

# *Review of* Wildlife Monitoring *Priorities*



Michael Driessen and Gregory Hocking

*Nature Conservation Report 08/02*

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**for the  
Department of Primary Industries and Water**

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Resource Management and Conservation Division  
Department of Primary Industries and Water

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## SUMMARY

The Department of Primary Industries and Water's wildlife monitoring priorities were reviewed to develop strategies to improve the way the agency conducts its wildlife monitoring.

We developed a decision key that sets monitoring priorities for the following groups of species: (1) species that are listed as threatened, (2) species subject to a potential threat, (3) species that are harvested/culled, and (4) introduced animal species. We compared priorities for wildlife monitoring as determined by the decision key with what is currently monitored by the department.

Currently, staff within the Resource Management and Conservation Division monitors over 40 species of wildlife. Most of these species are either harvested species or threatened species.

All harvested/culled species ranked as highest priority for monitoring, Priority 1 (seven species), and second highest priority for monitoring, Priority 2 (seven species), are subject to some level of monitoring.

For species subject to a potential threat, over half of the Priority 1 species (four species out of seven) and only one out of six Priority 2 species are currently subject to some level of monitoring; however, monitoring programs are currently being developed for most of the remaining species.

For introduced animal species, virtually all Priority 1 (five species out of six) and over half of Priority 2 (six out of ten) species are subject to some level of monitoring.

Only 40% (18 species out of 49) of Priority 1 and 22% (6 species out of 27) of Priority 2 threatened species are currently subject to some level of monitoring. Factors contributing to the low proportion of threatened species that are monitored include; the large number of threatened species, practical difficulties associated with monitoring some species threatened species (eg invertebrates), limited resources and a reliance on external funding. A small number of threatened species are monitored by other organisations.

We made a number of recommendations in this review to ensure that priority species of wildlife are being monitored using appropriate scientific methods and that the information gathered is appropriately stored, managed and disseminated.

## **ACKNOWLEDGMENTS**

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# CONTENTS

<b>SUMMARY .....</b>	<b>I</b>
<b>ACKNOWLEDGMENTS .....</b>	<b>II</b>
<b>1.0 INTRODUCTION.....</b>	<b>1</b>
1.1 Goal.....	2
1.2 Requirement for the Review and Governance.....	2
1.3 Scope .....	2
1.4 Types of Monitoring .....	3
<b>2.0 REVIEW OF EXISTING WILDLIFE MONITORING PROGRAMS .....</b>	<b>3</b>
2.1 Species that are listed as Threatened .....	4
2.2 Species Subject to a Potential Threat.....	5
2.3 Species that are Harvested/Culled .....	5
2.4 Introduced Animal Species .....	6
2.5 Species Monitored for Other Reasons.....	6
<b>3.0 CRITERIA FOR DETERMINING PRIORITIES FOR WILDLIFE MONITORING .....</b>	<b>7</b>
3.1 Legal Requirement.....	7
3.2 Extent of Occurrence and Abundance.....	7
3.3 Conservation Status.....	7
3.4 Occasional Visitors .....	7
3.5 Level of Harvesting/Culling .....	8
3.6 Potential Threats .....	8
3.7 Negative Environmental Impact.....	9
3.8 Other Criteria.....	9
<b>4.0 DECISION KEY FOR DETERMINING PRIORITIES FOR MONITORING.....</b>	<b>11</b>
<b>5.0 APPLICATION OF CRITERIA.....</b>	<b>14</b>
5.1 Species that are Listed as Threatened .....	14
5.2 Species Subject to a Potential Threat.....	15
5.3 Species that are Harvested/Culled .....	15
5.4 Introduced Animal Species .....	16
<b>6.0 COMPARISON BETWEEN CURRENT MONITORING AND PRIORITIES FOR MONITORING .....</b>	<b>16</b>
6.1 Species that are Listed as Threatened .....	16
6.2 Species Subject to a Potential Threat.....	16
6.3 Species that are Harvested/Culled .....	16
6.4 Introduced Animal Species .....	16
<b>7.0 CONCLUSIONS.....</b>	<b>30</b>
<b>8.0 STRATEGIC RECOMMENDATIONS.....</b>	<b>31</b>
<b>9.0 REFERENCES.....</b>	<b>33</b>
<b>APPENDIX I CURRENT AND HISTORICAL WILDLIFE MONITORING PROGRAMS .....</b>	<b>35</b>



## 1.0 INTRODUCTION

Wildlife monitoring is an integral part of a wildlife management and conservation program that informs managers of the success or otherwise of their programs. According to Caughley and Sinclair (1994) there are only four ways a wildlife population may be managed: make it increase, make it decrease, harvest it for a continuing yield, and leave it alone but 'keep an eye on it'.

A recent assessment of conservation monitoring in Australia (Field *et al.* 2007) revealed a pervasive lack of rigour in analysing, reporting and responding to the results of data collected, and millions of dollars are currently being wasted on monitoring programs that have no realistic chance of detecting changes in the variables of interest. This assessment recognised three fundamental problems that have contributed to this situation:

- Funding – in particular commitment needs to be sufficiently long-term to allow a change to be detected over and above the natural temporal fluctuations
- Objectives – clear articulation of what success would mean and specifying what degree of change would be considered sufficient to trigger a management response.
- Sampling design – the most fundamental requirement of the sampling design is that it should be capable of detecting the level of the desired change if it actually occurs.

In Tasmania, the Department of Primary Industries and Water is responsible for the conservation, management and protection of Tasmania's wildlife under the provisions of the *Nature Conservation Act 2002*, the *Threatened Species Protection Act 1995* and the *Whales Protection Act 1988*.

Traditionally, the focus of monitoring in Tasmania by the State Government has been on species that are subject to harvesting and culling. The information gained from this monitoring has been used to set restrictions on harvesting and culling to ensure that they are sustainable. There are 20 species of wildlife in Tasmania that are subject to harvesting and culling.

Monitoring has also been a key part of introduced animal eradication or control programs, informing managers of the results of their management actions and guiding the allocation of resources for future control.

During the past 20–25 years the focus of monitoring has expanded to include threatened species, particularly since the proclamation of the *Threatened Species Protection Act 1995*. Currently, 177 species of wildlife are listed as threatened on the schedules of this Act. Some of these species are actively managed while others require monitoring simply to 'keep an eye on them'. In addition to threatened species, there are several potential threats to species whose conservation status is considered secure, such as Mucor Fungus that



affects the platypus and Chytrid Fungus that affects frogs, and monitoring may be required to establish the impact of these threats.

Typically, there are far more species that could be monitored than there are resources available and therefore priorities for monitoring need to be determined.

### **1.1 Goal**

The ultimate goal of this review is to produce a strategy to ensure that priority species of wildlife are being monitored using appropriate scientific methods and that the information gathered is appropriately stored, managed and disseminated.

To help achieve this goal the following four-step process was undertaken:

1. Review existing wildlife monitoring programs undertaken by the Resource Management and Conservation Division of the Department of Primary Industries and Water.
2. Develop and apply a decision key that determines priorities for wildlife monitoring in Tasmania.
3. Compare priorities for wildlife monitoring with wildlife monitoring currently being undertaken.
4. Develop and recommend strategies to improve wildlife monitoring and achieve the ultimate goal.

### **1.2 Requirement for the Review and Governance**

John Whittington, General Manager of the Resource Management and Conservation Division of Department of Primary Industries and Water commissioned this review and the development of a wildlife monitoring strategy. This was identified in the 2006–2007 business plans for the Wildlife Management Branch and the Biodiversity Conservation Branch.

The steering committee for the project comprised the managers of the Wildlife Management Branch and the Biodiversity Conservation Branch, Gary Davies and Michael Pemberton respectively. The project team comprised Michael Driessen and Greg Hocking and they received advice and input from a Technical Assessment Group comprising Stewart Blackhall, Sally Bryant, Rosemary Gales, Graham Hall and Nick Mooney.

### **1.3 Scope**

This review applies to wildlife<sup>1</sup>, with the exception of plants, as defined under the *Nature Conservation Act 2002* and does not apply to fish as defined under the *Living Marine Resources Act 1995* and the *Inland Fisheries Act 1995*. It also

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<sup>1</sup> 'wildlife' means any living creature other than (a) a dog or cat; (b) domestic stock; (c) fish, within the meaning of the Living Marine Resources Management Act 1995; (d) an animal that (i) is being farmed under and accordance with the Animal Farming (Registration) Act 1994, or (ii) has been so farmed and is legally in the possession of any person.

applies to fauna listed under the schedules of the *Threatened Species Protection Act 1995*.

This review also applies to introduced animals (either intentionally or accidentally introduced) that have an impact, or have potential to impact, on environmental values. An introduced animal is defined as any species of animal that is not native to an area.

This review covers the State of Tasmania including off-shore islands and subantarctic Macquarie Island.

It is not within the scope of this review to undertake a review of the statistical adequacy of each monitoring program.

#### **1.4 Types of Monitoring**

Most wildlife monitoring programs are focussed on monitoring the abundance and distribution of animals. However, some monitoring programs are focussed on monitoring other characteristics of a population such as health status or a physical attribute such as size of antlers. There is a considerable amount of literature available on methods to monitor wildlife and this will not be provided in this review except for clarification of terms used within this report. This information is derived from Caughley and Sinclair (1994).

Animal numbers can be monitored using the following:

*Total Counts:* the count of every animal in a population or in a given area. Total counts have two serious drawbacks; they tend to be inaccurate and expensive, except in the case of very small, localised populations.

*Sampled Counts:* counting animals in a subset of sampling units drawn from the population of interest, and making deductions about the size of the population from the part sampled.

*Indices:* an index of density is some attribute that changes in a predictable manner with changes in density. Indices of density, if comparable, are useful for comparing the density of populations or for tracking changes in density of one population from year-to-year. Indices could be based on counts of animals themselves or track, scats, nests etc. Consistency and rigid standardisation of techniques are crucial when monitoring using an index.

## **2.0 REVIEW OF EXISTING WILDLIFE MONITORING PROGRAMS**

Information on current and some historical wildlife monitoring programs is given in Appendix I and summarised below. Although reasonable attempts were made to capture historical monitoring programs undertaken by this agency some may have been overlooked. For convenience and to pre-empt the structure of later sections, the species have been grouped under the following themes;

1. Species that are listed as threatened,
2. Species subject to a potential threat,

3. Species that are harvested/culled,
4. Introduced animal species and
5. Species monitored for other reasons.

Some of the species that are monitored do fit into more than one theme, where this is the case the primary theme was used.

## **2.1 Species that are listed as Threatened**

Of the 177 Rare, Vulnerable or Endangered wildlife species currently listed in Tasmania (including Macquarie Island), Resource Management and Conservation staff currently monitors 28 (16%). Monitoring of threatened species is largely dependent on external funding and, within DPIW, is generally the responsibility of the Biodiversity Conservation Branch. A small number of threatened species are also monitored by other organisations such as the Forest Practices Authority which monitors animals in relation to logging, for example, Simson's Stag Beetle, burrowing crayfish and hydrobiid snails).

Threatened species are subject to on-going threats, such as disease, habitat degradation or climate change, and there is a number of land management planning processes aimed at minimising these impacts. In the majority of cases the purpose of monitoring is to 'keep an eye on' the status of the species in Tasmania and to assess the success or otherwise of these management processes in protecting threatened species. In a few cases species are subject to active on-ground management, for example, provision of nest boxes for Orange-bellied Parrots, and monitoring is used to guide and gauge the success of management.

Due to provision of external funding, including recurrent funding from the Princess Melikoff Trust, a significant proportion (70%) of currently monitored threatened species are marine mammals and seabirds. Some species of marine mammal are monitored using more than one method (eg. fur seals).

Many species, particularly invertebrates, are difficult to monitor because the species are difficult to detect or detection may involve killing the species. For many naturally rare species monitoring may not be required at all provided habitat is protected. For example, Hickman's Pygmy Mountain Shrimp.

Several of the monitoring programs have been independently reviewed or published in peer reviewed journals. Methods and results of monitoring Southern Elephant Seals, Grey Petrels and several species of albatrosses on Macquarie Island have been published (Hindell 1991; McMahon 1999; Slip 1999; Schultz *et al.* 2005; Terauds *et al.* 2005, 2006). Monitoring of Tasmanian Devils, Australasian Gannets, New Zealand Fur Seals, Australian Fur Seals and Southern Elephant Seals in Tasmania has also been published (Pemberton and Skira 1989; Brothers and Pemberton 1990; Rounsevell and Pemberton 1994; Bunce *et al.* 2002; Pemberton and Gales 2004; Kirkwood *et al.* 2005; Hawkins *et al.* 2006).

## **2.2 Species Subject to a Potential Threat**

There are two current monitoring programs in relation to potential threats. The Tasmanian Tree Frog is being monitored because of the threat posed by Chytrid Fungus that was first detected in Tasmania in 2004. Invertebrate and bird communities are being monitored along an altitudinal gradient in southern Tasmania in an effort to detect changes in species distribution in relation to future climate change. Past monitoring programs have focussed on the impacts of fire on the fauna of buttongrass moorlands to help develop fire management guidelines, and the impact of a potential increase in tourism activity on cave fauna. These programs are, or were, funded externally and undertaken by the Biodiversity Conservation Branch.

A program to monitor species at risk from the Red Fox, such as Eastern Barred Bandicoots, Eastern Quolls and Tasmanian Bettongs, is in the process of being established. This program will guide management of the species should attempts to eradicate the Red Fox from Tasmania fail. Similarly a program to monitor the ecological impacts of Devil Facial Tumour Disease on a range of species that may be affected by a decrease in devil numbers is also in the process of being established. Both these programs are funded by both State and Commonwealth governments and undertaken by the Wildlife Management Branch.

Of these programs, only the impact of climate change monitoring program has been subject to an independent review (MacDonald 2001; Doran *et al.* 2003).

## **2.3 Species that are Harvested/Culled**

Resource Management and Conservation staff actively monitor 16 (80%) of the 20 species of wildlife subjected to either harvesting or culling in Tasmania. Monitored species include all species subject to harvesting as well as those subject to any significant culling. The remaining species are culled at very low levels and therefore formal population monitoring has not been undertaken.

All monitoring of harvested/culled species is funded by the State government and is largely the responsibility of the Wildlife Management Branch. An exception to this is the statewide waterfowl monitoring program that is coordinated by the Biodiversity Conservation Branch.

For most harvested or culled species, monitoring is undertaken to obtain information on trends in take as well as trends in the abundance of the harvested or culled population. Trends in annual take are obtained from information on the number of animals taken that is required to be returned by all holders of game licences and crop protection permits. In addition, survey forms are sent out to licensed deer and duck hunters with the publication "Game Tracks" to obtain more detailed information on take, such as the sex, age or antler size of harvested animals. Trends in abundance are monitored using a variety of methods ranging from systematic surveys undertaken by Resource Management and Conservation staff to sighting records provided by hunters. Some harvested species are monitored using more than one method (eg. waterfowl).

In most cases, the purpose of monitoring harvested/culled species is to ensure a sustainable harvest or cull. In the case of Fallow Deer, for example, the quality of antlers is also managed and monitored.

Very few of the monitoring programs for harvested/culled species have been independently reviewed or published in peer reviewed journals. The Tasmanian Mammal Spotlight Survey was independently reviewed by Southwell and Fletcher (1985), Pople (2004) and AAT (2006) who all found that the program was adequate for what it aims to achieve. The Cape Barren Goose survey methods and early results have been published (Eberhard and Pearse 1981). The Short-tailed Shearwater survey method was reviewed by Bradley *et al.* (2000) and they recommended more intensive monitoring than at present to decrease the time to detection of an impact.

#### **2.4 Introduced Animal Species**

Three introduced animal species are specifically targeted for monitoring. Funding for these programs is a mixture of State and external funding. The purposes for monitoring vary. In the case of the Red Fox, monitoring is undertaken to detect the presence of foxes to direct control efforts. European Rabbits are monitored at Strathgordon to measure the success of an eradication program. European Rabbits have also been monitored on Macquarie Island for many years to assess the impacts of European Rabbit and Cat control programs. Fallow Deer are monitored in the Central Plateau Conservation Area to determine their status and to determine whether control is required. Several other introduced animals are monitored as part of monitoring programs directed at other species (Spotlight Surveys – European Rabbit, Cat, Fallow Deer, and Brown Hare. Property-Based Wildlife Harvesting – European Rabbit, Brown Hare, Cat and Fallow Deer).

None these programs have been independently reviewed or published in refereed journals.

#### **2.5 Species Monitored for Other Reasons**

Several programs currently monitor species that are not listed as threatened (Little Penguin, Leopard Seal, Macquarie Island penguins and Australasian Gannets). These programs are all externally funded and are undertaken by the Biodiversity Conservation Branch. In most cases the purpose of monitoring is 'to keep an eye on' the species and to learn more about their ecology. In the case of the Little Penguin the purpose of monitoring is to measure the effectiveness of on-ground management. Australasian Gannets are monitored in conjunction with the Shy Albatross surveys. Peregrine Falcons have been monitored in the past to improve information about their ecology and to assess impacts of land use and persecution.

The Natural Values Atlas is currently the State's primary repository for animal distribution records particularly threatened species. This information is used to monitor changes in the distribution of native and introduced fauna and to assess the conservation status of native species. The atlas is primarily funded by the State.

The Tasmanian road-kill survey was originally established as an alternative method to monitor trends in the abundance of harvested species throughout the State. It proved to have some value in monitoring the distribution and abundance of non-target species such as bandicoots and potoroos, which normally require intensive trapping programs. This program lapsed in 1996. The data may prove useful in identifying roadkill hotspots and changes in species distribution.

Methods and results from some of these programs, Natural Values Atlas, Leopard Seal, Australasian Gannet have been published (Rounsevell *et al.* 1991; Rounsevell and Pemberton 1994; Hocking and Driessen 2000; Bunce *et al.* 2002).

### **3.0 CRITERIA FOR DETERMINING PRIORITIES FOR WILDLIFE MONITORING**

To determine priorities for monitoring species of wildlife, including introduced animals that have a negative environmental impact, a list of criteria must be identified and the relative importance of the criteria defined. The criteria used in this review are described below.

#### **3.1 Legal Requirement**

In some instances there is a legal requirement to monitor a species. For example, under *the Environment Protection and Biodiversity Conservation Act 1999*, Commonwealth approval of Wildlife Trade Management Plans for the harvest of certain wildlife species for export requires an appropriate monitoring program.

#### **3.2 Extent of Occurrence and Abundance**

The distribution and abundance of species is important for determining priorities for monitoring. This information is used together with information on cause and magnitude of population change to determine the conservation status of species in Tasmania (see below). It is also important in determining the level of management required for harvested species in relation to the extent and amount of harvest. There is a greater need to monitor a harvested species that has a restricted distribution than one that has a widespread distribution.

#### **3.3 Conservation Status**

The conservation status of Tasmanian native species is assessed using the criteria provided in the *Threatened Species Protection Act 1995*. Species are classified as Endangered, Vulnerable or Rare in terms of their risk of becoming extinct. Thus species listed under the *Threatened Species Protection Act 1995* have already been through a risk assessment process taking into account their distribution and abundance together with the level of threat. That ranking is used here to help determine priorities for monitoring threatened species.

#### **3.4 Occasional Visitors**

The occurrence of certain species of wildlife with distributions that extend beyond Tasmania is so infrequent as to make monitoring of them within

Tasmania meaningless in terms of its value in monitoring the total abundance or distribution of the species. Examples of these species are the Blue Whale, Fin Whale and certain marine turtles. They are therefore a low priority for focussed monitoring, however recording opportunistic sightings is considered to be important to contribute to national and international recovery programs.

### **3.5 Level of Harvesting/Culling**

The level of harvesting/culling of a population has a significant influence on determining priorities for monitoring. If the number of animals harvested is high relative to the estimated total number of animals in the population then the priority for monitoring will be high and vice versa for a species subject to low levels of harvesting. Given that maximum sustainable yields for vertebrate species are typically of the order of 20-30% of population per annum, we propose the following conservative levels of harvest/cull to determine priorities for monitoring:

- >15% per annum, high priority for monitoring
- 5-15% per annum, medium priority for monitoring
- <5% per annum, low priority for monitoring

For most species accurate estimates of population size are not available, even though the size of the harvest/cull is known. In these cases the level of harvesting/culling is based on an estimate of what the minimum population size is in relation to the size of the harvest/cull.

For some species with large total populations in which there is only limited movement among sub-populations, there is a need to manage the level of harvest/cull on a local scale to ensure sustainability. For example, Short-tailed Shearwaters, where the adults and their off-spring typically return only to their island of origin, need to be managed at the level of individual islands.

### **3.6 Potential Threats**

This criterion relates to native species of wildlife, which are not listed on the schedules of the *Threatened Species Protection Act 1995*, but may be vulnerable to a potential threat. This criterion also applies to a threatened species where a new potential threat has been identified. Potential threats include:

1. Threats where the impact on a species has not been quantified. For example, Mucor Fungus has been present in Tasmania for more than 25 years but the impact of the disease on Platypus populations is not well known due to limited monitoring and research.
2. New threats that have recently established or are in the process of establishing or may have been previously unrecognised. For example, Chytrid Fungus, which is associated with declines in and extinctions of frog species worldwide, was recorded for the first time in Tasmania in 2004 but probably was introduced to Tasmania much earlier. This disease is a significant potential threat to Tasmanian frogs that are not listed on the *Threatened Species Protection Act 1995* including several endemic frog species. If no monitoring is

in place it is not possible to determine if these species are declining. In the case of the Red Fox, it is linked with the decline of a number of native species on the Australian mainland. It has recently been introduced to Tasmania and is likely to establish if eradication efforts are not successful. A number of Tasmanian native species that are not listed on the *Threatened Species Protection Act 1995* are at risk of significant decline and extinction if the fox becomes established.

3. A threat, whether identified or not, that is causing a decline to a species outside of Tasmania and it is not known whether the same species is undergoing a similar decline in Tasmania. For example, there are concerns about the Rockhopper Penguin population on Macquarie Island due to massive declines in numbers on New Zealand subantarctic islands from unknown causes.

4. Climate change, which represents a significant potential threat to many species of wildlife in Tasmania. At present, better modelling of predicted climate change impacts on Tasmanian environments is required to identify habitats and species at risk. Species potentially at risk include those restricted to alpine areas, coastal areas and peatlands.

### **3.7 Negative Environmental Impact**

This criterion relates only to an introduced animal species that has been shown to have a significant negative environmental impact and the impact of that species is being managed through a control or eradication program. Monitoring of this species is a high priority. Examples of significant impact include a conservation threat to a native animal or plant species, loss or severe degradation of a vegetation community or a geoconservation or cultural value.

Where such species are widespread and common in Tasmania there is little value in monitoring the species if no management program is in place, although this does not obviate the need to investigate their impact on values. However, where introduced animal species still have potential to spread into areas of high conservation value then monitoring of these areas may be a priority.

To determine whether a species has a significant environmental impact we used Table 1 to rank impacts on conservation values. Species that have a moderate, high or extreme impact on environmental values were considered to have a significant impact.

### **3.8 Other Criteria**

There are other criteria that may be considered to have a role in determining the priority for monitoring a species such as its endemism, role in the ecosystem, practicality of monitoring, whether it is ecologically unique and/or its tourism or other economic value. These criteria were considered to have a lower priority weighting by comparison with other criteria and were not applied in this review. Nevertheless they could be used to prioritise further within the rankings.



Table 1. Ranking of Impacts on Conservation Values from Introduced Animal Species.

Extreme	<p>The impact of an introduced animal is likely to be extreme, including:</p> <ul style="list-style-type: none"> <li>• A significant impact on more than one non-threatened species such that the species are likely to become threatened, and/or</li> <li>• The conservation status of more than one threatened species would be worsened, and/or</li> <li>• Severe and widespread impacts on geo-diversity values.</li> </ul>
High	<p>The impact of an introduced animal is likely to be highly significant, including:</p> <ul style="list-style-type: none"> <li>• A significant impact on one non-threatened species such that the species is likely to become threatened, or</li> <li>• A significant impact on more than one non-threatened species but without the species necessarily becoming threatened, or</li> <li>• The conservation status of a single threatened species would be worsened, and/or</li> <li>• Locally severe impacts on geo-diversity values.</li> </ul>
Moderate	<p>The impact of an introduced animal is likely to be significant, including:</p> <ul style="list-style-type: none"> <li>• Local population impacts on one or more non-threatened species, with more than one population per species effected, and/or</li> <li>• Local population impacts on one threatened species, and/or</li> <li>• Widespread, moderate-level impacts on geo-diversity values.</li> </ul>
Low	<p>The impact of an introduced animal is likely to be minor, including:</p> <ul style="list-style-type: none"> <li>• Local population impact on one or more non-threatened species, with a single population per species effected, and/or</li> <li>• Local, moderate-level impacts on geo-diversity values.</li> </ul>
Very low	<p>The impact of an introduced animal is unlikely to be recognised at the population level for any species; however the introduced animal may impact on individual animals.</p>
Negligible	<p>The impact of an introduced animal is unlikely to be significant for populations or individuals.</p>

#### 4.0 DECISION KEY FOR DETERMINING PRIORITIES FOR MONITORING

Before applying the criteria for monitoring, we have separated the species of wildlife into the following management groupings:

1. Species that are listed as threatened,
2. Species subject to a potential threat,
3. Species that are harvested/culled, and
4. Introduced animal species.

This was done because the criteria used for determining priorities within these groups differ to a significant degree. It also avoids making value judgements such as the relative merits of threatened species conservation versus the sustainable management of harvested species, and reflects different priorities for different business units within the agency.

Below is the decision key used to separate species (or communities) into management groups and within these groupings the priorities for monitoring are determined using further keys. We anticipate that the keys will be improved through wider use and will be reviewed periodically.

##### Decision Key for Determining Priorities for Monitoring

1	Is the species listed on the schedules of the <i>Tasmanian Threatened Species Protection Act 1995</i> ?	Yes	Go to Part A
		No	Go to 2
2	Is there a potential threat to the species that could significantly reduce the distribution and/or abundance of the species across major parts of the species range?	Yes	Go to Part B
		No	Go to 3
3	Is the species native to Tasmania or protected under the <i>Nature Conservation Act 2002</i> and subject to a harvesting or culling?	Yes	Go to Part C
		No	Go to 4
4	Is the species introduced to Tasmania and causing, or has potential to cause, at least a moderate negative impact on environmental values (refer to Table 1 for levels of impact).	Yes	Go to Part D
		No	Low Priority

### Part A: Species that are Listed as Threatened

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1	Is the species an occasional visitor to Tasmania?	Yes	Low Priority
		No	Go to 2

---

2	Has an additional threat to the species been recognised that has a high potential to significantly reduce the distribution or abundance of the species across its range?	Yes	Priority 1
		No	Go to 3

---

3	Is the species listed as Endangered under the TSPA?	Yes	Priority 1
		No	Go to 4

---

4	Is the species listed as Vulnerable under the TSPA? (species listed as Rare)	Yes	Priority 2
		No	Priority 3

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### Part B: Species Subject to a Potential Threat

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1	Is the potential threat to the species present in Tasmania?	Yes or unknown	Go to 2
		No	Go to 6

---

2	Is the potential threat restricted to Tasmania?	Yes	Go to 3
		No or unknown	Go to 4

---

3	Is there evidence that local populations have significantly declined as a result of the threat and that there is at least a moderate risk for the threat to spread across major parts of the species range?	Yes	Priority 1
		No	Low Priority

---

4	Has the threat resulted in the species, or a closely related species, being listed as Extinct or Critically Endangered* elsewhere?	Yes	Priority 1
			Go to 5
5	Has the threat resulted in the species, or a closely related species, being listed as Endangered or Vulnerable* elsewhere?	Yes	Priority 2
		No	Priority 3
6	Is there at least a moderate risk of the potential threat establishing and spreading into large parts in Tasmania?	Yes	Go to 7
		No	Low Priority
7	Has the threat resulted in the species, or a closely related species, being listed as Extinct or Critically Endangered* elsewhere?	Yes	Priority 2
			Go to 8
8	Has the threat resulted in the species, or a closely related species, being listed as Endangered or Vulnerable* elsewhere?	Yes	Priority 3
		No	Low Priority

\*Comparable with the criteria used in the *Environment Protection and Biodiversity Conservation Act 1999*

### **Part C: Species that are Harvested/Culled**

1	Is there a legal requirement to monitor the species?	Yes	Priority 1
		No	Go to 2
2	Is the level of harvest/cull >15% of the minimum estimated total population	Yes	Priority 1
		No	Go to 3
3	Is the level of harvest/cull 5-15% of the minimum estimated total population	Yes	Priority 2
		No	Priority 3

## Part D: Introduced Animal Species

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1	Is the species of animal subject to an eradication or control program?	Yes	Priority 1
		No	Go to 2
2	Is there at least a moderate risk of the species spreading into areas of conservation significance?	Yes	Go to 3
		No	Low Priority
3	Is the spread of the species likely to have a high impact on environmental values?	Yes	Priority 1
		No	Priority 2

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### 5.0 APPLICATION OF CRITERIA

The criteria specified above have been applied to those species of Tasmanian wildlife and introduced animals as defined in Section 1.2 (Scope). The results of this process are contained in Tables 2-5 and summarised below.

#### 5.1 Species that are Listed as Threatened

Of the 177 wildlife species listed under the *Threatened Species Protection Act 1995*, a total of 49 species were identified as Priority 1 for monitoring (Table 2). All but five of these species were so identified because of their listing as Endangered under the *Threatened Species Protection Act 1995*. The other five species, the Tasmanian Devil, Tasmanian Devil Tapeworm, Spotted-tailed Quoll, Fairy Tern and the Green and Gold Frog, while being listed as Rare or Vulnerable, were raised to Priority 1 on the basis of them being subject to additional threats (Devil Facial Tumour Disease, Red Fox and Chytrid Fungus). In contrast, two marine species - the Blue Whale and Loggerhead Turtle - while being listed as Endangered, are only occasional and infrequent visitors to Tasmanian waters making them a low priority for focussed monitoring.

Twenty-seven species were identified as Priority 2 for monitoring on the basis of them being listed as Vulnerable under the *Threatened Species Protection Act 1995*. Four marine species - the Fin Whale, Green Turtle, Hawkesbill Turtle and Leathery Turtle - while being listed as Vulnerable, are only occasional and infrequent visitors to Tasmanian waters making them a low priority for focussed monitoring.

A total of 95 species were identified as Priority 3 for monitoring on the basis of them being listed as Rare under the *Threatened Species Protection Act 1995*.

## **5.2 Species Subject to a Potential Threat**

Twenty-one species of wildlife subject to a potential threat were identified as priorities for monitoring (Table 3). The potential threats were an introduced animal, the Red Fox which may be establishing in Tasmania; two diseases, the Chytrid Fungus and Mucor Fungus which are established in Tasmania; and an unidentified potential threat to Rockhopper Penguins. Seven species were identified as Priority 1 for monitoring because they or closely related species have become Extinct or Critically Endangered elsewhere due to the threat. In the case of the platypus, it was listed as Priority 1 because there is a high risk of the Mucor Fungus spreading to other parts of Tasmania and there is potential for the disease to cause population declines, although this impact has not been quantified. Six species were identified as Priority 2 because they or closely related species have become Endangered or Vulnerable elsewhere due to the threat. Eight species were identified as Priority 3 because at least some major declines in distribution and abundance are considered possible across major parts of the species' range.

## **5.3 Species that are Harvested/Culled**

Of the twenty species of wildlife that are protected under the *Nature Conservation Act 2002* and subject to harvesting or culling, a total of seven were identified as Priority 1 for monitoring on the basis that they are subject to high levels of harvesting/culling in relation to their distribution and abundance (Table 4). In the case of Bennetts Wallabies and Tasmanian Pademelons on the Bass Strait Islands, and Brushtail Possums across Tasmania, monitoring was identified as being at the highest level of priority, 1, as it is a legal requirement of the Commonwealth Government approval under the *Environment Protection and Biodiversity Conservation Act 1999* that allows overseas export of products of these species. The Short-tailed Shearwater, while having a wide extent of occurrence and a low harvesting pressure in relation to its total population size, was identified as Priority 1 for monitoring on harvested colonies on the basis that harvesting pressure on certain colonies has been found to be very high (>30%) and because of the very limited movement of animals between colonies harvested colony must be managed individually to ensure sustainability. Other Priority 1 species were Cape Barren Goose, Forester Kangaroo and Fallow Deer.

Seven species of harvested/culled wildlife were identified as Priority 2 for monitoring. These species include Pheasants on King Island, Brown Quail and the five species of partly protected wild duck, Black Duck, Mountain Duck, Chestnut Teal, Grey Teal and Wood Duck. These species have a wide extent of occurrence, and are subject to moderate levels of harvesting during an annual open season.

The remaining six species of harvested/culled wildlife were identified as Priority 3 for monitoring. They have a wide extent of occurrence, but are subject to only low levels of culling for damage mitigation purposes. They are the Common Wombat, Black Swan, Forest Raven, Silver Gull, Sulphur-crested Cockatoo and Tasmanian Native Hen.

#### **5.4 Introduced Animal Species**

Six species of introduced animal were identified as Priority 1 for monitoring; the Red Fox, the Indian Myna, the Black Rat, and European Rabbit on Macquarie Island, Common Starling at Birches Inlet and Melaleuca, the European Rabbit at Strathgordon and the Cat on offshore islands (Table 5). Two species, the Red Fox and the Indian Myna, have recently established or attempted to establish in Tasmania, respectively. The other four species are well established on mainland Tasmania and, with the exception of the Common Starling competing with Orange-bellied Parrots, none are known to threaten the conservation status of native wildlife there. However, there is concern about the impacts of these species on off-shore islands.

Ten species of introduced animal were identified as Priority 2 for monitoring. For most of these species there is concern about their establishment on land reserved under the Nature Conservation Act 2002. In the case of the Ferret there is concern about them establishing a wild population in Tasmania and impacting on a wide range of species.

### **6.0 COMPARISON BETWEEN CURRENT MONITORING AND PRIORITIES FOR MONITORING**

#### **6.1 Species that are Listed as Threatened**

Only a small proportion of threatened species are currently subject to some level of monitoring; 37% (18 species out of 49) of Priority 1 species, 22% (6 out of 27) of Priority 2 species and 4% (4 out of 95) of Priority 3 species.

#### **6.2 Species Subject to a Potential Threat**

Four of the seven species (57%) subject to an emerging threat and identified as Priority 1 for monitoring are subject to monitoring and three species are not currently monitored although the Eastern Barred Bandicoot has been monitored in the past using roadkill surveys. Only one of the six Priority 2 species is currently monitored although the Southern Brown Bandicoot and Long-nosed Potoroo have been monitored in the past using roadkill surveys. Of the eight Priority 3 species only the Little Penguin is currently being monitored but only at a few locations. Monitoring programs are currently being established for species at risk from the Red Fox and Mucor Fungus.

#### **6.3 Species that are Harvested/Culled**

All Priority 1 and 2 harvested/culled species (100%) are currently subject to some level of monitoring. Two (33%) Priority 3 species (Black Swan, Common Wombat) are also monitored as non-target species of other programs.

#### **6.4 Introduced Animal Species**

Five of the six Priority 1 species (83%) and six of the ten Priority 2 species (60%) are subject to some level of monitoring. Only the Red Fox, Cat, European Rabbit and Fallow Deer monitoring is undertaken in a systematic way. Monitoring of the other species relies on reporting by public and staff of Department of Primary Industries and Water and other agencies. Off-shore island monitoring is not systematic and is opportunistic.

**Table 2. Monitoring Priorities for Species that are Listed as Threatened.**

TSPA – *Threatened Species Protection Act 1995*. E = Endangered, V = Vulnerable, R = Rare.

Common Name	Scientific Name	Occasional Visitor to Tasmania?	Additional Threat?	TSPA 1995 Listing	Priority	Currently Monitored?
Antarctic Tern	<i>Sterna vittata bethunei</i>	No	No	E	1	No
Azure Kingfisher	<i>Alcedo azurea diemenensis</i>	No	No	E	1	No
Black-browed Albatross	<i>Thalassarche melanophrys</i>	No	No	E	1	Yes, annual counts.
Blind Velvet Worm	<i>Tasmanipatus anophthalmus</i>	No	No	E	1	No, difficult practically.
Bornemissza's Stag Beetle	<i>Hoplogonus bornemisszai</i>	No	No	E	1	No
Broad-toothed Stag Beetle	<i>Lissotes latidens</i>	No	No	E	1	No
Brown Thornbill (King Island)	<i>Acanthiza pusilla archibaldi</i>	No	No	E	1	No
Caddis Fly (Lake Pedder)	<i>Taskiria mccubbini</i>	No	No	E	1	No- difficult practically.
Caddis Fly (Lake Pedder)	<i>Taskiropsyche lacustris</i>	No	No	E	1	No- difficult practically.
Cave Cricket	<i>Micropathus kiernani</i>	No	No	E	1	No
Central North Burrowing Crayfish	<i>Engaeus granulatus</i>	No	No	E	1	No
Chaostola Skipper	<i>Antipodia chaostola</i>	No	No	E	1	No
Eastern Curlew	<i>Numenius madagascariensis</i>	No	No	E	1	Yes, annual counts.
Fairy Prion southern sub-species	<i>Pachyptila turtur subantarctica</i>	No	No	E	1	Yes, annual counts.
Fairy Tern	<i>Sterna nereis nereis</i>	No	Yes, Fox	R	1	Yes, annual counts.
Forty-spotted Pardalote	<i>Pardalotus quadragintus</i>	No	No	E	1	No- last monitored 1989.
Green and Golden Frog	<i>Litoria raniformis</i>	No	Yes, Chytrd	V	1	No
Grey Goshawk	<i>Accipiter novaehollandiae</i>	No	No	E	1	No
Grey Petrel	<i>Procellaria cinerea</i>	No	No	E	1	Yes, annual counts.
Grey-headed Albatross	<i>Thalassarche chrysostoma</i>	No	No	E	1	Yes, annual counts.
Humpback Whale	<i>Megaptera novaeangliae</i>	No	No	E	1	Yes, annual counts.
Lake Fenton Trapdoor Spider	<i>Plesiothele fentoni</i>	No	No	E	1	No
Lake Pedder Earthworm	<i>Diporochaeta pedderensis</i>	No	No	E	1	No- probably extinct.
Little Tern	<i>Sterna albifrons sinensis</i>	No	Yes, Fox	E	1	Yes, annual counts.
Live-bearing Seastar	<i>Patiriella vivipara</i>	No	No	E	1	No



Common Name	Scientific Name	Occasional Visitor to Tasmania?	Additional Threat?	TSPA 1995 Listing	Priority	Currently Monitored?
Marrawah Skipper	<i>Oreisplanus munionga larana</i>	No	No	E	1	No
Masked Owl	<i>Tyto novaehollandiae castanops</i>	No	No	E	1	No
Miena Jewel Beetle	<i>Castiarina insculpta</i>	No	No	E	1	No
New Holland Mouse	<i>Pseudomys novaehollandiae</i>	No	Yes, Fox	E	1	No
Orange-bellied Parrot	<i>Neophema chrysogaster</i>	No	No	E	1	Yes, annual counts.
Pedra Branca Skink	<i>Niveoscincus palfreymani</i>	No	No	E	1	Yes, annual counts.
Port Davey Skate	<i>Raja</i> sp. L	No	No	E	1	No
Schayer's Grasshopper	<i>Schayera baiulus</i>	No	No	E	1	No- difficult practically.
Scottsdale Burrowing Crayfish	<i>Engaeus spinicaudatus</i>	No	No	E	1	No
Scrubtit (King Island)	<i>Acanthornis magnus greenianus</i>	No	No	E	1	No
Seastar	<i>Marginaster littoralis</i>	No	No	E	1	No
Soft-plumaged Petrel	<i>Pterodroma mollis</i>	No	No	E	1	Yes, annual counts.
Southern Elephant Seal	<i>Mirounga leonina</i>	No	No	E	1	Yes, annual counts.
Southern Right Whale	<i>Eubalaena australis</i>	No	No	E	1	Yes- annual counts.
Spotted-tail Quoll	<i>Dasyurus maculatus maculatus</i>	No	Yes, Fox	R	1	No
Stanley Snail	<i>Miselaoma weldi</i>	No	No	E	1	No
Subantarctic Fur Seal	<i>Arctocephalus tropicalis</i>	Yes	No	E	1	Yes- by SARDI
Swift Parrot	<i>Lathamus discolor</i>	No	No	E	1	Yes- methods being revised.
Tapeworm (Tasmanian Devil)	<i>Dasyurotaenia robusta</i>	No	Yes, DFTD	R	1	No
Tasmanian Devil	<i>Sarcophilus harrisii</i>	No	Yes, DFTD, Fox	V	1	Yes- annual counts.
Tunbridge Looper Moth	<i>Chrysolarentia decisaria</i>	No	No	E	1	No
Tussock Skink	<i>Pseudemoia pagenstecheri</i>	No	No	E	1	No
Wandering Albatross	<i>Diomedea exulans</i>	No	No	E	1	Yes, annual counts.
Wedge-tailed Eagle	<i>Aquila audax fleayi</i>	No	No	E	1	Yes- nest checks
Blue Petrel	<i>Halobaena caerulea</i>	No	No	V	2	Yes, annual counts.
Burrowing Crayfish (Burnie)	<i>Engaeus yabbimunna</i>	No	No	V	2	No
Cave Beetle (Junee-Florentine)	<i>Goedetrechus parallelus</i>	No	No	V	2	No
Chappell Island Tiger Snake	<i>Notechis ater serventyi</i>	No	No	V	2	No
Chevron Looper Moth	<i>Amelora acontistica</i>	No	No	V	2	No
Furneaux Burrowing Crayfish	<i>Engaeus martigener</i>	No	No	V	2	No

Common Name	Scientific Name	Occasional Visitor to Tasmania?	Additional Threat?	TSPA 1995 Listing	Priority	Currently Monitored?
Giant Freshwater Crayfish	<i>Astacopsis gouldi</i>	No	No	V	2	Yes, but not by DPIW; Cradle Coast NRM.
Great White Shark	<i>Carcharodon carcharias</i>	No	No	V	2	No
Gunn's Screw Shell	<i>Gazameda gunnii</i>	No	No	V	2	No
Hydrobiid Snail (Great Lake)	<i>Beddomeia tumida</i>	No	No	V	2	No
Hydrobiid Snail (St. Pauls River)	<i>Beddomeia krybetes</i>	No	No	V	2	No
King Island Green Rosella	<i>Platycercus caledonicus brownii</i>	No	No	V	2	No
Land Snail	<i>"Discocharopa" vigens</i>	No	No	V	2	No
Light-mantled Sooty Albatross	<i>Phoebetria palpebrata</i>	No	No	V	2	Yes, annual counts.
Macquarie Island Shag	<i>Leucocarbo atriceps purpureus</i>	No	No	V	2	No
Mt. Arthur Burrowing Crayfish	<i>Engaeus orramakunna</i>	No	No	V	2	No
Mt. Mangana Stag Beetle	<i>Lissotes menalcas</i>	No	No	V	2	No
Ptunarra Brown Butterfly	<i>Oreixenica ptunarra</i>	No	No	V	2	No- monitored annually from 1997-2003.
Saltmarsh Looper Moth	<i>Dasybela achroa</i>	No	No	V	2	No
Shy Albatross	<i>Thalassarche cauta</i>	No	No	V	2	Yes, annual counts.
Simson's Stag Beetle	<i>Hoplogonus simsoni</i>	No	No	V	2	No
Southern Giant Petrel	<i>Macronectes giganteus</i>	No	No	V	2	Yes, annual counts.
Southern Hairy Red Snail	<i>Austrochloritis victoriae</i>	No	No	V	2	No
Vanderschoor's Stag Beetle	<i>Hoplogonus vanderschoori</i>	No	No	V	2	No
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	No	No	V	2	No
White-fronted Tern	<i>Sterna striata</i>	No	No	V	2	No
White-headed Petrel	<i>Pterodroma lessonii</i>	No	No	V	2	Yes, annual counts.
Amphipod (Great Lake)	<i>Tasniphargus tyleri</i>	No	No	R	3	No
Broad-striped Ghost Moth	<i>Fraus latistria</i>	No	No	R	3	No
Burgundy Snail	<i>Helicarion rubicundus</i>	No	No	R	3	No
Caddis Fly (Bluff Hill Creek)	<i>Stenopsychodes lineata</i>	No	No	R	3	No
Caddis Fly (Corinna)	<i>Ramiheithrus kocinus</i>	No	No	R	3	No
Caddis Fly (Derwent River)	<i>Orthotrichia adornata</i>	No	No	R	3	No
Caddis Fly (Huon & Picton Rivers)	<i>Tasimia drepana</i>	No	No	R	3	No

Common Name	Scientific Name	Occasional Visitor to Tasmania?	Additional Threat?	TSPA 1995 Listing	Priority	Currently Monitored?
Caddis Fly (King River)	<i>Diplectrona lyella</i>	No	No	R	3	No
Caddis Fly (Macquarie River)	<i>Ecnomina vega</i>	No	No	R	3	No
Caddis Fly (Macquarie River)	<i>Leptocerus sounta</i>	No	No	R	3	No
Caddis Fly (Mt. Wellington)	<i>Hydrobiosella armata</i>	No	No	R	3	No
Caddis Fly (Ouse River)	<i>Oxyethira mienica</i>	No	No	R	3	No
Caddis Fly (South Esk River)	<i>Oecetis gilva</i>	No	No	R	3	No
Caddis Fly (St. Columba Falls)	<i>Hydrobiosella sagitta</i>	No	No	R	3	No
Caddis Fly (Upper Scamander River)	<i>Hydroptila scamandra</i>	No	No	R	3	No
Caddis Fly (Wedge River)	<i>Orphninostrichia maculata</i>	No	No	R	3	No
Catadromus Carabid Beetle	<i>Catadromus lacordairei</i>	No	No	R	3	No
Cave Beetle (Hastings Cave)	<i>Idacarabus cordicollis</i>	No	No	R	3	No
Cave Beetle (Ida Bay)	<i>Goedetrechus mendumae</i>	No	No	R	3	No
Cave Beetle (Mole Creek)	<i>Tasmanotrechus cockerilli</i>	No	No	R	3	No
Cave Beetle (Precipitous Bluff)	<i>Idacarabus troglodytes</i>	No	No	R	3	No
Cave Cricket	<i>Parvotettix rangaensis</i>	No	No	R	3	No
Cave Harvestman	<i>Hickmanoxymma cavaticum</i>	No	No	R	3	No
Cave Harvestman	<i>Hickmanoxymma gibbergunyar</i>	No	No	R	3	No
Cave Pseudoscorpion (Mole Creek)	<i>Pseudotyranochthonius typhlus</i>	No	No	R	3	No
Cave Spider (Bubs Hill Cave)	<i>Olgania excavata</i>	No	No	R	3	No
Chequered blue	<i>Theclinesthes serpentata lavara</i>	No	No	R	3	No
Craggy Island Cave Cricket	<i>Cavernotettix craggiensis</i>	No	No	R	3	No
Flinders Island Cave Slater	<i>Echinodillo cavaticus</i>	No	No	R	3	No
Giant Velvet Worm	<i>Tasmanipatus barretti</i>	No	No	R	3	No
Glossy Grass Skink	<i>Pseudemoia rawlinsoni</i>	No	No	R	3	No
Great Crested Grebe	<i>Podiceps cristatus</i>	No	No	R	3	No
Hickman's Pigmy Mountain Shrimp	<i>Allanaspides hickmani</i>	No	No	R	3	No
Hydrobiid Snail (Arthur River)	<i>Beddomeia mesibovi</i>	No	No	R	3	No
Hydrobiid Snail (Blizzards Creek)	<i>Beddomeia wiseae</i>	No	No	R	3	No
Hydrobiid Snail (Blyth River)	<i>Beddomeia petterdi</i>	No	No	R	3	No
Hydrobiid Snail (Bowry Creek)	<i>Beddomeia bowryensis</i>	No	No	R	3	No
Hydrobiid Snail (Bowry Creek)	<i>Beddomeia trochiformis</i>	No	No	R	3	No
Hydrobiid Snail (Buttons Rivulet)	<i>Beddomeia hallae</i>	No	No	R	3	No

Common Name	Scientific Name	Occasional Visitor to Tasmania?	Additional Threat?	TSPA 1995 Listing	Priority	Currently Monitored?
Hydrobiid Snail (Cam River)	<i>Beddomeia camensis</i>	No	No	R	3	No
Hydrobiid Snail (Cataract Gorge)	<i>Beddomeia launcestonensis</i>	No	No	R	3	No
Hydrobiid Snail (Clayton's Rivulet)	<i>Beddomeia waterhouseae</i>	No	No	R	3	No
Hydrobiid Snail (Dip Falls)	<i>Beddomeia kessneri</i>	No	No	R	3	No
Hydrobiid Snail (Emu River)	<i>Beddomeia protuberata</i>	No	No	R	3	No
Hydrobiid Snail (Farnhams Creek)	<i>Beddomeia fultoni</i>	No	No	R	3	No
Hydrobiid Snail (Fern Creek)	<i>Beddomeia briansmithi</i>	No	No	R	3	No
Hydrobiid Snail (Frankland River )	<i>Beddomeia franklandensis</i>	No	No	R	3	No
Hydrobiid Snail (Frome River)	<i>Beddomeia fromensis</i>	No	No	R	3	No
Hydrobiid Snail (Great Lake)	<i>Glacidorbis pawpela</i>	No	No	R	3	No
Hydrobiid Snail (Heathcote Creek)	<i>Beddomeia fallax</i>	No	No	R	3	No
Hydrobiid Snail (Heathcote Creek)	<i>Beddomeia inflata</i>	No	No	R	3	No
Hydrobiid Snail (Heazlewood River)	<i>Beddomeia bellii</i>	No	No	R	3	No
Hydrobiid Snail (Heazlewood River)	<i>Beddomeia hullii</i>	No	No	R	3	No
Hydrobiid Snail (Heazlewood River)	<i>Phrantela annamurrayae</i>	No	No	R	3	No
Hydrobiid Snail (Heazlewood River)	<i>Phrantela marginata</i>	No	No	R	3	No
Hydrobiid Snail (Keddies Creek)	<i>Beddomeia phasianella</i>	No	No	R	3	No
Hydrobiid Snail (Little Henty River)	<i>Beddomeia zeehanensis</i>	No	No	R	3	No
Hydrobiid Snail (Little Henty River)	<i>Phrantela conica</i>	No	No	R	3	No
Hydrobiid Snail (Macquarie River)	<i>Beddomeia kershawi</i>	No	No	R	3	No
Hydrobiid Snail (Minnow River)	<i>Beddomeia turnerae</i>	No	No	R	3	No
Hydrobiid Snail (Rabid River)	<i>Beddomeia angulata</i>	No	No	R	3	No
Hydrobiid Snail (Salmon River Road)	<i>Beddomeia gibba</i>	No	No	R	3	No
Hydrobiid Snail (Salmon River)	<i>Beddomeia salmonis</i>	No	No	R	3	No
Hydrobiid Snail (Scottsdale)	<i>Beddomeia minima</i>	No	No	R	3	No
Hydrobiid Snail (St. Patricks River)	<i>Beddomeia ronaldi</i>	No	No	R	3	No
Hydrobiid Snail (Table Cape)	<i>Beddomeia capensis</i>	No	No	R	3	No
Hydrobiid Snail (Terrys Creek)	<i>Beddomeia tasmanica</i>	No	No	R	3	No
Hydrobiid Snail (Tyenna River)	<i>Phrantela pupiformis</i>	No	No	R	3	No
Hydrobiid Snail (Upper Castra Rivulet)	<i>Beddomeia lodderae</i>	No	No	R	3	No
Hydrobiid Snail (Viking Creek)	<i>Beddomeia hermansi</i>	No	No	R	3	No

Common Name	Scientific Name	Occasional Visitor to Tasmania?	Additional Threat?	TSPA 1995 Listing	Priority	Currently Monitored?
Hydrobiid Snail (West Gawler)	<i>Beddomeia averni</i>	No	No	R	3	No
Hydrobiid Snail (Williamson Creek)	<i>Beddomeia topsiae</i>	No	No	R	3	No
Hydrobiid Snail (Wilmot River)	<i>Beddomeia forthensis</i>	No	No	R	3	No
Hydrobiid Snail (Wilmot river)	<i>Beddomeia wilmotensis</i>	No	No	R	3	No
Isopod (Great Lake & Shannon Lagoon)	<i>Onchotelson brevicaudatus</i>	No	No	R	3	No
Isopod (Great Lake)	<i>Mesacanthotelson setosus</i>	No	No	R	3	No
Isopod (Great Lake)	<i>Mesacanthotelson tasmaniae</i>	No	No	R	3	No
Isopod (Great Lake)	<i>Onchotelson spatulatus</i>	No	No	R	3	No
Isopod (Great Lake)	<i>Uramphisopus pearsoni</i>	No	No	R	3	No
Keeled Snail	<i>Tasmaphena lamproides</i>	No	No	R	3	No
New Zealand Fur Seal	<i>Arctocephalus forsteri</i>	No	No	R	3	Yes, annual counts.
Northern Giant Petrel	<i>Macronectes halli</i>	No	No	R	3	Yes, annual counts.
Northwest Velvet Worm	<i>Ooperipatellus cryptus</i>	No	No	R	3	No
Salt Lake Slater	<i>Haloniscus searlei</i>	No	No	R	3	No
Seastar	<i>Smilasterias tasmaniae</i>	No	No	R	3	No
Silky Snail	<i>Roblinella agnewi</i>	No	No	R	3	No
Skemps Snail	<i>Charopidae "Skemps"</i>	No	No	R	3	No
Snail (Cataract Gorge)	<i>Pasmaditta jungermanniae</i>	No	No	R	3	No
Sooty Albatross	<i>Phoebetria fusca</i>	No	No	R	3	Yes, annual counts.
Spider (Cataract Gorge)	<i>Migas plomleyi</i>	No	No	R	3	No
Striped Marsh Frog	<i>Limnodynastes peroni</i>	No	No	R	3	No
Tasmanian Hairstreak (butterfly)	<i>Pseudalmenus chlorinda myrsilus</i>	No	No	R	3	No
Weldborough Forest Weevil	<i>Enchymus sp. nov.</i>	No	No	R	3	No
Whinray's Cave Cricket	<i>Parvotettix whinrayi</i>	No	No	R	3	No
Wilson's Storm Petrel	<i>Oceanites oceanicus</i>	No	No	R	3	Yes, annual counts.
Blue Whale	<i>Balaenoptera musculus</i>	Yes	No	E	Low Priority	No
Fin Whale	<i>Balaenoptera physalus</i>	Yes	No	V	Low Priority	No- but sightings recorded.
Green Turtle	<i>Chelonia mydas</i>	Yes	No	V	Low Priority	No

Common Name	Scientific Name	Occasional Visitor to Tasmania?	Additional Threat?	TSPA 1995 Listing	Priority	Currently Monitored?
Hawksbill Turtle	<i>Eretmochelys imbricata</i>	Yes	No	V	Low Priority	No
Leathery Turtle	<i>Dermochelys coriacea</i>	Yes	No	V	Low Priority	No
Loggerhead Turtle	<i>Caretta caretta</i>	Yes	No	E	Low Priority	No

**Table 3. Monitoring Priorities for Species subject to a Potential Threat.**

Common Name	Scientific Name	Potential Threat	Status of Threat in Tasmania	Have Populations Declined as a Result of the Threat in Tasmania?	Does the Threat Occur Outside Tasmania?	Risk of Threat Spreading to or within Tasmania	Status of Species Elsewhere - Linked to Threat	Priority	Currently Monitored?
Eastern Barred Bandicoot	<i>Perameles gunnii</i>	Red Fox	Establishing	No	Yes	High	Critically Endangered (FFG Act), Endangered (EPBC Act)	1	No, but roadkill monitoring data exists.
Eastern Quoll	<i>Dasyurus viverrinus</i>	Red Fox	Establishing	No	Yes	High	Extinct (mainland Aust.)	1	Yes, detected in limited numbers in spotlight surveys
Tasmanian Bettong	<i>Bettongia gaimardi</i>	Red Fox	Establishing	No	Yes	High	Extinct (mainland Aust.)	1	Yes, detected in limited numbers in spotlight surveys
Tasmanian Pademelon	<i>Thylogale billardieri</i>	Red Fox	Establishing	No	Yes	High	Extinct (mainland Aust.)	1	Yes, Tasmanian Mammal Spotlight Surveys
Platypus	<i>Ornithorhynchus anatinus</i>	Mucor Fungus	Established	Unknown	No	High	Not listed	1	No

Common Name	Scientific Name	Potential Threat	Status of Threat in Tasmania	Have Populations Declined as a Result of the Threat in Tasmania?	Does the Threat Occur Outside Tasmania?	Risk of Threat Spreading to or within Tasmania	Status of Species Elsewhere - Linked to Threat	Priority	Currently Monitored?
Tasmanian Tree Frog	<i>Litoria burrowsae</i>	Chytrid Fungus	Established	No	Yes	High	Tas endemic (species in same genus listed as Critically Endangered, EPBC Act)	1	Yes, Tasmanian Tree Frog Survey
Rockhopper Penguin		90% decline on NZ subantarctic island populations due to unknown causes	Unknown	Unknown	Yes	Unknown	90% decline on NZ subantarctic island populations	1	No
Hooded Plover	<i>Thinornis rubricollis</i>	Red Fox	Establishing	No	Yes	High	Vulnerable (FFG Act)	2	Yes
Long-nosed Potoroo	<i>Potorous tridactylus</i>	Red Fox	Establishing	No	Yes	High	Vulnerable (EPBC Act, FFG Act)	2	No, but roadkill monitoring data exists.
Southern Brown Bandicoot	<i>Isoodon obesulus</i>	Red Fox	Establishing	No	Yes	High	Endangered (EPBC Act, TSPC Act)	2	No, but roadkill monitoring data exists.
Moss Froglet	<i>Bryobatrachus nimbus</i>	Chytrid Fungus	Established	Unknown	Yes	High	Tas. endemic (species with similar life cycle listed as Endangered, EPBC Act)	2	No
Tasmanian Froglet	<i>Crinia tasmaniensis</i>	Chytrid Fungus	Established	Unknown	Yes	High	Tas. endemic (no species in genus listed in relation to	2	No

Common Name	Scientific Name	Potential Threat	Status of Threat in Tasmania	Have Populations Declined as a Result of the Threat in Tasmania?	Does the Threat Occur Outside Tasmania?	Risk of Threat Spreading to or within Tasmania	Status of Species Elsewhere - Linked to Threat	Priority	Currently Monitored?
Tasmanian Native Hen	<i>Gallinula mortierii</i>	Red Fox	Establishing	No	Yes	High	threat, EPBC Act, FFG Act, TSPC Act) Tas. endemic	2	No
Banded Lapwing	<i>Vanellus tricolor</i>	Red Fox	Establishing	No	Yes	High	Not listed	3	No
Little Penguin	<i>Eudyptula</i>	Red Fox	Establishing	No	Yes	High	Not listed	3	Yes, limited areas
Long-tailed Mouse	<i>Pseudomys higginsii</i>	Red Fox	Establishing	No	Yes	High	Tas. endemic	3	No
Masked Lapwing	<i>Vanellus miles</i>	Red Fox	Establishing	No	Yes	High	Not listed	3	No
Eastern Banjo Frog	<i>Limnodynastes dumerilii</i>	Chytrid Fungus	Established	Unknown	Yes	High	Not listed	3	No
Smooth Froglet	<i>Geocrinia laevis</i>	Chytrid Fungus	Established	Unknown	Yes	High	Not listed	3	No
Southern Toadlet	<i>Pseudophryne semimarmorata</i>	Chytrid Fungus	Established	Unknown	Yes	High	Not listed	3	No
Spotted Marsh Frog	<i>Limnodynastes tasmaniensis</i>	Chytrid Fungus	Established	Unknown	Yes	High	Not listed	3	No

FFG Act = Victorian *Flora and Fauna Guarantee Act 1988*, EPBC Act = Commonwealth *Environment Protection and Biodiversity Act 1999*, TSP Act = Tasmanian *Threatened Species Protection Act 1995*.



**Table 4. Monitoring Priorities for Species that are Harvested/Culled.**

Common Name	Scientific Name	Legal Requirement for Monitoring?	Does Species have a restricted Extent of Occurrence?	Is Harvesting-Culling Pressure >15%pa?	Is Harvesting-Culling Pressure <5%pa?	Priority	Currently Monitored?
Bennetts wallaby	<i>Macropus rufogriseus</i>	Yes- Bass Strait Islands	No- Occurs over >50% of State	Yes-	No	1	Yes- harvest returns, questionnaires, statewide spotlight counts.
Brush-tail Possum	<i>Trichosurus vulpecula</i>	Yes- subject to renewal of Management Plan	No- Occurs over >50% of State	Yes-	No	1	Yes- harvest returns, questionnaires, statewide spotlight counts.
Cape Barren Goose	<i>Ceropsis novaehollandiae</i>	No	Yes- Occurs over <15% of State	Yes-	No	1	Yes- harvest returns, questionnaires, total counts on breeding islands.
Forester Kangaroo	<i>Macropus giganteus</i>	No	Yes- Occurs over <15% of State	Yes-	No	1	Yes- harvest returns, transect counts
Tasmanian Pademelon	<i>Thylogale billardierii</i>	Yes- Bass Strait Islands	No- Occurs over >50% of State	Yes-	No	1	Yes- harvest returns, questionnaires, statewide spotlight counts.
Fallow Deer	<i>Dama Dama</i>	No	No- Occurs over >30% of State	Yes-	No	1	Yes- harvest returns, counts on properties.
Short-tailed Shearwater	<i>Puffinus tenuirostris</i>	No	No- Occurs over >50% of State	Yes- on harvested islands only	Yes	1	Yes, harvest returns, pre- and post-harvest burrow occupancy rates.
Common Pheasant	<i>Phasianus colchicus</i>	No	Yes- Occurs over <15% of State	No-	?	2	Yes- harvest returns, transect counts.
Black Duck	<i>Anas superciliosa</i>	No	No- Occurs over >50% of State	No-	No	2	Yes- harvest returns, standard counts.
Brown Quail	<i>Coturnix ypsilophora</i>	No	No- Occurs over >50% of State	No-	?	2	Yes, harvest returns, non-target counts as part of goose counts.
Chestnut Teal	<i>Anas castanea</i>	No	No- Occurs over >50% of State	No-	No	2	Yes- harvest returns, standard counts.
Grey Teal	<i>Anas gracilis</i>	No	No- Occurs over >50% of State	No-	No	2	Yes- harvest returns, standard counts.
Mountain	<i>Tadorna</i>	No	No- Occurs over >50% of State	No-	No	2	Yes- harvest returns, standard

Common Name	Scientific Name	Legal Requirement for Monitoring?	Does Species have a restricted Extent of Occurrence?	Is Harvesting-Culling Pressure >15%pa?	Is Harvesting-Culling Pressure <5%pa?	Priority	Currently Monitored?
Duck	<i>tadornoides</i>		State				counts.
Wood Duck	<i>Chenonetta jubata</i>	No	No- Occurs over >30% of State	No-	No	2	Yes- harvest returns, standard counts.
Black Swan	<i>Cygnus atratus</i>	No	No- Occurs over >50%	No-	Yes	3	Yes- harvest returns, standard counts.
Common Wombat	<i>Vombatus ursinus</i>	No	No- Occurs over >50% of State	No-	Yes	3	Yes- non target species of spotlight surveys.
Forest Raven	<i>Corvus tasmanicus</i>	No	No- Occurs over >50% of State	Unknown- Unprotected wildlife- no figures available		3	No.
Silver Gull	<i>Larus novaehollandiae</i>	No	No- Occurs over >50% of State	No-	Yes	3	No.
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>	No	No- Occurs over >50% of State	No-	Yes	3	No.
Tasmanian Native Hen	<i>Gallinula mortierii</i>	No	No- Occurs over >50% of State	Unknown- Unprotected wildlife- no figures available		3	No.

**Table 5. Monitoring Priorities for Introduced Animal Species.**

Common Name	Species Name	>moderate impact	Is the species subject to an eradication or control program.	Is there potential for the species to spread into and affect high conservation areas?	High or moderate negative impact if spreads into areas of conservation significance	Priority	Currently Monitored?
Black Rat	<i>Rattus rattus</i>	Yes	Yes, Macquarie Is.	Yes, offshore islands	High, Maquarie Is, some offshore island	1	No, Macquarie Is., opportunistic island surveys
Common Starling	<i>Sturnus vulgaris</i>	Yes	Yes, Melaleuca and Birches Inlet only	No	High, Melaluca and Briches Inlet only	1	Yes, Melaleuca and Birches Inlet only
Red Fox	<i>Vulpes vulpes</i>	Yes	Yes	Yes, throughout Tasmania	Yes	1	Yes
European Rabbit	<i>Oryctolagus cuniculus</i>	Yes	Yes, Strathgordon only (Macquarie Is. likely)	No, spread largely achieved	High, Macquarie Island only.	1	Yes, Strathgordon and Macquarie Island
Indian Myna	<i>Acridotheres tristis</i>	Yes	Yes	Yes, potential to establish in Tasmania	High	1	Yes, relies on reporting rather than systematic surveys
Cat	<i>Felis catus</i>	Yes	No	Yes, offshore islands	High, offshore islands; moderate, mainland Tas.	1, offshore islands; 2 mainland Tas.	Yes, spotlight surveys, opportunistic island surveys
Ferret	<i>Mustela furo</i>	Yes	No	Yes, potential to establish in the wild and spread.	Moderate	2	Yes, relies on reporting rather than systematic surveys
Dog	<i>Canis familiaris</i>	Yes	Yes, Walls of Jerusalem only	Yes, reserved lands	Moderate	2	Yes, relies on reporting rather than systematic surveys

Common Name	Species Name	>moderate impact	Is the species subject to an eradication or control program.	Is there potential for the species to spread into and affect high conservation areas?	High or moderate negative Impact if spreads into areas of conservation significance	Priority	Currently Monitored?
English Wasp	<i>Vespula vulgaris</i>	Yes?	No	Yes	Unknown	2	No
Fallow Deer	<i>Dama dama</i>	Yes	No	Yes, reserved lands	Moderate	2	Yes, CPCA only
Goat	<i>Capra hircus</i>	Yes	Yes	Yes, reserved lands	Moderate	2	Yes, relies on reporting rather than systematic surveys
Long-necked Tortoise	<i>Cheledonia longicollis</i>	Yes?	No	Yes, reserved lands	Moderate?	2	No
Pig	<i>Sus scrofa</i>	Yes	No	Yes, reserved lands	Moderate	2	Yes, relies on reporting rather than systematic surveys
Superb Lyrebird	<i>Menura novaehollandiae</i>	Yes	No	Yes, further spread into reserved lands	Moderate	2	Yes, relies on reporting rather than systematic surveys
Yabbie	<i>Cherax destructor</i>	Yes	No	Yes	Moderate	2	No
Brown Rat	<i>Rattus norvegicus</i>	Yes	No	Yes, offshore islands	High, offshore islands; low, mainland Tas.	2, offshore islands; Low Priority, mainland Tas.	No, except opportunistic island surveys
European Wasp	<i>Vespula germanica</i>	Yes	No	No, achieved spread	Moderate	Not a priority	No
Large Earth Bumblebee	<i>Bombus terrestris</i>	Yes	No	No, achieved spread	Moderate	Not a priority	No

## 7.0 CONCLUSIONS

- With the exception of threatened species, virtually all species identified as Priority 1 for monitoring and most species identified as Priority 2 are currently subject to some level of monitoring.
- Factors contributing to the low proportion of threatened species that are monitored are:
  - the large number of threatened species,
  - practical difficulties associated with monitoring some threatened species (eg some invertebrates),
  - limited resources, and
  - reliance on securing external funding.
- Threatened species are subject to on-going threats, such as habitat degradation/loss, and there is a number of land management planning processes aimed at minimising this impact. In the majority of cases the purpose of monitoring is to 'keep an eye on' the status of the species and to assess the success or otherwise of these management processes in protecting threatened species.
- To improve the capacity to monitor Priority 1 threatened species would require additional resources.
- Where appropriate monitoring of threatened species habitat may be a better and more efficient alternative to monitoring species numbers.
- Information is required on wildlife species most at risk from potential climate change impacts and that require monitoring.
- Very few of the existing programs have been independently reviewed to determine if they are capable of meeting their stated objectives. This has left the agency open to criticism as to whether the monitoring programs are adequate.
- Limited statistical expertise exists within the Resource Management and Conservation Division to adequately design and analyse monitoring data.
- The agency is at risk of losing some corporate knowledge because in some instances there is no documentation or inadequate documentation of the methods required to undertake existing monitoring programs. Further, information on monitoring methods and data is stored in a variety of locations including personal computers or paper files. Copies of methods and data need to be stored at a centralised location and updated on an annual basis.
- Some species are monitored using more than one method. This can be useful in providing independent approaches to monitoring species and identify problems with monitoring techniques if trends differ. This may also

be an area where resources may be rationalised or re-directed into other areas.

- Although much monitoring information is made available in reports and publications, more can be done to provide stakeholders and the wider public with access to current information. Stakeholders should be informed about what monitoring is taking place and provided with results of monitoring on a regular basis. Information on monitoring can be made available to stakeholders and the wider public through greater use of the web.

## **8.0 STRATEGIC RECOMMENDATIONS**

### **Monitoring Priority Wildlife**

- Priorities for monitoring will be determined using the Decision Key for Determining Priorities for Wildlife Monitoring.
- Monitoring priorities and the decision key will be reviewed in light of new information to ensure that monitoring continues to meet the needs of conservation and management.
- Facilitate research to determine which species of wildlife are most at risk from climate change and require monitoring.

### **Quality Assurance**

- Establish an advisory group to assess adequacy and efficiency of current monitoring programs, review monitoring priorities and, where necessary, recommend new monitoring programs.
- The proponent of a new wildlife monitoring program must prepare a written proposal that is approved by the relevant Branch Manager and incorporated into the Branch Business Plan.
- New monitoring programs must be consistent with the monitoring strategy.
- New monitoring programs that involve significant time and resources need to include sufficient resources for appropriate statistical advice in its funding arrangements.
- Where appropriate, monitoring programs should specify triggers for management response and the type of response.
- All existing monitoring programs that involve significant time and resources should be subject to independent peer review such as publication in peer-reviewed journals or independent scrutiny.

### **Knowledge Management**

- The monitoring methods for new programs as well as all existing programs must be written up as establishment reports detailing everything necessary to undertake the monitoring program.

- All existing reports on methods and future establishment reports must be stored electronically, backed-up at a central location available to all divisional staff, and maintained by relevant sections within each branch of the division with proper support from the agency.
- Copies of all monitoring data should be stored and backed-up at a central location available to all divisional staff, and maintained by relevant sections within each branch of the division with proper support from the agency.
- An appropriate system needs to be established with on-going support by the Resource Management and Conservation Division and by Corporate Information Technology Branch, to enable efficient centralised storage of monitoring information.
- The Natural Values Atlas will be the central repository for information on wildlife monitoring undertaken by the Department of Primary Industries and Water.

#### **Staff Training and Development**

- Provide information to staff about their role in implementing the strategy.
- Encourage staff participation in relevant training programs.
- Staff should be encouraged and given time to publish results of monitoring programs in peer reviewed journals.

#### **Welfare, Safety and Other Statutory Obligations**

- All monitoring programs must comply with the requirements of the *Animal Welfare Act 1993* and the *Workplace Health and Safety Act 1995*.
- All monitoring programs must comply with any relevant requirements of the Nature Conservation Act 2002, Threatened Species Protection Act 1995, Environment Protection and Biodiversity Conservation Act 1999 and any other relevant legislation.
- Establishment reports for wildlife monitoring programs must contain an explicit statement about whether the monitoring program meets the legislative requirements above.

#### **Public Communication**

- Establish web pages to make available to the public what wildlife is being monitored and results of the monitoring with regular updates.
- Encourage staff to publish results of monitoring programs in agency publications, popular articles and in peer reviewed journals.
- Undertake pro-active and positive engagement with the media to promote monitoring programs.

## Capacity

- Encourage further collaboration with other organisations to participate in monitoring and analysis.
- Encourage and, where appropriate, co-supervise post-graduate students in the review of survey designs.
- Encourage non-departmental people to assist with monitoring programs where appropriate.
- Investigate other methods of remote monitoring of species and their habitat.
- Ensure there is no unnecessary duplication of monitoring efforts.

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## **Appendix I Current and Historical Wildlife Monitoring Programs**

Based on surveys of RMC staff between February and July 2007.

### Acronyms used in Appendix I

AAD	Australian Antarctic Division
BCB	Biodiversity Conservation Branch
CAMBA	China Australia Migratory Bird Agreement
CIT	Corporate Information Technology
D Drive	Refers to storage area on personal computers and relies on staff to back up data.
DEH	Commonwealth Department of Environment and Heritage
DFTD	Devil Facial Tumour Disease
DPIW	Department of Primary Industries and Water
FPA	Forest Practices Authority
FTE	Full-time equivalent
JAMBA	Japan Australia Migratory Bird Agreement
M Drive	Is server where data may be stored and the information is automatically backed up by CIT daily.
OBP	Orange-bellied Parrot
PC	Personal Computer
PELIS	Permit and Licensing System, a database managed by CIT
PWS	Parks and Wildlife Service
RMC	Resource Management and Conservation Division
S Drive	Refers to storage area on personal computers and relies on staff to back up data.
TSS	Threatened Species Section
WMB	Wildlife Management Branch
WMCS	Wildlife and Marine Conservation Section

Monitoring Program Grouping	Rare or Threatened Species	Rare or Threatened Species	Rare or Threatened Species
<b>Name of Program</b>	<b>Australian and NZ Fur Seal Abundance and Population trends - Breeding Sites</b>	<b>Australian and NZ Fur Seal Abundance and Population trends - Haulout Sites</b>	<b>Australian and NZ Fur Seal Mortality Monitoring</b>
Coordinator, Section and Branch within Resource Management and Conservation Division	Rosemary Gales, Wildlife and Marine Conservation Section, BCB	Rosemary Gales, Wildlife and Marine Conservation Section, BCB	Rosemary Gales, Wildlife and Marine Conservation Section, BCB
<b>Species targeted for monitoring</b>	Australian Fur Seal, New Zealand Fur Seal	Australian Fur Seal, New Zealand Fur Seal	Australian Fur Seal, New Zealand Fur Seal
<b>Are other non-target species recorded (list them)</b>	Opportunistic island seabird counts	Cetacean and sea bird species	None
<b>Purpose of monitoring</b>	Monitor the status of the species in Tasmania. New Zealand Fur Seal is listed as threatened species. Both seal species are subject to illegal killing predation on fishing operations (aquaculture and wild fisheries) and die from entanglement and ingestion of marine debris.	Monitor the status of the species in Tasmania. New Zealand Fur Seal is listed as threatened species. Both seal species are subject to illegal killing predation on fishing operations (aquaculture and wild fisheries) and die from entanglement and ingestion of marine debris.	To investigate causes of seal mortality.
<b>Extent of monitoring (state if Statewide, Regional, Property or Site)</b>	Regional. New Zealand Fur Seal: islands within the Maatsuyker and Tasman group. Australian Fur Seal: islands within Bass Strait (Tenth, Judgement, Moncouer Islands, and Reid, East Moriarty, West Moriarty Rocks); also coordinate with Victorian researchers for surveys throughout species range (2005 and 2008).	Regional: Bull Rocks, Isle des Phoques, Cape Hauy, Cape Pillar, Tasman Island, Cape Raul Friars, Maatsuyker Island	Statewide
<b>Describe what is monitored (counts, density, index, population characteristic, health status, etc) and number of monitoring sites</b>	New Zealand Fur Seal: total count of pup production on islands used for breeding, number of colonies occupied/established. Australian Fur Seal: total count of pup production by direct and mark/recapture counts, breeding biology such as extended maternal investment, and aerial photographs to obtain counts of animals. For both species marine debris entanglement is recorded.	Numbers of seals on haulout sites (index of total population trends). Number of entanglements (index of entanglement rate). Number of pups (monitor expansion in number of breeding islands).	Location, cause of death, age, sex and morphometrics of seals reported dead on Tasmanian coastlines.
<b>Year monitoring started</b>	Pre-1990	Early 1990s	Early 1990s
<b>Year monitoring completed (or put ongoing if ongoing)</b>	Ongoing	Ongoing	Ongoing
<b>Frequency of survey</b>	Annual	3 to 4 times year plus incidental reports throughout the year from tour operators	All year
<b>Timing of survey (when performed)</b>	New Zealand Fur Seal: March - April. Australian Fur Seal: January for Bass Strait Islands	Summer, autumn, winter and spring except on Maatsuyker where photos are taken of the Needles every second week. Incidental reports throughout the year from tour operators.	When dead seals are reported.
<b>Days of staff time required to complete survey (including data entry). Please give RMC staff time separate to other staff (eg PWS/UTAS)</b>	New Zealand Fur Seal: RMC - 3 personnel 10 days in the field, 1 person 4 days data analysis and write up. Australian Fur Seal: RMC - 4 personnel 10 days in the field, 1 person 15 days data analysis and write up.	RMC - 12 person days plus on Maatsuyker Island scanning and counting takes 3 person days.	RMC - 2 personnel 2 days/month (48 days). Plus external researcher to age teeth
<b>Days of volunteer staff time required to complete survey (including data entry)</b>	None	Maatsuyker, Australian Fur Seal: one photo every second week 10 min X 26 (=4.5 hours year)	None
<b>Where is data stored (program and where data held eg personal computer file, M: Drive, etc. What back-up systems are in place for electronic databases)</b>	Excel spreadsheet and MS Word report, both held electronically in the shared MARINE folder on M: drive, and external backup hard drive.	Excel spreadsheet and MS Word report, both held electronically in the shared MARINE folder on M: drive, and external backup hard drive.	Access database (Seabase) on M: Drive.
<b>Documentation of survey methods (does it exist, where is the documentation, please provide a copy)</b>	New Zealand Fur Seal: Brothers, N. and Pemberton, D. 1990. Status of Australian and New Zealand fur seals at Maatsuyker Island, Southwest Tasmania. Australian Wildlife Research 17: 563-9. Australian Fur Seal: Kirkwood, R., Gales, R., Terauds, A., Arnould, J. P. Y., Pemberton, D., Shaughnessy, P. D., Mitchell, A. T., Gibbens, J. 2005. Pup production and population trends of the Australian fur seal ( <i>Arctocephalus pusillus doriferus</i> ). Marine Mammal Science 21 (2): 260-282. Pemberton, D., and Gales, R. 2004. Australian fur seals ( <i>Arctocephalus pusillus doriferus</i> ) breeding in Tasmania: population size and status. Wildlife Research 31: 301-303.	Marine Occurrence forms M drive	Standard proforma used to record information before entry into Seabase. Copy on M Drive and hard copy in office.
<b>Has the survey method been reviewed (if yes give details of who did the reviewing, what was reviewed and outcome)</b>	Yes, see references above.	No	No
<b>Are the results of the monitoring program made available to the public on a regular basis? If yes, how frequently is it provided and in what form (eg website, in newsletters or magazine articles - please give details).</b>	Yes, annual results published in the Princess Melikoff Trust annual report, and in publications (see above).	No, used in a basic form of harvest management and as a trigger for management of harvest activities	Princess Melikoff Trust annual reports
<b>Has the survey data and methods been published in a peer-reviewed journal (if yes give details of each publication).</b>	Yes, see publications above.	No	No
<b>Funding</b>	External	External	External

Rare or Threatened Species	Rare or Threatened Species	Rare or Threatened Species	Rare or Threatened Species
<b>Southern Elephant Seal Abundance and Population trends - Breeding Sites</b>	<b>Population and Foraging Ecology of Tasmania's Threatened Whales</b>	<b>Cetacean Sampling at Strandings</b>	<b>Soft-plumaged Petrel</b>
Rosemary Gales, Wildlife and Marine Conservation Section, BCB	Rosemary Gales, Wildlife and Marine Conservation Section, BCB	Rosemary Gales, Wildlife and Marine Conservation Section, BCB	Rosemary Gales, Wildlife and Marine Conservation Section, BCB
Southern Elephant Seal	Southern Right Whale, Humpback Whale	All cetaceans that strand (mainly pilot whales and sperm whales)	Soft-plumaged Petrel
Opportunistic island seabird counts	All other cetacean species	None	None
Monitor the status of species in Tasmania. Threatened Species.	Monitor the status of species in Tasmania. Identify important whale areas in Tasmania for the purposes of tourism and management. Monitor entanglement rates to assess if impact is increasing or not.	To determine reasons for stranding. To gather information on life history and health status.	To monitor the status of the species in Tasmania. Listed as threatened species.
Macquarie Island and Maatsuyker Island group.	Statewide	Statewide	Maatsuyker Island and other southern Tasmanian islands
Macquarie Island: Sampled count. Number of animals counted in selected colonies from which total elephant seal population for Macquarie Island is estimated. Maatsuyker: Number of animals recorded, sex, size class, breeding status and moult stage are recorded at both islands - based on opportunistic records from keepers, re-supply flights and as part of other surveys on island.	Number of reports/year (index of abundance). Location, sex, breeding status and individual identification using images of callosities, scars, tail flukes. How long the species are resident in Tasmanian waters. Genetics to determine which population they belong to.	Number of strandings reported. Number of cetaceans at each reported stranding. Record sex, age, size, diet, genetics and health status.	Presence/absence on islands and distribution on Maatsuyker Island. Trialing call-playback to locate birds. Known nest sites on Maatsuyker Island are surveyed annually pre- and post-breeding to measure breeding success and burrow occupancy.
Pre-1990.	2006 specifically, but opportunistically from late 1990s.	Early 1990s.	2002
Ongoing	Ongoing	Ongoing	Ongoing
Macquarie Island: 15 October. Maatsuyker Island Group: 4-5 times per year.	All year.	All year.	Annual
Macquarie Island: 15 October. Maatsuyker Island Group: 4-5 times per year during September-March. Undertaken as part of fur seal surveys.	Southeast Tasmania: fortnightly from May to December, monthly from January to April. Northwest Tasmania: Monthly from June to November. Opportunistic responses to specific sightings. Surveys are conducted only if weather is permitting.	When strandings reported.	Three times a year from September - April
RMC - 1 person 5 days in the field, 1 person, 2 days data analysis and write up. PWS and AAD staff on Macquarie Island 10 personnel, two field days.	RMC - 2 people for 26 field days, 1 person for 4 days data entry and analysis.	RMC - variable, estimated 72 days per year.	RMC - 10 person days.
None	None	None	None
Excel spreadsheet and MS Word report, both held electronically in the shared MARINE folder on M: drive, and external backup hard drive.	Excel spreadsheet and word document report, both held electronically in the shared MARINE folder on M: drive, External backup on hard drive.	Access database (Whalebase) stored on M: Drive	database on m drive and backed-up
Department of Environment and Water (Melissa Giese for Macquarie Is). New method for Maatsuyker Island with PWS	Standard proforma kept on the M Drive in BCB. Aerial survey method for southern right whales is currently based on Barnister (WA) but currently under review. Humpback whales and other cetaceans counted opportunistically during southern right whale surveys.	Stored on M: Drive. Hard copies held in WMCS.	No
Census technique used widely in published literature. A survey method was designed for Department of Environment and Water and accepted by all stakeholders at a Workshop in 2005 (Report available).	Survey method is currently under in-house review for Tasmanian conditions.	Commonwealth methods reviewed inhouse and adapted to meet local requirements.	No
Maatsuyker Island: Annual results published in the Princess Melikoff Trust annual report, and for species management and as a baseline dataset for other stakeholders. Macquarie Island - data submitted to AAD metadata annually.	Annual results published in the Princess Melikoff Trust annual report and as a baseline dataset for other stakeholders.	Annual results published in the Princess Melikoff Trust annual report and as a baseline dataset for other stakeholders.	No, but available on request. First published in Emu
Pemberton and Skira (1989) The elephant seal in Tasmania. Victorian Naturalist 108: 202-204. McMahion, C.R., Burton, H.R., Bester, M.N. 1999. First year survival of southern elephant seals, Mirounga leonina at Macquarie Island. Polar Biology 21: 279-84. Hindell, M.A. 1991. Some life history parameters of a declining population of southern elephant seals, Mirounga leonina. Slip, D. J. and H. R. Burton 1999. Population status and seasonal haulout patterns of the southern elephant seal (Mirounga leonina) at Heard Island. Antarctic Science 11: 38-47.	No	No	First record in Wiltshire, A. et al (2002). Soft plumaged petrels Pterodroma mollis breeding in Australia. Emu 104(4) 363-368
External	External	External	External

Rare or Threatened Species	Rare or Threatened Species	Rare or Threatened Species	Rare or Threatened Species
<b>Shorebird counts (annual winter/summer)</b>	<b>Devil Disease Monitoring</b>	<b>Raptor mortality and injury</b>	<b>Eagle Nest Monitoring</b>
Birds Tasmania assisted by Sally Bryant, Threatened Species Section and Stewart Blackhall, Wildlife and Marine Conservation Section, BCB	Clare Hawkins, Devil Facial Tumour Disease Program, WMB	Bill Brown, Threatened Species Section, BCB	Bill Brown, Threatened Species Section, BCB
All resident and migratory shorebirds	Tasmanian Devil	Wedge-tailed Eagle, White-bellied Sea Eagle, Peregrine, Swamp Harrier, Brown Falcon, Little Falcon, Grey Goshawk, Brown Goshawk, Masked Owl, Collared Sparrowhawk	Wedge-tailed Eagle, White-bellied Sea Eagle
Gulls, terns, ducks, Black Swan and cormorants	Spotted-tailed Quoll, Eastern Quoll, cat (occasional) and any other species trapped also recorded but extremely rare, eg Brushtail Possum and Dog	No	No
Monitor the status of these species in Tasmania and integrity of sites for the purposes of managing habitat. Includes threatened species (Fairy Tern, Little Tern and Eastern Curlew) and CAMBA, JAMBA species.	To assess distribution and demographic impact of DFTD, and to identify factors affecting this.	Identify threats to species and identify dangerous infrastructure (poles, power installations etc). Identify locations where mortalities/injuries are frequent so that management actions may be undertaken.	To improve knowledge of ecology and to minimise impact of forestry activities. Wedge-tailed Eagle is listed as Endangered. White-bellied Sea Eagle is listed Vulnerable.
Coastal beaches, statewide but rarely in southwest Tasmania.	Trapping: statewide except the southwest; cameras: southwest only	Statewide	Statewide
Total counts at 50 beaches providing an index of abundance.	Trapping: total counts; recaptures used to estimate density, survival; individual age estimates; DFTD status; parasite loads. Six regular monitoring sites; others trapped in a similar format, most notably two others run by students. Camera trapping: counts, recapture (used to estimate density) and approximate estimate of DFTD status; no regular monitoring sites but general focus in World Heritage Area.	Any raptor injuries and mortalities reported are investigated and documented. Monitor the number of incidents, number of mortalities, number of injuries, type and source of injuries.	Between 20 and 100 random nests are monitored each year, the number varies depending on resources. Nests are checked to see if they are active and producing young. Nest activity is related to nearby disturbance. Forestry Tasmania monitors approx. 200 nests/year in coupes to see if they are active prior to harvest activities. No. of nests, tree dimensions, nest usage, vegetation type, level of abundance
1970s	2004	2000	1980's but more regular since 2000
Ongoing	Ongoing, though under review	Ongoing	Ongoing
Annual	Two west coast, disease free sites are monitored annually; four diseased sites are monitored 3-4 times a year.	Opportunistic	Annual during the breeding season
Summer (January-February) and Winter (June-July). Tide dependent.	Granville Harbour: April; Woolnorth: August; Bronte: February, May, October; Fentonbury: January, April, July, October; Mt William: December, March, July; Buckland: January, June, September	All year.	Breeding season (August-January).
RMC - 4 person days per year.	RMC - single staff member, 11-13 days per survey	RMC - 1 FTE for 3 weeks per year.	RMC - 1 FTE for 2 months per year. Forestry Tasmania - 120 person days per year.
Birds Tasmania organise volunteers	Two volunteers, 11-13 days per survey	None	None
Birds Tasmania annual report (Library)	DFTD Program database on M drive	Access database on Bill Brown's desktop computer and backed up on M: Drive.	Access database on Bill Brown's desktop computer and backed up on M: Drive. Nest locations on the Natural Values Atlas.
Birds Tasmania annual report (Library)	Some information in Hawkins et al. (2006) <i>Biological Conservation</i> 131:307-324; also in three monitoring project plans from 2004. More in assorted documents, planning to bring together more formally this year, concluding a report on camera trapping methodology.	Proforma available for use from front desk and has been sent out to PWS offices	Protocols and Power Point training program on Bill Brown's desktop computer and FPA technical note series available on FPA website.
No	To some extent in the paper. To be further reviewed by team and Hamish McCallum as part of general review of monitoring over the next three months.	No	No
Yes - Birds Tasmania annual report.	Newsletters every three months, press releases (irregular, typically 3-4 times a year), conferences (typically around 2 a year), scientific papers (one last year, one already this year, several more anticipated over the next two years), website.	No, but on request	No
No	Yes: Hawkins et al. (2006) <i>Biological Conservation</i> 131:307-324; another recently accepted in <i>Ecohealth</i> .	No	No
External (some State)	State/External	External	External

Rare or Threatened Species	Rare or Threatened Species	Rare or Threatened Species	Rare or Threatened Species
<b>Meander Dam Spotted-tailed Quoll Monitoring</b>	<b>Orange-bellied Parrot Recovery Program</b>	<b>Swift Parrot Nest Monitoring</b>	<b>Swift Parrot in E. globulus Monitoring</b>
Greg Hocking, Wildlife Policy and Planning Section, WMB	Mark Holdsworth Threatened Species Section, BCB	Matt Webb, Threatened Species Section, BCB	Matt Webb, Threatened Species Section, BCB
Spotted-tailed Quoll	Orange-bellied Parrot	Swift Parrot	Swift Parrot
Other mammal species caught in traps are recorded including Tasmanian Devil and Eastern Quoll	Blue-winged parrot	Other hollow nesting birds	None
To monitor the impact of dam construction and inundation on the local Spotted-tailed Quoll population	Monitor status of the species in Tasmania. Listed as Endangered in Tasmania. Includes monitoring the success of management actions such as release of captive-bred birds, provision of predator proof nestboxes, supplementary feeding and predator control.	Monitor status of species in Tasmania. Listed as Endangered	Monitor status of species in Tasmania. Listed as Endangered
Site: within and around the proposed inundation zone of the meander dam	Regional: southwest, west coast and west Bass Strait Islands.	Regional - at sites throughout the species breeding range	Regional: E. globulus forests of eastern Tasmania.
Relative density index. Counts of animals trapped.	Monitor survivorship of birds by banding fledglings and determining the proportion of banded birds observed each breeding season. An index of reproductive success is determined from monitoring the number of fledglings in artificial nest boxes. Movement and habitat use of individual birds is also monitored by direct observation.	Monitoring program is currently being developed. Involves identifying nesting and foraging habitats during the breeding season. Measuring temporal and spatial changes in habitat use.	Counts of birds at sites containing E. globulus. Index of use of flowering trees.
2005	1988	2004	1998
Follow up survey will be undertaken 2 years after the operation of the dam	Ongoing	Ongoing	2005
3 surveys will be undertaken over 10 years	Annual	Annual	Annually
Late winter early spring	October-March monitoring breeding birds at Metaleuca and Birch's Inlet. February-September monitoring non-breeding birds at other sites.	Breeding season (September-January).	Breeding season (September-January).
RMC- 2 personnel 10 days in field and 1 person 5 days write up	RMC - 0.5 FTE plus 2 people for 15 days field work.	RMC - 1 person full time for 3 months plus 2 casuals for 3 weeks	RMC - 1 person for six weeks.
None	Birches Inlet and Metaleuca: 60 people from October to March. Non-breeding surveys: 30 people for 5 weekends, plus others as part of national count.	Varies but has been up to 100 volunteer days per year	None
Both paper and electronic storage in Excel spread sheet on D drive.	Reproductive success, survivorship and demography on Filemaker database on M. Holdsworth's desktop computer. Birds Australia holds national monitoring data. Hard copies of all monitoring data held in TSS.	Natural Values Atlas and Excell database on desktop computer.	M: Drive
Documentation of survey methods is presented in the report held on Greg Hockings D:Drive and sent to Environment Division at Dept. of Environment, Parks, Heritage and the Arts.	Reproductive success, survivorship and demography in Holdsworth MSc Thesis (2006). National counts in Birds Australia reports (since 1991).	Yes, on desktop computer (TSS) and in Voogdt Horn's Theses (Library).	M: Drive
No	No review but pending under OBP recovery plan (2006-2010)	No - review pending	No
No	No - but available if requested. National Counts published in annual reports.	No	No
No	No (papers pending in EMU).	Paper pending	No
State	External	External	External

Rare or Threatened Species Pedra Branca Skink	Rare or Threatened Species Forty-spotted Pardalote	Rare or Threatened Species Ptunnarra Brown Butterfly	Species that are Listed as Threatened Oil Spill Response Seabirds
Matt Webb, Threatened Species Section, BCB	Matt Webb, Threatened Species Section, BCB	Phil Bell (TSS)	Rosemary Gales, Wildlife and Marine Conservation Section, BCB
Pedra Branca Skink	Forty-spotted Pardalote	Ptunnarra Brown Butterfly	All Oil Spill Response Atlas Seabirds
None	None	Common Brown, Shouldered Brown, Silver Xenica, Cabbage White and European Wasp	None
Monitor status of species in Tasmania. Listed as vulnerable.	Monitor status of species in Tasmania. Listed as Endangered.	Monitor status of the species and habitat. Listed as vulnerable in Tasmania.	To update capabilities to respond to oil spill emergencies.
Pedra Branca island, southeast Tasmania.	Regional.	Regional. Eastern Highlands to Northwest plains	Statewide
Original surveys were capture-mark-recapture using toe clipping to estimate total population. Since 2006, an index count of skinks observed during a one day visit to the island.	Total count of birds within known range during the breeding season.	Counts along standard transect at 15 sites to determine density and estimate total populations. Index of habitat condition using photo points. Fire history, grazing intensity recorded.	Data based on 1. Use of historical records (presence/absence). 2. Staff reports (presence/absence). 3 (focussed surveys (presence/absence) and visual estimate of total population). 4. Standard line transect counts undertaken as time allows when visiting islands. 5. Exhaustive search for species such as little penguins or where species occur in low densities).
1986	1985	1997	1999
Ongoing	Ongoing	2002 DPW, 2003 ongoing by Gunns and private consultants	Ongoing
Annual	Surveyed in 1985 and 1992. Next survey to be determined.	Annual	Opportunistic
April	August to December.	Autumn	Opportunistic
RMC - 2 person days	1 FTE for 5 months.	RMC - 10 person days.	RMC - 25 person days.
None	None	None	None
In WMCS shared file on M Drive.	In reports by Brown 1986 and Bryant 1992.	Excel files on P. Bell's desktop computer.	Updated every year and stored on M: Drive and at Australian Marine Safety Authority and PWS.
Original capture-mark-recapture monitoring methods are documented. Index count method not documented.	No	Reports - hard copies on DPIW files, Electronic copy on P. Bell's computer.	None
Yes, internally. Change to index count due to OH&S issues and change to less intensive monitoring.	No	No	No
Yes, in Pedra Branca Skink Recovery Program.	In Brown 1986 and Bryant 1992.	No, but available on request	No, but available on request. Also "Offshore Islands of Tasmania" by Brothers et al.
No	No	No	Offshore Islands of Tasmania by Brothers et al.
External	External	External	External

Species that are Listed as Threatened Macquarie Island Albatrosses and Giant Petrels	Species that are Listed as Threatened Macquarie Island Burrowing Petrels	Species that are Listed as Threatened Shy Albatross Population Status and Conservation Assessment	Species that are Listed as Threatened Raptor Monitoring
Rosemary Gales, Wildlife and Marine Conservation Section, BCB	Rosemary Gales, Wildlife and Marine Conservation Section, BCB	Rosemary Gales, Wildlife and Marine Conservation Section, BCB	Nick Mooney, Policy and Planning, Wildlife Management Branch BCB
Wandering Albatross, Black-browed Albatross, Light-mantled Albatross, Grey-headed Albatross, Southern Giant Petrel, Northern Giant Petrel	Blue Petrel, Soft-plumaged Petrel, Grey Petrel, Sooty Shearwater, White-headed Petrel, Cape Petrel	Shy Albatross	Tasmanian diurnal raptors
None	None	None	No
To monitor the status of the species on Macquarie Island. Threatened species.	To monitor the status of the species on Macquarie Island. All listed as threatened species except Sooty Shearwater, White-headed Petrel and Cape Petrel.	To monitor the status of the species in Tasmania. Listed as threatened species.	To monitor changes in abundance in relation to changes in land use and rainfall.
Macquarie Island	Macquarie Island.	Albatross Island, Mewstone and Pedra Branca.	Statewide where there are roads
Total Counts of all species except the Northern Giant Petrel, which are sample counts from which a total population is estimated. Population numbers, survival (albatrosses only) and breeding success	Cape, White-headed and Grey Petrel - total count of active burrows. Blue Petrel and Sooty Shearwater - subset of sites with burrows monitored. Soft-plumaged Petrel - monitored by vocal activity and search for burrows (very rare/cryptic).	Albatross Is - total number of chicks annually; periodically total number of eggs and annually count a subsample of eggs at standard nest locations (to record breeding success and breeding effort). Pedra Branca - annual on-ground count of total chicks and aerial counts of adults. Mewstone: subsample of adults and chicks from aerial photographs.	Total counts along roads
Current program started in 1994, opportunistic data prior to that.	2002	1980	1977
Ongoing	Ongoing	Ongoing	Ongoing
Annual	Annual	Albatross Island: 3-4 times per year. Mewstone and Pedra Branca: 1-2 times per year.	1977-1986 regular, spasmodic since
October-April	Spring except for Grey Petrel in Winter	Sept-April	All year in the course of other duties
RMC: 6 months for two staff each year	PWS - Half time for one person all year under guidance from BCB staff.	RMC - field survey work 30 person days, data entry 20 person days.	None, extra to other surveys.
None	None	None	None
Database on M drive	PWS and BCB database	Access database on M: Drive and backed-up.	Most is in personal diaries, some with Birds Australia as BOPWatch data.
No	Terauds, A and Headley, G. (2006). Burrow Petrels on Macquarie Island - Monitoring Manual 2006-2007 held electronically in WMCS.	Hard copy of field manual in WMCS and electronic copy on M: Drive. Annual reports of results to DEH also include survey method.	No
Terauds, A., R. Gales and R. Alderman (2005). Trends in population numbers and survival of black-browed and grey-headed albatrosses on Macquarie Island. Emu - Austral Ornithology 105: 159-168. Terauds, A., R. Gales, G. B. Baker and R. Alderman (2006). Population and survival trends of Wandering Albatrosses Diomedea exulans breeding on Macquarie Island. Emu - Austral Ornithology 106: 211-218.	Schultz, M., Robinson, S., and R. Gales (2005) Nesting of the Grey Petrel Procellaria cinerea on Macquarie Island. Emu - Austral Ornithology 105: 323-329	No	No
Data contributed to Agreement on Conservation of Albatrosses and Petrels (ACAP) database annually.	No	No, but available on request. Annual reports provided to DEH annually.	Occasional through Birds Australia
Terauds, A., R. Gales and R. Alderman (2005). Trends in population numbers and survival of black-browed and grey-headed albatrosses on Macquarie Island. Emu - Austral Ornithology 105: 159-168. Terauds, A., R. Gales, G. B. Baker and R. Alderman (2006). Population and survival trends of Wandering Albatrosses Diomedea exulans breeding on Macquarie Island. Emu - Austral Ornithology 106: 211-218.	Schultz, M., Robinson, S., and R. Gales (2005) Nesting of the Grey Petrel Procellaria cinerea on Macquarie Island. Emu - Austral Ornithology 105: 323-329	No	No
External	External	External	State



Species that are Listed as Threatened Persistent Pesticides in Raptors	Species Subject to a Potential Threat Tasmanian Tree Frog	Species Subject to a Potential Threat Cave Fauna Monitoring Program	Species Subject to a Potential Threat Impact of Climate on Biodiversity
Nick Mooney, Policy and Planning, Wildlife Management Branch	Matthew Pauza, Wildlife and Marine Conservation Section, BCB	Michael Driessen, Wildlife and Marine Conservation Section, BCB	Michael Driessen, Wildlife and Marine Conservation Section, BCB in collaboration with Forestry Tasmania and University of Tasmania
Tasmanian raptors	Tasmanian Tree Frog	Tasmanian Glow-worm, Tasmanian Cave Cricket	Invertebrates and birds
No	Brown Tree Frog, Tasmanian Froglet, Brown Froglet and incidental observation of other frog species	Ida Bay Cave Beetle, Ida Bay Cave Harvestman	None
To track persistence of pesticides as an environmental health issue and to relate it to breeding success of raptors.	To survey the distribution of the Tasmanian Tree Frog and to establish monitoring sites to assess impact of amphibian frog fungus.	To provide a baseline monitoring program against which future impacts may be compared against. Ida Bay caves identified as having potential for increased tourism. Glow-worm listed as a world heritage value. Ida Bay Cave Beetle and Harvestman listed as Rare.	To detect change in the distributions of animal populations in relation to climate change for the purposes of gathering evidence of climate change.
Statewide	Regional: western Tasmania, particularly the TWWHA	Exit and Mystery Creek Caves, Ida Bay.	Mt Weld/WARRA
All carcasses and added or deserted eggs that came to hand through DPIW or public museums were sampled and tested. Productivity of those species was recorded for comparison on an ad-hoc basis or as part of other monitoring (eg for peregrine falcons).	Distribution and Relative Density Index. Survey distribution of species. Number of calls recorded at standard sites.	Counts of all species at designated sections of the caves (Index of Abundance).	Index of abundance/activity. At every 100 metre contour from 100m to 1300m invertebrates are sampled using pitfall traps and malaise traps and birds are recorded by call or sound.
1973	2006	1998	2001
Ceased in 1986 when user-pays was applied to the analytical labs.	2007	2000	2002
Monthly	Baseline only	Monthly for 2 years	10 years
All year round.	Throughout the peak calling and breeding period from spring through to autumn	Monthly for 2 years	November-April
40 person days.	RMC - 9 months	RMC - 12 person days in the field, 25 person days data entry and analysis.	RMC - 1FTE for 12 months.
None	Approx. 20 days per 9 month	12 person days.	21 person days.
Hard copy as lab reports in DPIW files	Both paper and electronic storage in Excel spread sheet on D drive.	Excel files on M. Driessen's desktop computer and backed up on DVDs held in office. Also hard copy in establishment report: Driessen (2008). Baseline Monitoring of the Tasmanian Glow-worm and other Cave Fauna in Exit Cave and Mystery Creek Cave, Tasmania. DPIW.	Forestry Tasmania
No	No	Electronic files on M. Driessen's desktop computer and backed up on DVDs held in office. Hard copy report, Driessen (2008). Baseline Monitoring of the Tasmanian Glow-worm and other Cave Fauna in Exit Cave and Mystery Creek Cave, Tasmania. DPIW.	Grove, S. (2004). Warra-Mount Weld Altitudinal Transect Ecotonal and baseline Altitudinal Monitoring Plots (BAMPS): Establishment report. Technical report No. 17/2004. Forestry Tasmania. Doran, N., Balmer, J., Driessen, M., Bashford, R., Grove, S., Richardson, A. M. M., Griggs, J. and Ziegeler, D. (2003). Moving with the times: baseline data to gauge future shifts in vegetation and invertebrate altitudinal assemblages due to environmental change. <i>Organisms, Diversity and Evolution</i> 3: 127-149. MacDonald (2001). Altitudinal distribution of birds at the Warra LTER Site, southern Tasmania: a preliminary study. <i>Tasforests</i> 13 (1): 87-100.
No	No	No	No
No	Some results have been made available to the public and interest groups through media releases, articles in journals and presentations	Available on request. Has been provided in public talks.	In publications
Some has	No	No	Doran, N., Balmer, J., Driessen, M., Bashford, R., Grove, S., Richardson, A. M. M., Griggs, J. and Ziegeler, D. (2003). Moving with the times: baseline data to gauge future shifts in vegetation and invertebrate altitudinal assemblages due to environmental change. <i>Organisms, Diversity and Evolution</i> 3: 127-149. MacDonald, M. (2001). Altitudinal distribution of birds at the Warra LTER Site, southern Tasmania: a preliminary study. <i>Tasforests</i> 13: 87-100.
State	External	External	External

Species Subject to a Potential Threat	Species Subject to a Potential Threat	Species Subject to a Potential Threat	Species Subject to a Potential Threat
<b>Effects of Fire on Hickman's Allanspides</b>	<b>Effect of fire on small mammals in montane moorland.</b>	<b>Effect of fire on invertebrates in buttongrass moorlands</b>	<b>Monitoring of Ecological Impacts of DFTD</b>
Michael Driessen, Wildlife and Marine Conservation Section, BCB	Michael Driessen, Wildlife and Marine Conservation Section, BCB	Michael Driessen, Wildlife and Marine Conservation Section, BCB	Nick Mooney, Policy and Planning, Wildlife Management Branch
Hickman's Allanspides	Broad-toothed Mouse, Swamp Rat and Swamp Antechinus	Invertebrates that inhabit above ground vegetation and ground litter and that will be captured by sweep nets and pitfall traps	Feral Cats, Tasmanian Devils, Spotted-tailed Quolls, Eastern Quolls, Bennetts Wallaby, Tasmanian Pademelon, Common Wombat, Short-beaked Echidna, Forest Raven, Wedge-tailed Eagles, Marsh Harriers, Brown Falcons
Allanspides helonomus, Ombrastacoides huonensis	None	None	The non-target impacts will be vegetation browsing levels and impacts of Feral Cats (2 research projects)
To determine impact of fire on species to provide fire management recommendations for the conservation of the species. Listed as Rare in Tasmania.	To determine the impact of fire on species to provide fire management recommendations for the conservation of the species. At start of program status of broad-toothed mouse considered to be unknown and under threat from fire.	To determine impact of fire on invertebrate biodiversity to provide fire management recommendations for the conservation of the species.	To track changes in abundance of key competitors and prey and generate research on their impacts for management
Regional: Lake Pedder and Lake Gordon areas.	Lake St Clair area.	Lake St Clair and Lake Pedder areas.	Statewide
Before-after-control-impact design. Index counts using live trap and release on grids that have either been burnt or left unburnt.	Before after-control-impact design. Live trap and release using minimum known to be alive. Two treatments and one control site.	Index of abundance/activity. Before-after-control-impact design at both study areas (1 site near Lake St Clair, 2 sites near lake Pedder). Space-for-time monitoring at both study areas (25 sites near Lake St Clair and 19 sites near Lake Pedder).	Survey methods have yet to be developed. Different surveys will be needed for various species but there will be much integration with other monitoring (eg with statewide spotlight surveys, Forester Kangaroo monitoring, monitoring key at-risk species from Red Fox).
1999	1995	BACI: 1999, SFT 2004.	To be commenced in 2007
Due to be completed in 2008.	Ongoing	BACI: 2007, SFT 2004.	
Annual	Annual	BACI: Annual. SFT: one-off but could be easily repeated.	
September	May	February-March	
RMC - 3 person days.	RMC 14 person days. PWS - 2 person days.	RMC - BACI: field = 12 person days; invertebrate sorting 30 person days. SFT: field = 16 person days, invertebrate sorting is 55 person days	To be determined
None	Variable, approx. 1 person day.	None	To be determined
Electronic files on M. Driessen's desktop computer and backed up on DVDs held in office.	Electronic files on M. Driessen's desktop computer and backed up on DVDs held in office.	Electronic files on M. Driessen's desktop computer and backed up on DVDs held in office.	
No	Yes, Driessen, M.M. (1999). Effects of fire on the broad-toothed mouse, Mastacomys fuscus, and other small mammals in buttongrass moorlands of western Tasmania – preliminary findings. Pp 119-126 in The Proceedings of the Australian Bushfire Conference, Albury Australia 7-9 July 1999. Also updated version on M. Driessen's desktop computer and backed up on DVDs held in office.	Yes, Electronic files on M. Driessen's desktop computer and backed up on DVDs held in office.	
No	No	Yes, in part, initial BACI design reviewed by Leon Barmuta, University of Tasmania. Professional statistical advice was sought before implementing the SFT study.	
No	Presented in public talks to community groups, university seminars and conferences. Available on request.	Presented in public talks to community groups, university seminars and conferences. Available on request.	
No	No	No	
External	External	External	State/External

Species Subject to a Potential Threat	Species that are Harvested/Culled	Species that are Harvested/Culled	Species that are Harvested/Culled
Monitoring key at-risk species from foxes	Short-tailed Shearwater (Muttonbird) Surveys	Waterbird Harvest Monitoring	Deer Harvest Monitoring
Nick Mooney, Policy and Planning, Wildlife Management Branch	David Leguis, Wildlife Policy and Planning Section, WMB	Graham Hall, Game Management Unit, WMB	Graham Hall, Game Management Unit, WMB
Tas. Bettong, Eastern Barred Bandicoot, Tas. Devil, Spotted-tailed and Eastern quolls, Bennetts Wallaby, Tas. Pademelon, Brushtail Possum, Tas. Native-nen, Masked and Banded Lapwings, Long-tailed and New Holland mice, Little Penguin, Short-tailed Shearwater, Marsh Harriers	Short-tailed Shearwater	Hunted Ducks: Grey Teal, Chestnut Teal, Mountain Duck, Black Duck, Wood Duck	Fallow Deer
Yes - species of secondary importance such as Long-nosed Potoroo and Ringtail Possum	Little Penguin	None	None
To track changes in abundance of key competitors and prey for management	To monitor trends in abundance on rookeries subject to recreational harvesting to assist in managing for a sustainable harvest.	Monitor regional trends in composition of species harvest and sex ratios.	To provide property based management of deer. To inform landholders of the number of deer harvested and observed on their properties. To manage the quality of the deer herd for hunters.
Statewide	Regional: Furneaux Islands - Big Green I, East Kangaroo I, Little Green I, Little Dog I, West Coast - Ocean Beach (Strahan).	Statewide.	Property based but potential to extrapolate regional trends.
Survey methods have yet to be developed. Different surveys will be needed for various species but there will be much integration with other monitoring (eg with statewide spotlight surveys, Forester Kangaroo monitoring, monitoring Ecological Impacts of DFTD).	Percentage occupancy of burrows transects (100 by 2 m) pre- and post-recreational harvest to provide an index of abundance. The number of paired adults in burrows is recorded pre-harvest in December. The number of chicks in burrows is recorded pre-and post-harvest in March and April respectively.	Hunters voluntarily provide wings and heads of ducks for the purposes of aging (young/old) and determining sex respectively. The number of ducks provided for each region varies as it depends on hunter returns. Hunters are encouraged to send in wings and heads by placing a data form in Game Tracks magazine and visits to hunter camps during the opening weekend of the season. Several hundred returns are provided each year.	Hunters voluntarily provide information on numbers, sex, age (lower jaws are provided for aging), reproductive information (females), antler information (males) and other biological information (both sexes) for properties. Approximately 2500 records are provided each year for about 100 properties.
Has not commenced	1995	2003	1994
	Ongoing	Ongoing	Ongoing
	Annual	Annual	Annual
	December, March and April	Duck hunting season, usually March-June	Throughout the year.
500 person days extra to establish projects. What about ongoing monitoring? Need days per year	RMC - 15 person days (5 days for each of the 3 surveys). PWS - 9 person days (3 days for each survey).	RMC - approx. 8 person days per year.	RMC - approx. 60 days per year.
estimated 200 person days/ year	9 person days	None	None
	Irynej Skira's original notebooks held by Susan Skira. Data entered onto excel spreadsheet and stored on M: Drive.	Hard copy and electronic files on shared PCs at Cressy.	Hard copy and electronic files on shared PCs at Cressy.
	Skira, I. And Wapstra, J.E. (1980). Occupation of burrows as a means of estimating the harvest of short-tailed shearwaters in Tasmania. Emu 80, 233-8.	Yes, hard copy at Cressy.	Yes, hard copy at Cressy.
	Aspects of monitoring program reviewed by Bradley, J. S., Manson, K. M. and Wooller, R. D. (2000). Evaluation of the harvesting effort required to manage sustainable harvesting in an exploited seabird. Report 2. Simulation modelling to evaluate the power of monitoring regimes. Unpublished report. Biological Sciences, Murdoch University, Western Australia 6150.	No	Yes, review by Quality Deer Management Association in 2004.
	No	Yes, annually in Game Tracks, verbally to hunters.	Yes, annually in Game Tracks magazine, verbally to hunters, DPIW website, factsheet produced by the Game Management Unit.
	Methods published in Skira, I. And Wapstra, J.E. (1980). Occupation of burrows as a means of estimating the harvest of short-tailed shearwaters in Tasmania. Emu 80, 233-8.	No	No
State/External	State	State	State

Species that are Harvested/Culled	Species that are Harvested/Culled	Species that are Harvested/Culled	Species that are Harvested/Culled
<b>Pheasant Harvest Monitoring</b>	<b>Brown Quail Harvest Monitoring</b>	<b>Property-based Wildlife Harvesting</b>	<b>Wood Duck Surveys</b>
Graham Hall, Game Management Unit, WMB	Graham Hall, Game Management Unit, WMB	Graham Hall, Game Management Unit, WMB	Graham Hall, Game Management Unit, WMB
Common Pheasant	Brown Quail	Bennetts Wallaby, Tasmanian Pademelon, Brushtail Possum, Fallow Deer, Rabbit, Hare, Cat, Cape Barren Goose, Forester Kangaroo	Wood Duck
None	None	Any wildlife observed is recorded	Blue-Winged Shoveler, Hardhead, Musk Duck, Cape Barren Goose and Black Swan
To monitor trends in abundance and harvest in order to manage for a sustainable harvest.	To obtain estimates of the take of quail for use in management.	To inform property owners of the level of harvest on their properties and trends in abundance of species. Assists with determining need for crop protection permits.	To monitor trends in numbers, harvest and distribution on farm dams to manage for a sustainable harvest.
King Island.	Statewide.	Property based.	Statewide.
Number of male birds are counted along standard road transects to provide an index of abundance. Hunters voluntarily provide wings of shot birds for aging (young/old). Hunters provide harvest numbers. Approx. 100 wings are provided each year.	Relies on hunters voluntarily providing information on the number of birds harvested and providing wings to estimate age of birds. Has not proved successful to date to lack of data provided. No returns in 2006.	Numbers of animals seen and culled and level of effort is recorded in log books for each property.	Counts on 466 private farm dams to provide an index of abundance; 165 dams in the northwest, 182 dams in the northeast and 119 in the southeast.
1998	1999	1994	2003
Ongoing	Ongoing	Ongoing	Ongoing
Male bird counts every two years. Harvest data recorded annually.	Annual	Annual	Annual
Male bird counts in October. Harvest data in June (hunting season).	May (hunting season).	Throughout the year.	January-February.
RMC - male bird counts approx. 6 person days every second year; harvest data approx. 8 person days per year.	RMC - approx. 4 days annually.	RMC - approx. 100 days each year	RMC - 40 person days per year
None	None	Information collected by property-based hunters.	None
Hard copy and electronic files on shared PCs at Cressy.	Hard copy and electronic files on shared PCs at Cressy.	Hard copy and electronic files on shared PCs at Cressy.	Hard copy and electronic files on shared PCs at Cressy.
Yes, hard copy at Cressy.	Yes, hard copy at Cressy.	No	Yes, hard copy at Cressy.
No	No	No	No
Yes, annually in Game Tracks, verbally to hunters.	Yes, annually in Game Tracks, verbally to hunters.	Yes, in Game Tracks, verbally to landowners and hunters.	Yes, in Game Tracks, Game Management Liaison Committee
No	No	No	No
State	State	State	State

Species that are Harvested/Culled Game Species Harvest Returns	Species that are Harvested/Culled Crop Protection Permit Returns	Species that are Harvested/Culled Tasmanian Mammal Spotlight Surveys	Species that are Harvested/Culled Cape Barren Goose Population Monitoring
Greg Hocking, Wildlife Policy and Planning Section, WMB	Greg Hocking, Wildlife Policy and Planning Section, WMB	Greg Hocking, Wildlife Policy and Planning Section, WMB	Greg Hocking, Wildlife Policy and Planning Section, WMB
Partly Protected Wildlife subject to Open Seasons- including Short-tailed Shearwater, Brown Quail, Fallow Deer, Common Pheasant, Wood Duck, Black Duck, Mountain Duck, Grey Teal, Chestnut Teal	Protected Wildlife subject to culling under Crop Protection Permit- includes Bennetts Wallaby, Tasmanian Pademelon, Brushtail Possum, Common Wombat, Forester Kangaroo, Fallow Deer, Cape Barren Goose, Black Swan, Wood Duck, Mountain Duck, Sulphur-crested Cockatoo, Silver Gull	Tasmanian Pademelon, Bennetts Wallaby, Brushtail Possum	Cape Barren Goose
None	In the case of permit to use 1080 poison, any non-target take is required to be returned	Wombat, Tasmanian Devil, Eastern Quoll, Cat, Rabbit, Tasmanian Bettong, incidental sightings of other mammals recorded	None
To obtain precise estimates of the harvest of game species for use in game species management.	To obtain estimates of the take of wildlife culled under crop protection permits for use in management.	For harvested species: to monitor trends in abundance in order to manage for a sustainable harvest. For other native species: to monitor species status. For feral species:- to monitor potential threat.	To monitor trends in breeding production and flock goose numbers in the Furneaux Group of Islands for use in setting sustainable annual harvest quotas.
Statewide.	Statewide	Statewide and including Flinders Island and King Island.	Regional: Furneaux Islands- specifically the breeding islands of Vansittart I, Tin Kettle I, Woody I, Big Green I, East Kangaroo I, Goose I, Isabella I, Chappell I, and Badger I, as well as over-summer habitat on Flinders I.
The number of animals of each species taken by licensed hunters. Information on harvest is required to be returned on a take questionnaire form sent to all hunters of these species at the completion of the annual game seasons.	The number of animals taken by holders of Crop Protection Permits. All permits are required to be returned on expiry with information on the number of animals taken.	Relative Density Index. Animals counted by spotlight along 187, 10km road-based survey routes using line-transect methodology and used to provide an index of abundance.	Total Population Count (effectively). Counts of goslings on each breeding island; counts of flock geese in agricultural land undertaken from roads on Flinders Island.
2006	1997	1975	1970
Ongoing	Ongoing	Ongoing	Ongoing
Annual	Continuous.	Annual	Annual
July-August after completion of game seasons.	Throughout year.	Mainland Tasmania sites are surveyed once during period November to February. Flinders and King Island routes are surveyed twice annually.	Breeding production surveys during last week in September. Flock goose counts on Flinders I during late February-early March.
2 days- set up, 5 days- data entry, 0.5 day data analysis.	30 days- data entry, 1 day- data analysis.	RMC - approx. 40 person-days per year.	RMC- 9 person-days per year (breeding surveys- 5 days; flock surveys 4 days). PWS- 5 days.
None	None	None	25 days- (5 volunteers for 5 days)
PELIS database in CIT.	PELIS database.	Paper storage in Hobart office, electronic storage in Filemaker and Access databases stored on M-drive and S-drive.	Paper storage in Hobart office, electronic storage in Excell spreadsheet stored on M-drive and S-drive.
CIT Business Plan for PELIS redevelopment.	CIT Business Plan.	Hard copies in Hobart office and DPIW library (Hocking and Driessen 1992), e-copies stored on M-drive and S-drive.	Hard copies in Hobart office.
No	No	Methodology independently reviewed by Southwell of Commonwealth department in 1985. Pople of University of Qld in 2003 and Administrative Appeals Tribunal in 2006 all found that the method is adequate for what it is intending to achieve. Internal review by Driessen and Hocking (1992).	Methodology independently reviewed by Mark Hindell of University of Tasmania in 1997 who found that the method is adequate for what it is intending to achieve.
Yes, annually in Game Tracks as well as media releases.	On an as-needs basis in response to public, media or Ministerial enquiries.	Results of surveys are regularly made available to public through media releases and magazine articles.	Results of surveys are sent annually to all participating hunters. Results published periodically in magazine articles.
Short-tailed Shearwater: in Skira et al (1985). Conservation of the Short-tailed Shearwater Puffinus tenuirostris in Tasmania, Australia. Biological Conservation 37: 225-236.	No	Tasmanian devil results published in Hawkins et al (2006) Biological Conservation 131: 307-324.	Early results and methodology published in Eberhard and Pearce 1961. Aust J Wildl Manage.
State	State	State	State

Species that are Harvested/Culled	Species that are Harvested/Culled	Species that are Harvested/Culled	Species that are Harvested/Culled
<b>Forester Kangaroo Population Monitoring</b>	<b>Brown Quail Surveys</b>	<b>Maria Island Macropod Monitoring</b>	<b>Waterfowl Monitoring</b>
Greg Hocking, Wildlife Policy and Planning Section, WMB	Greg Hocking, Wildlife Policy and Planning Section, WMB	Greg Hocking, Wildlife Policy and Planning Section, WMB	Stewart Blackhall, Wildlife and Marine Conservation Section, BCB
Forester Kangaroo	Brown Quail	Forester Kangaroo, Bennetts Wallaby, Tasmanian Pademelon	Hunted ducks: Black Duck, Mountain Duck, Wood Duck, Grey Teal and Chestnut Teal
Bennetts Wallaby, Tasmanian Pademelon, Fallow Deer	None	None	All sites: Blue-winged Shoveler, Hardhead, Musk Duck, Cape Barron Goose and Black Swan At Moulting Lagoon all waterfowl present (up to 60 species)
To monitor regional trends in abundance for use in setting harvest/cull quotas.	To monitor trends in abundance to assist in managing for a sustainable harvest.	To monitor trends in abundance for use in setting cull quotas aimed at minimising habitat damage and starvation.	To monitor trends in abundance to manage a sustainable harvest of hunted species and to monitor trends in abundance in relation to other pressures.
Regional: Ross area, Nile area, Fordon area, Macquarie Tier area, Northeast area.	Regional: Furneaux Islands- Vansittart I, Tin Kettle I, Woody I, Big Green I, East Kangaroo I, Goose I, Isabella I, Chappell I, and Badger I	Site: Maria Island.	Statewide except the southwest
Absolute density using sampled counts. Estimates of population density obtained from walked line transect surveys.	Relative Density Index. Counts of quail flushed by each observer corrected for distance walked on each island.	Relative Density Index. Counts of each species of macropod obtained during standardised counts done twice- at dusk and several hours after dark. Autopsy of culled animals.	Relative Density Index. Total counts of waterbirds at 80 wetland sites across the state are compared between years.
1980	1998	1985	1985
Ongoing	Ongoing	Ongoing	Ongoing
Every 2 to 3 years	Annual	Annual	Annual
During period July to September.	Done concurrently with Cape Barron goose survey in last week of September.	Pre-cull survey in May-June. Autopsy of culled animals in July.	All sites counted in February except Moulting Lagoon which is counted twice a year in February and July.
RMC- 12 person-days per year (2 persons for 3 days per survey of each area. Attempt to survey 2 areas per year).	RMC- Done concurrently with goose survey - 9 person-days per year (breeding surveys- 5 days; flock surveys 4 days). PWS- 5 days.	RMC- 8 days. PWS- 6 days	RMC - approx. 5 days per year. PWS - approx 20 days/year. IFS - approx 2 days/year.
6 days (1 person for 3 days of each of 2 surveys).	25 days- (5 volunteers for 5 days)	None	Approx. 30 days per year
Paper storage in Hobart office, electronic storage in Excell spreadsheet stored on M-drive and S-drive.	Paper storage in Hobart office, electronic storage in Excell spreadsheet stored on M-drive and S-drive.	Paper storage in Hobart office, electronic storage in Excell spreadsheet stored on M-drive and S-drive.	Both paper and electronic storage in Excel spreadsheet on D drive of my workstation computer.
Hard and e-copy of Tanner and Hocking 2000 'Status and management of Forester Kangaroo in Tasmania', DPIW report.	Hard copy in Hobart office.	Hard copy in Hobart office.	Yes, hard copy kept on file.
No	No	No	Internal review in 2004 resulting in standardising sites counted by volunteers across the State.
Landowners on whose properties surveys are done are sent information on outcome of surveys and anticipated culling quotas.	Landholders are provided with results.	Periodic media releases.	Initially results were printed and distributed to interested parties. Then until 2007 was published annually in Game Tracks magazine.
No	No	No	No
State	State	State	State

Introduced Animal Species	Introduced Animal Species	Introduced Animal Species	Introduced Animal Species
Fox Monitoring Program	Amphibian Chytrid Fungus Monitoring	Status of Deer in the Central Plateau Conservation Area	Rabbit Monitoring on Macquarie Island
Alison Foster, Fox Eradication Branch and Nick Mooney, Wildlife Policy and Planning, WMB	Matthew Pauza, Wildlife and Marine Conservation Section, BCB	Michael Driessen, Wildlife and Marine Conservation Section, BCB	Rosemary Gales, Wildlife and Marine Conservation Section, BCB
Fox	Chytrid	Fallow Deer	European Rabbit
Cat, Dog, Tasmanian Devils, Spotted-tailed Quoll and Eastern Quoll	None	None	None
To track the distribution and abundance of foxes to eradication efforts. To monitor potential impacts of foxes on other species.	To survey the distribution of the amphibian chytrid fungus to identify disease free areas and to monitor disease free areas.	To determine whether deer are establishing in the CPCA and their numbers increasing to guide management.	To assess the success of control programs on both the rabbit and cats.
Statewide except the southwest (in design phase).	Regional: western Tasmania, with a particular focus on the TWWHA	Regional: CPCA.	Macquarie Island
All carnivore scats along linear features within survey area collected for DNA analysis. Number of monitoring sites to be confirmed. Collection areas to be standardised.	Distribution. Amphibian chytrid fungus infection presence or absence in both tadpoles and frogs of all species. Chytrid is detected in either mouthpart abnormalities or as a PCR calculated concentration	Aerial counts along standard transects (one survey completed in 2005). Standard ground surveys looking for scats and other deer signs.	Originally, counts of rabbits were obtained from 17 sites around the island. The method was changed in 2005 and the island was divided up into 122 areas and the total number of rabbits in each area was counted. Counts undertaken monthly.
Commencing 2007	2006	2005	1974
Ongoing	2007	Ongoing	Ongoing
Annual	Baseline established, ongoing monitoring planned.	5 years	Monthly
Probably during autumn (design in progress)	All year, depending on tadpole presence	Autumn	Monthly
RMC - approx 600 person days per year. PWS - approx 50 days/year.	RMC - 6 months	RMC - 30 days	
Approx. 200 person days per year.	Approx. 20 days per 6 months	None	
M. Drive, backed-up to CD and on Natural Values Atlas	Both paper and electronic storage in Excel spread sheet on D drive.	Locke, S. The distribution and abundance of Fallow Deer in the Central Plateau Conservation Area and adjacent areas of Tasmania. Nature Conservation Report 07/03 DPIW	
Survey method is under development.	Pauza, M and Driessen, M (2008). Distribution and Potential Spread of Amphibian Chytrid Fungus Batrachochytrium dendrobatidis in the Tasmanian Wilderness World Heritage Area. DPIW report.	Locke, S. The distribution and abundance of Fallow Deer in the Central Plateau Conservation Area and adjacent areas of Tasmania. Nature Conservation Report 07/03 DPIW	Stored on M. Drive. Hard copies held in WMCS.
Survey method being designed with the input of an independent technical advisory panel.	No	No	Aleks Terauds reviewed and implemented new methods in 2005.
No data has been collected.	Pauza, M and Driessen, M (2008). Distribution and Potential Spread of Amphibian Chytrid Fungus Batrachochytrium dendrobatidis in the Tasmanian Wilderness World Heritage Area. DPIW report.	Locke, S. The distribution and abundance of Fallow Deer in the Central Plateau Conservation Area and adjacent areas of Tasmania. Nature Conservation Report 07/03 DPIW	No
No	No	No	No
State/External	External	External	Internal

<b>Introduced Animal Species</b>	<b>Species Monitored for Other Reasons</b>	<b>Species Monitored for Other Reasons</b>	<b>Species Monitored for Other Reasons</b>
<b>Strathgordon Rabbit Eradication Program</b>	<b>Little Penguin Monitoring</b>	<b>Wildlife Road-kill Surveys</b>	<b>Natural Values Atlas</b>
Michael Driessen, Wildlife and Marine Conservation Section, BCB	Drew Lee, Wildlife and Marine Conservation Section, BCB	Greg Hocking, Wildlife Policy and Planning Section, WMB	Kristy Goddard, Threatened Species Section, BCB
European Rabbit	Little Penguin	All wildlife killed on Tasmanian roads	All Tasmanian animals
None	Short-tailed Shearwater	None	N/A
To measure success of eradication program.	To monitor the status of the species in Tasmania. To measure the effectiveness of conservation efforts.	To monitor population trends among more abundant species; to identify roadkill 'black-spots'; and gain information on the distribution of Tasmanian wildlife.	To monitor the distribution of animals in Tasmania to assess conservation status of native animals. To document changes in distribution of introduced animals.
Strathgordon.	Regional: Derwent Estuary, Bruny Island, Fortesque Bay, other sites opportunistically.	Statewide- where roads are present.	Statewide.
1. Counts of rabbits along standard transects. 2. Searches of Strathgordon village for signs of rabbits.	Burrow occupancy rates and breeding success in Derwent Estuary (120 burrows), Bruny Island (60 burrows) and Fortesque Bay (80 burrows). Index. Site dependent. Abundance, breeding success, mortality (terrestrial rates). Presence/absence opportunistically on islands or other coastal areas. Estimate of total number of burrows is obtained using fixed transects at Fortesque Bay.	Relative Density Index. Counts of road-killed species along specified road transects.	Primarily location information but can store a range of other data to meet various needs.
1992	2005	1982	1969 (previously TASPAYS and GTSpot).
2002	Derwent Estuary- Ongoing. Bruny Island and Fortesque Bay last monitored in 2005/2006.	1995	Ongoing
Every six weeks.	Derwent Estuary: Annual	Three times annually	Records received all the time.
Every six weeks.	Derwent Estuary: monthly over breeding period in spring and summer.	Summer, Autumn and Spring	Records received all the time.
RMC - approx. 25 person days/ annum.	RMC - 30 person days per year.	RMC- 18 days (6 days per seasonal survey.)	Unknown.
Approx. 5 person days/annum (and his dog).	None	None	Unknown.
Electronic files on M. Driessen's desktop computer and backed up on DVDs held in office.	Electronic files on D. Lee's desktop computer.	Paper storage in Hobart office, electronic storage in Excell spreadsheet stored on M-drive and S-drive.	CIT.
Yes, Electronic files on M. Driessen's desktop computer and backed up on DVDs held in office.	No, in preparation.	Hard and e-copies in Hobart office.	N/A.
No	No	No	N/A.
Available on request. Provided in State of the TWWHA report. Provided to Hydro Tasmania and PWS.	No, sensitive information in urban areas	Periodic media releases.	Yes, available through website.
No	No	No	Numerous publications have relied on the database for publication of distribution maps.
External	External	State	State/External



Species Monitored for Other Reasons Leopard Seal Monitoring	Species Monitored for Other Reasons Macquarie Island Penguins	Species Monitored for Other Reasons Gannet Population Monitoring	Species Monitored for Other Reasons Peregrine Monitoring
Rosemary Gales, Wildlife and Marine Conservation Section, BCB	Rosemary Gales, Wildlife and Marine Conservation Section, BCB	Rosemary Gales, Wildlife and Marine Conservation Section, BCB	Nick Mooney, Policy and Planning, Wildlife Management Branch
Leopard Seal	Gentoo Penguin, King Penguin, Rockhopper Penguin	Australasian Gannets (piggy backed on Shy Albatross aerial counts on Pedra Branca Skink ground counts)	Peregrine Falcons
None	None	None	Prey species
Monitor trends in the status of the species in Tasmania	To monitor the status of the species on Macquarie Island. Rockhopper penguins have declined by 90% on NZ subantarctic islands.	To monitor the status of the species in Tasmania. Undertaken as part of Shy Albatross surveys.	To track productivity and survival in coordination with international protocols (the species is a near worldwide bio-indicator) in relation to pesticides and persecution and land-use changes.
Statewide	Macquarie Island.	All breeding locations in Tasmania; Black Pyramid, Pedra Branca, Edgystone.	Northeastern half of Tasmania
Location, age, sex and condition. Number of seals reported/year (index of total population).	Gentoo Penguin - minimum number known to be alive on Macquarie Island based on counts of birds on eggs. King and Rockhopper Penguin - only a subsample of the population is monitored for number of birds on egg to give an index of population trends.	Total counts of birds obtained from aerial photographs.	30 traditional nests visited each year for occupation, egg-laying, hatching, fledging, food and added/deserted eggs.
Early 1980s.	Gentoo penguin - 1984. King Penguin - 1980s. Rockhopper Penguin - 1993.	Early 1990s.	1973
Ongoing	Ongoing	Ongoing	1988 downgraded to 10 traditional nests every 3 years
All year	Gentoo Penguin - 1984, 2000, 2002, 2003. King Penguin - surveyed annually. Rockhopper Penguin - surveyed irregularly.	Twice per year	1973-1988 yearly, tri yearly since
When seals are reported.	October-December	Sept-April	seasonal - spring
RMC - 1 person for 3 hours/month (4 days)	PWS - 14 person days.	20 person days for counting birds on photos (field time as part of Shy Albatross Surveys)	80 (2 people X 40)
N/A	None	None	RMC - 80 person days
Access database (Sealbase) on M. Drive.	Paper records kept by Rosemary Gales and PWS.	Excel spreadsheet on M. Drive.	Mostly in diaries, and floppies.
Marine Occurrence Forms, stored on M. Drive, documents standard information collected.	No	Refer to Shy Albatross methods.	yes (for formal publication)
No	No	Bunce, A., Norman, F., Brothers, N., Gales, R. (2002). Long-term trends in the Australasian gannet population in Australia: the effect of climate change and commercial fisheries. Marine Biology 141: 263-269	Much has been published in Australian Wildlife Research, RAOU conference proceedings, and books.
Princess Melkoff Trust annual reports	Yes	No, but available on request.	No
Rounsevell and Pemberton (1994) The status and seasonal occurrence of Leopard seals in Tasmanian waters. Australian Mammalogy 17: 97-102.	No	Bunce, A., Norman, F., Brothers, N., Gales, R. (2002). Long-term trends in the Australasian gannet population in Australia: the effect of climate change and commercial fisheries. Marine Biology 141: 263-269	Much has been published in Australian Wildlife Research, RAOU conference proceedings, and books.
External	External	External	State



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