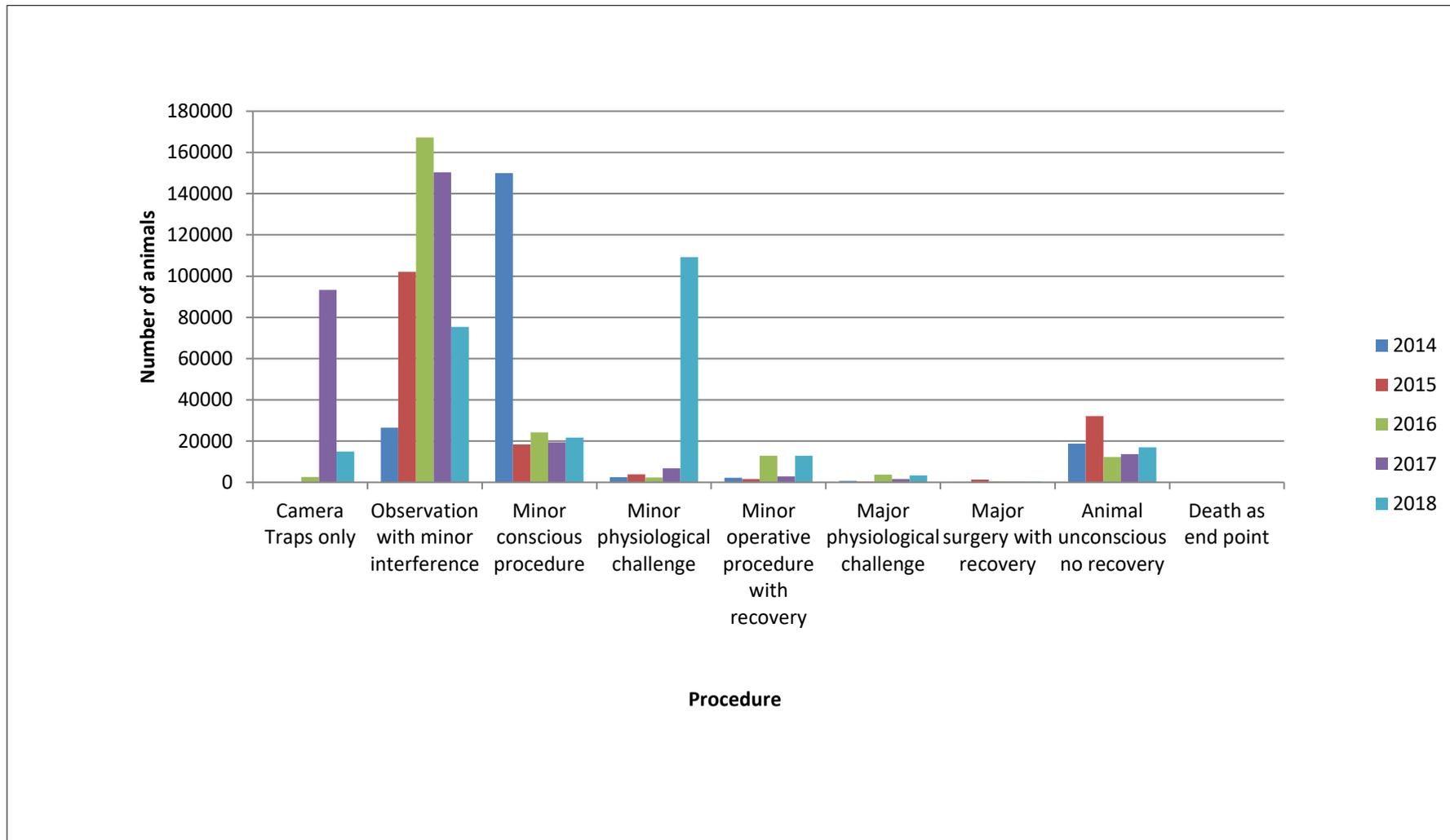
**Figure 3 Purposes for which animals were used between 2014 and 2018**



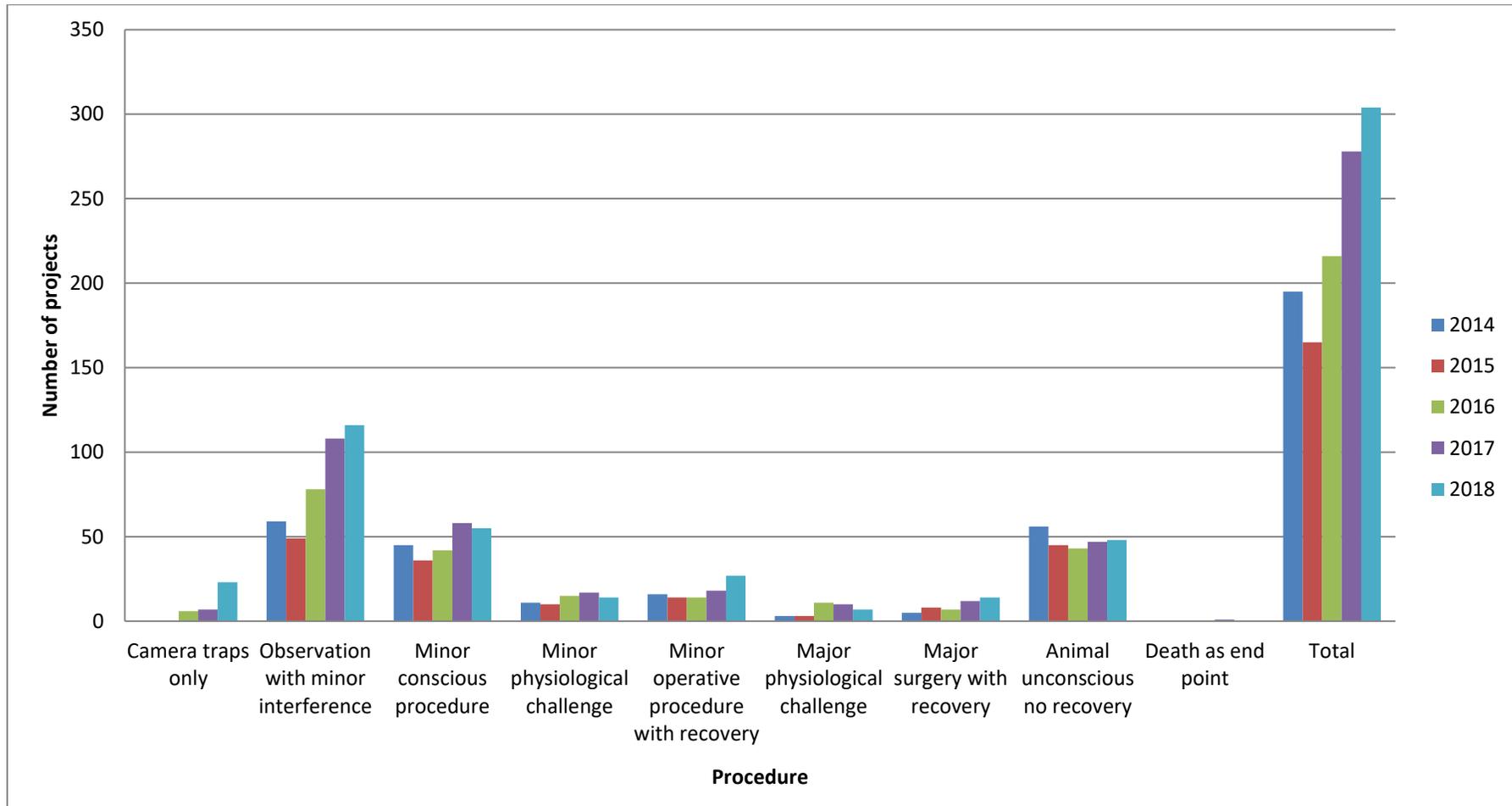
**Figure 4 Projects per purposes between 2014 and 2018**



**Figure 5 Procedures used between 2014 and 2018**



**Figure 6 Projects per procedures used between 2014 and 2018**



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## ABBREVIATIONS

AEC	Animal Ethics Committee
ANU	Australian National University
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
Macquarie	Macquarie University
McIntyre	McIntyre, Nathan; Independent researcher
Monash	Monash University
Murdoch	Murdoch University
NHMRC	National Health and Medical Research Council
Tassal	Tassal Operations Pty Ltd
Treidlia	Treidlia Biovet Pty Ltd, New South Wales
UAdel	The University of Adelaide, South Australia
UQld	The University of Queensland
USA	The University of South Australia
USC	The University of the Sunshine Coast
USyd	University of Sydney, New South Wales
UTas	University of Tasmania
Virbac	Virbac (Australia) Pty Ltd
VWSG	Victorian Wader Study Group Inc
3Rs	Replacement, Reduction and Refinement

End