# WildTracker

## TRIALLING A COMMUNITY-BASED ECOLOGICAL MONITORING PROGRAM IN SOUTHEAST TASMANIA

## INTERIM REPORT 2017


Eastern quoll (*Dasyurus viverrinus*) captured on camera at Barnes Bay, Bruny Island

**Citation:**

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## Acknowledgements

The wildlife monitoring trial wouldn't have been possible without tremendous community support. Thanks to all the landholders, whose enthusiasm and willingness to help was inspirational. Thanks to all the TLC volunteers who classified the many wildlife images generated by this project. Thanks also to Sarah Lloyd for listening to the many hours of recorded bird calls and turning it into data. Finally thanks to all the organisations and their staff who supported this work technically and financially - Bruny Island Environment Network, Derwent Catchment Project, Kingborough and Huon Councils, NRM *South*, the Department of Primary Industries, Parks, Water and the Environment and the University of Tasmania.

## Introduction

Tasmania is home to amazing and unique wildlife – 33 species of mammal and over 180 species of bird. Many of our species, like the eastern quoll and forty-spotted pardalote, are found nowhere else in the world. But human activities such as land clearing, climate change and urbanisation, along with feral species such as cats, rabbits and deer pose a major threat to native animals (Barry & Claridge 2000). Wildlife monitoring is an essential part of protecting our native species. It provides valuable information about the areas where animals occur and how their populations are faring over time (Lindenmayer & Likens 2010). It also identifies areas where there are high densities of feral animals. We can use this information to target conservation effort to the places that need it most.

The Tasmanian Land Conservancy (TLC) trialled a community based wildlife monitoring program called WildTracker in 2016-17. The trial involved 125 landholders from three regions in southern Tasmania – Bruny Island, the Derwent Valley and the Huon Valley. Landholders collected data on mammals, birds and habitat from 175 sites located in diverse habitat types, ranging from montane rainforest to farmland to coastal heathland. A range of social data was also gathered through interviews and a workshop to complement the ecological aspect of the program. The WildTracker trial highlights the value of citizen science as a model for engaging landholders in conservation of wildlife in their local area (Toomey & Domroese 2013).

## Methods

Three regions were selected as case-studies for the WildTracker trial, representing contrasting ecological and socio-economic contexts – Bruny Island, the Derwent Valley and the Huon Valley (Figure 1). Participants in the trial were recruited through advertising and directly through the networks of the TLC and partner organisations. Monitoring sites were allocated for each property in order to include a representative sample of five vegetation types – wet forest, dry forest, riparian, coastal and agricultural. Maps were produced for each property showing landholders their preferred site. Larger properties were allocated more sites with a minimum distance between sites of 500m.

Introductory workshops were held in each region and were attended by 105 landholders. At the workshops landholders were trained in methods for establishing a monitoring site, setting a wildlife camera, photo-monitoring habitat, making an audio recording of birds and classifying wildlife images. Detailed instructions for each method used in the trial were provided to landholders in a compact field manual (see Appendix 1). Equipment was rotated to groups of landholders monthly between September 2016 and May 2017. Landholders established a monitoring site at their allocated locations, comprising a steel post to be left in place for future, ongoing monitoring.

Wildlife images were classified by landholders or TLC volunteers and data was entered into a spreadsheet for analysis. Occupancy was calculated as the number of sites a species was detected at as a proportion of total sites. Abundance was calculated for each property as the percentage of survey days that a species was detected. Sound recordings were listened to by an ornithologist and a species list for each property was recorded. Social data was collected through interviews with 16 landholders and a workshop involving landholders, academics from the University of Tasmania and professionals from conservation and environmental management organisations.

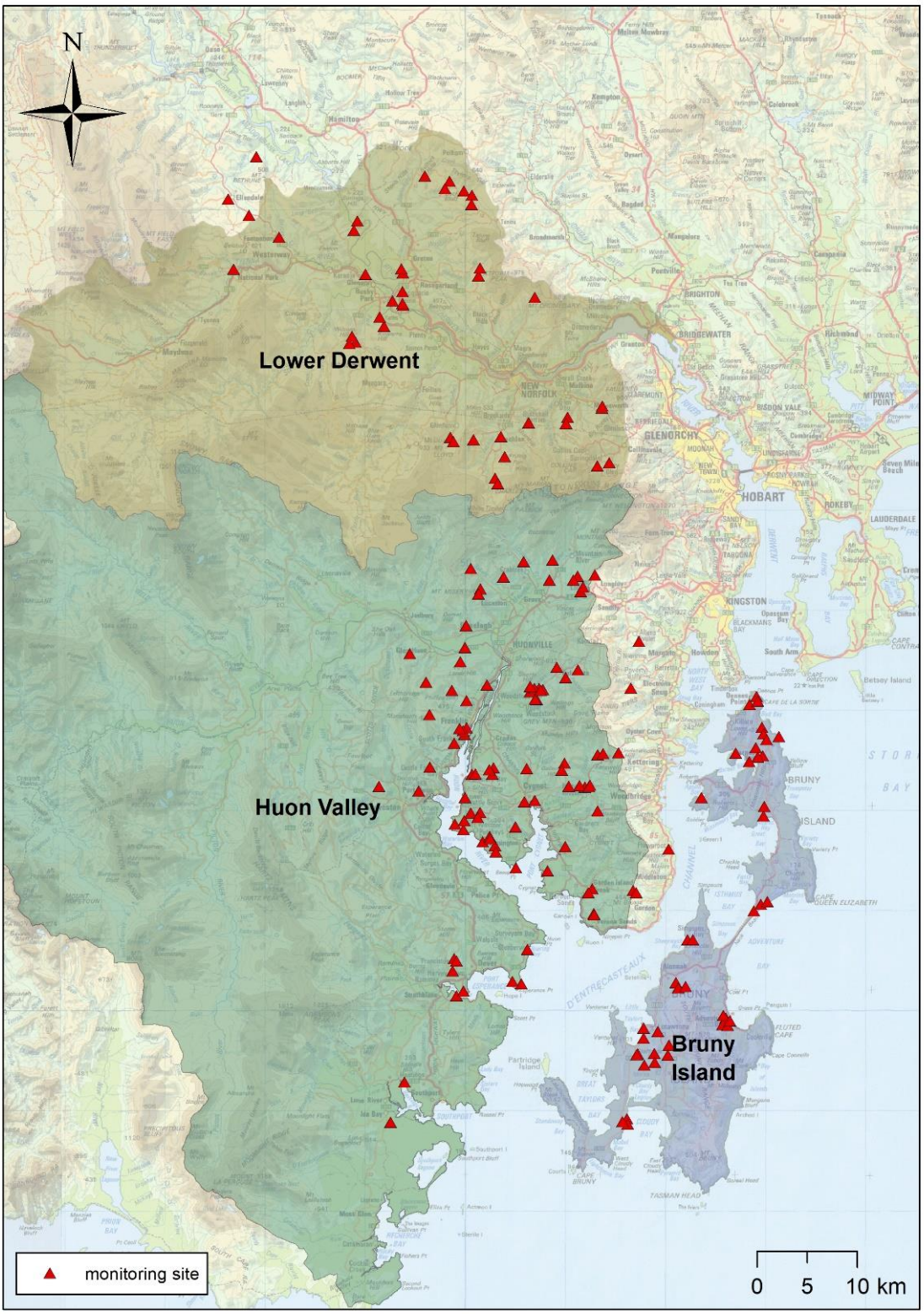


Figure 1. Location of the wildlife monitoring trial in southeast Tasmania showing Bruny Island, the Huon Valley and Lower Derwent Valley and the 175 sites where data was collected.

## Results

### Mammals

The distribution of each mammal species is shown on a series of maps presented as Appendix 2. Occupancy of mammals across the three trial regions is shown in Figure 2. Common species such as brushtail possum (*Trichosurus vulpecula*) and Tasmanian pademelon (*Thylogale billardier*ii) were detected at most sites, while species such as southern brown bandicoot (*Isoodon obesulus*) and spotted-tailed quoll (*Dasyurus maculatus*) were detected at less than 5% of sites. Mammal abundance shows a similar pattern (Figure 3), with common species making up most of the detections, while rarer species were detected on less than 5% of trap-nights. Mammal richness per site was highest in the Huon Valley and lowest on Bruny Island (Figure 4). Feral cats were widespread but only moderately abundant, while rabbit and fallow deer were detected at few sites and in very low numbers. Feral species were most abundant in the Derwent Valley and least abundant on Bruny Island (Figure 5).

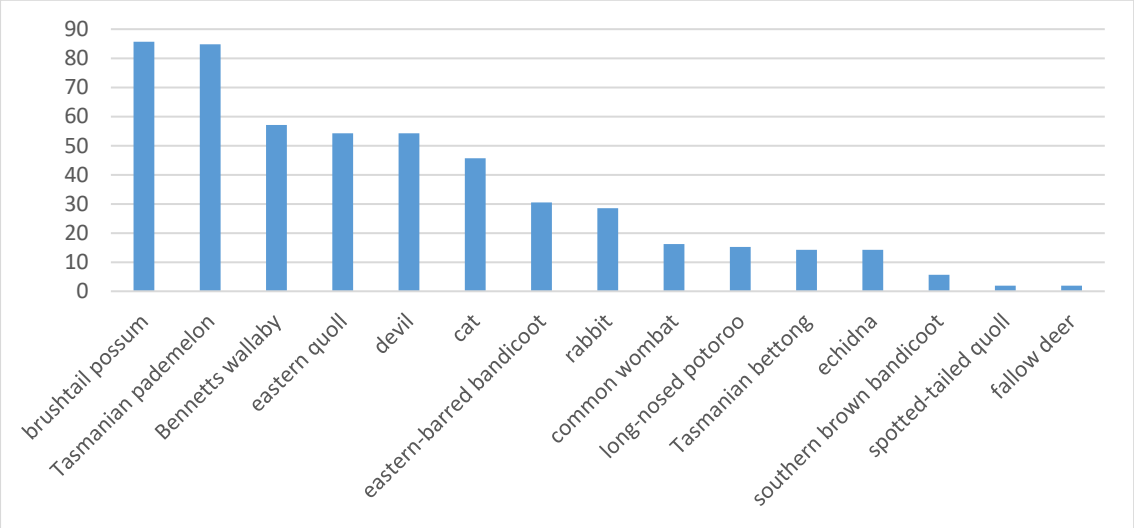


Figure 2. Occupancy of mammal across all regions (% sites)

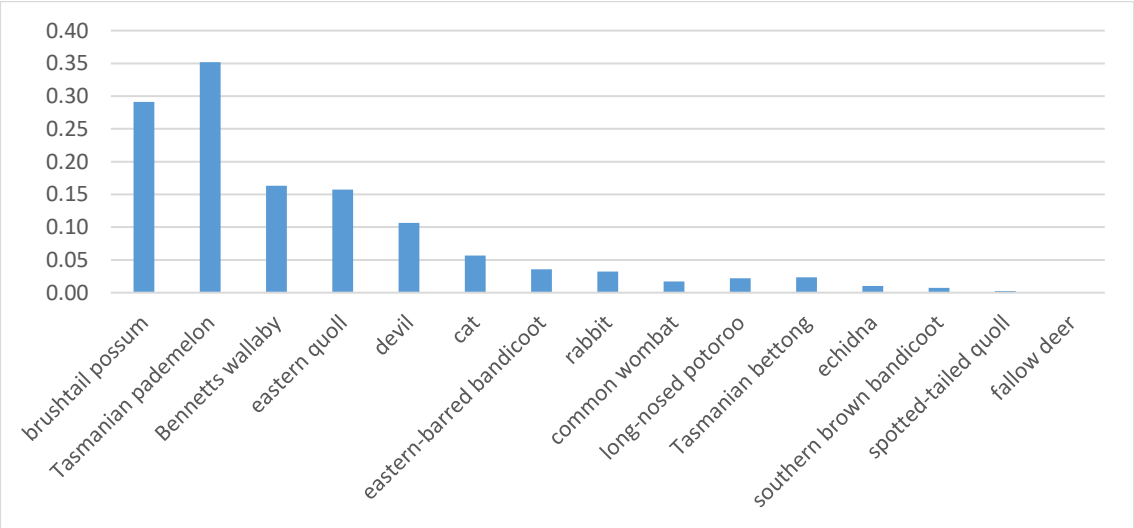


Figure 3. Average abundance per site of mammals across all regions (detections/trap night)

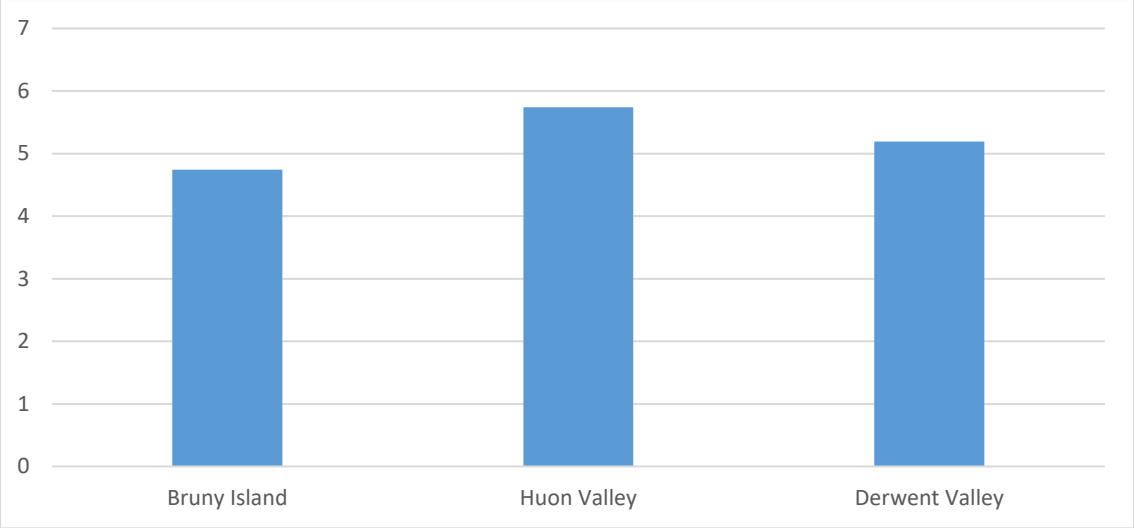


Figure 4. Average mammal richness per site in each region

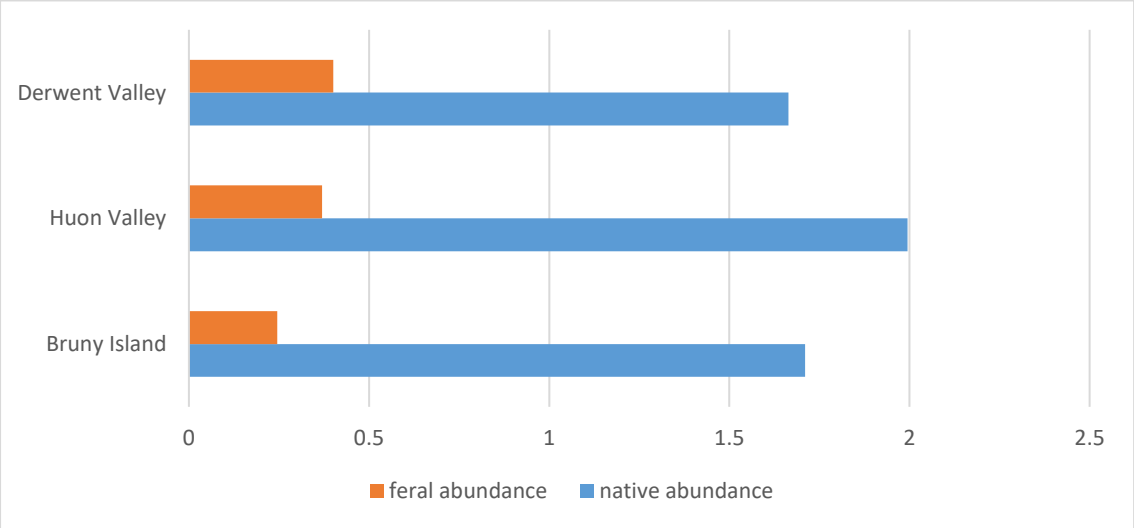


Figure 5. Average abundance of native and feral mammals in each region

## Habitat

Monitoring sites were distributed in 5 major vegetation types (Figure 6). The distribution of sites is roughly representative of the percentage of private land in the study area occupied by each vegetation type.

| FACTOR | RATING |
|---|---|
| Agricultural land | 87 |
| Dry eucalypt forest and woodland | 60 |
| Wet eucalyptus forest | 25 |
| Wetland and coastal vegetation | 8 |
| Riparian vegetation | 7 |

Figure 6. Number of monitoring sites in each vegetation type.

## Birds

A total of 60 bird species were recorded across the three regions. The highest number of species was recorded in the Huon Valley, while the lowest number was recorded in the Derwent Valley (Figure 6). However, bird species richness per site was similar in each region (Figure 7). Seven introduced bird species were recorded across the study area, but less than one species was recorded on average per site.

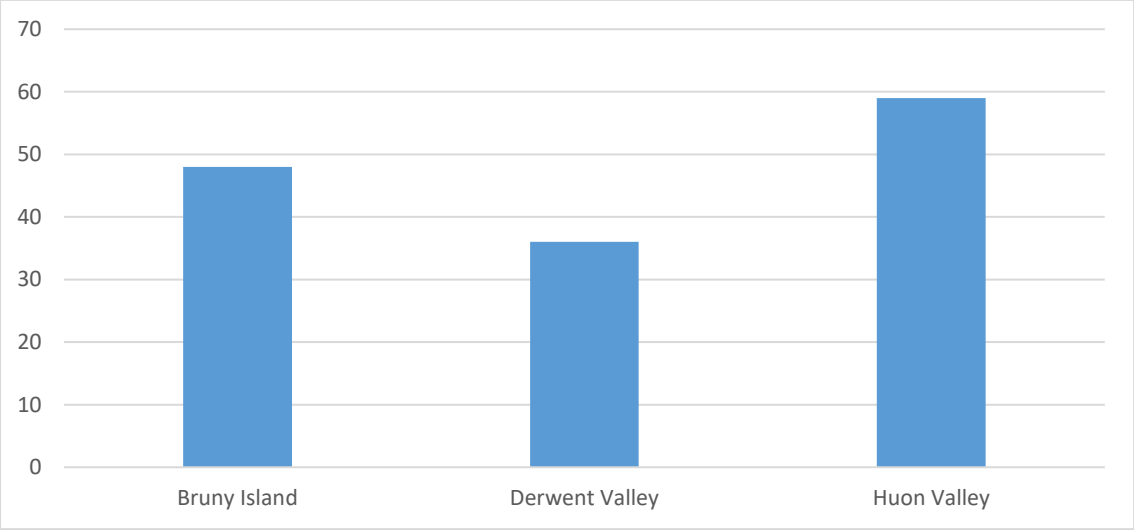


Figure 6. Total number of bird species recorded in each region.

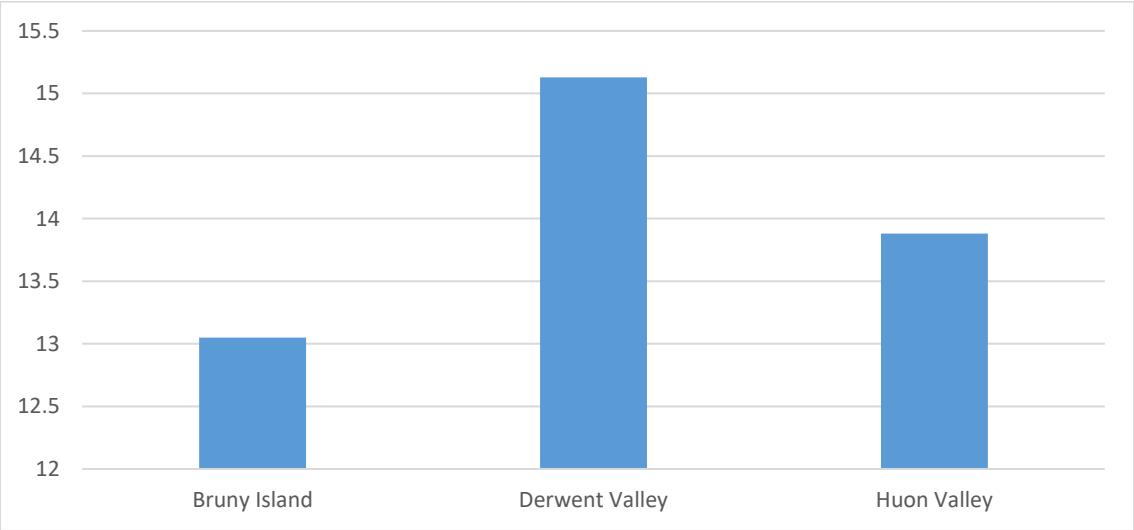


Figure 7. Average richness per site in each region

## People

In interviews landholders identified 70 socio-economic drivers of importance to wildlife conservation (Appendix 3). A subset of 15 factors were rated as critically important by at least 75% of workshop participants (Table 1). All landholders interviewed reported an increase in knowledge of wildlife on their properties and enthusiasm for wildlife management following participation in the WildTracker trial and attendance of the series of workshops.

| FACTOR | RATING |
|---|---|
| sense of place | 100 |
| clearing native vegetation | 95 |
| attitude towards conservation | 95 |
| historic practices | 80 |
| urbanisation, subdivision, population density | 80 |
| government policy priorities | 75 |
| cropping, horticulture | 75 |
| restoring native vegetation | 75 |
| government support | 75 |
| financial cost of conservation | 75 |

Table 1. Rating of importance by workshop participants

## Discussion

The WildTracker trial produced landscape-scale data on the abundance and distribution of native wildlife, feral animals and the condition of habitat in southeast Tasmania. The data produced gives a one-year snapshot of ecological conditions, which is a valuable tool for prioritising conservation efforts in these regions. However, ongoing monitoring every 2-5 years would increase the power of this tool enormously by beginning to generate information on trends in the status of native birds and mammals, their habitat and the threat posed by feral species. Wildlife populations are dynamic, respond to environmental conditions, climate change and land management interventions. Long-term data is therefore essential to our understanding and management of native ecosystems.

The data shows clear regional differences in the status of several mammal species. For example, the eastern quoll, listed as endangered, is common on Bruny Island and in the Huon Valley, but mostly absent from the Derwent Valley. Similarly, the long-nosed potoroo is relatively common on Bruny Island and in the Huon Valley but was not recorded in the Derwent Valley. These examples highlight the importance of good data on species distributions for targeting conservation efforts. In the Derwent Valley there is a strong case for managing threats and restoring habitat, while on Bruny and in the Huon protecting areas of habitat where these species are in good numbers may be more appropriate.

The Tasmanian devil was found to be widespread, and despite the well documented decline in population from devil facial tumour disease, remains relatively abundant across the study area, even in areas where substantial agricultural development and habitat modification has occurred. Data from the trial will be provided to the Save the Tasmanian Devil Program. In contrast, the second largest mammalian carnivore – the spotted-tailed quoll – was only detected at two sites. While this species naturally occurs at low densities and can be difficult to detect with remote cameras, it is still of concern that there were so few detections given the large and widespread survey effort.

A finding of considerable concern is the rarity of some species that are considered common, such as the southern brown bandicoot and common wombat, which are listed under the Threatened Species Protection Act as of least concern. Suitable habitat for these species is widespread in the Huon Valley and yet southern brown bandicoots were only detected at a handful of sites and wombats were only detected around the margins of settled areas. In contrast, the eastern-barred bandicoot, which is a threatened species, was found at upwards of 20 sites. This finding warrants further investigation and highlights the importance widespread, regular data collection in providing an early warning system that species are in decline (Wayne et al 2017).

Feral cats were detected at about half of all sites, but are typically in low numbers on most properties. However, there are areas where cat density and therefore cat impacts are much higher and these sites would make good candidates for cat management. Deer were only detected at two sites, but alarmingly, these sites are well outside the historical range of the species, at Hastings in the far south and on Bruny Island where they have only recently become established. The eradication of these outlier populations should be a priority.

While the Derwent Valley had a high number of bird species per site, a low number of species were recorded in that region in total. In contrast, a diverse community of birds was recorded on Bruny Island and in the Huon Valley. This may be due to the more heterogeneous landscapes and vegetation of those regions, which provide a broader range of niches for specialist species (Tews et al 2004). The association of species and habitat warrants additional analysis, beyond the summary statistics produced for this report.

The social dimensions of nature conservation on private land were investigated using qualitative methods under the guidance of researchers at the University of Tasmania. A range of land management practices were identified by landholders as important for wildlife management. Landholders offered diverse perspectives on the social and economic influences that result in different approaches to land management. It seems that different strategies can still lead to good outcomes for wildlife and that the broad social context within which people make decisions about their land is important. The WildTracker trial has highlighted the value of involving the community in ecological monitoring, in generating not only a large amount of scientific data, but also foresting knowledge of wildlife and enthusiasm for the conservation of native species.

## Conclusion and recommendations

1. Implement a state-wide ecological monitoring program on private land involving landholders
2. Consider a reassessment of the conservation status of some species 'of least concern'
3. Develop a questionnaire to assess landholder engagement in nature conservation
4. Target cat control in areas with high cat density and where sensitive species are present
5. Prioritise deer eradication in the far south and on Bruny Island before large, wild herds establish

## References


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- Lindenmayer, D & Likens, G. 2010, *Effective Ecological Monitoring,* 1st edn, CSIRO Publishing, Melbourne
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Appendix 1 – WildTracker Field Manual

TASMANIAN LAND CONSERVANCY

# WILDTRACKER
## Community Wildlife Monitoring

First Edition 2017



Tasmanian Land Conservancy
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## Introduction

Tasmania is home to amazing and unique wildlife. It is home to 33 species of mammal and over 180 species of bird. Many of our species, like the eastern quoll and forty-spotted pardalote, are found nowhere else in the world. But human activities such as land clearing, climate change and urbanisation, along with feral species such as cats, rabbits and deer pose a major threat to native species.

Wildlife monitoring is an essential part of protecting our native species. It provides valuable information about the areas where animals occur and how their populations are faring over time. It also identifies areas where there are high densities of feral animals, which helps to target control efforts. As a private landholder, you can play an important role in protecting our native wildlife. Monitoring is a big job that is made a lot easier by sharing the load. By getting involved and helping us identify important areas for wildlife you can make a big difference!

WILDTRACKER is an ecological monitoring system developed by the Tasmanian Land Conservancy. It was trialled in southeast Tasmania in 2016-17 and is now being rolled out state-wide. We are working with landholders like yourself across Tasmania to establish a network of long-term wildlife monitoring sites on private land. The information collected by this program will be used to design better conservation programs and target feral animal control in the landscape.

We have created this manual as a resource for landholders. It contains instructions for monitoring the wildlife and habitat on your property and is divided into the following sections:

1. Establishing a Wildlife Monitoring Site
2. Setting a Camera Trap for Wildlife
3. Photographing Habitat
4. Classifying Wildlife Images
5. Recording Bird-Calls

## Any questions?

If you have any questions along the way or need help with any aspect of the monitoring tasks then please get in touch.

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## *Establishing a Wildlife Monitoring Site*

The site will be used to capture information about the wildlife and habitat condition of your property using the methods described later in this manual. We will provide you with a map showing the types of habitat on your property and suggested monitoring sites.

### Equipment

Star picket, camera bracket, mallet, property map, GPS or PDF Maps (smartphone app)

### Time required

0.5-1 hour

### Instructions

1. **Choose a monitoring site**
   Find a location close to the suggested monitoring site that is easily accessible and where the vegetation is fairly open. This will make it easier to set up the camera trap, photograph the vegetation and make a sound recording. If nowhere nearby is suitable then choose a different location in the same habitat type and mark the new location on your property map.
2. **Identify a target area for the camera trap**
   Ideally the target area should be a patch of ground at least 2 metres across where there is little vegetation that can be buffeted by the wind (this can trigger the camera inadvertently). A wallaby trail or disused vehicle track can make a great location.
3. **Install the star picket**
   Find a spot about 3 metres from the target area to install the star picket. Hammer the star picket into the ground with the side of the picket with the holes pointing directly at the target area. Keep hammering until the picket is firmly embedded in the ground and the top of the picket is about level with your chest. Place the yellow protective cap over the picket.
4. **Attach the camera bracket**
   Connect the wooden bracket to the star picket on the second whole down from the top using the bolt and wing-nut. Make sure it is on the right way. One side of the bracket is labelled *top* and another is labelled *target.*
5. **Record the location**
   Mark the exact location of the monitoring site on your property map. If you have a GPS or smartphone app then record the coordinates. Provide this information to us so we can record the location in the monitoring database.
6. **Leave the star picket and bracket in place so that it can be used again in the future.**

### Any questions?

Get in touch if you need advice or have any questions. Contact details are on the first page of this manual.

## *Setting a Camera Trap for Wildlife*

Camera trapping is a method of monitoring wildlife that uses a wildlife camera to automatically record the animals that pass through a target area. The camera uses an infra-red sensor that detects the movement of an animal and triggers the camera. The batteries will last about 2 months and they will continue to capture images of animals this whole time.

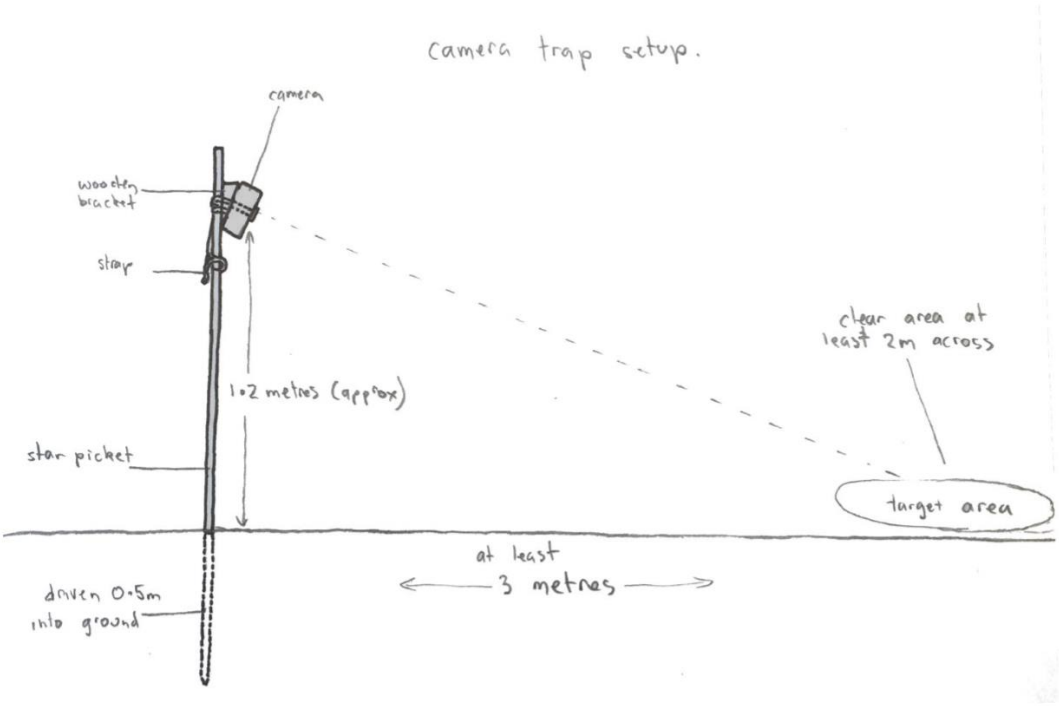
| Equipment | Time required |
|---|---|
| Wildlife camera, strap, fish oil | 30 minutes |

### Instructions

1. **Mount the camera**
   Attach the camera to the wooden camera bracket using the strap. Make it as secure as possible. Check that the bracket is tightly attached to the star picket. Secure the strap so that it can't wave around in the wind.
2. **Turn the camera on**
   Open the case and move the switch to the on position.
3. **Lay the bait**
   Slosh about a measuring-cup of fish oil on the ground in the target area.
4. **Check the camera**
   Check after about 3 days to see that the camera is working properly. Open up the camera and use the preview setting to see if it has been capturing images. If there are no photos, if there is something wrong with the photos, or if the batteries are flat then let us know. If the camera is working fine then leave the camera in place, switch it back to the on position and close the case.
5. **Collect the camera**
   After 3 weeks go and pick up the camera. Unstrap it from the star picket, open the camera up and turn it off. Give us a call and let us know when you are done.
6. **See what animals you've captured!**
   Look through the images captured either using preview on the camera, or by downloading them using the USB connection or the SD card.

### Any questions?

Get in touch if you need advice or have any questions. Contact details are on the first page of this manual.


camera trap setup.
camera
wooden bracket
strap
star picket
driven 0.5m into ground
1.2 metres (approx)
clear area at least 2m across
target area
at least
3 metres

## *Photographing Habitat*

Photo monitoring is an easy and effective method for recording changes in habitat and vegetation condition over time. A series of repeat photographs are taken at a fixed location. Multiple images can be stitched together to provide a panoramic view of the habitat surrounding a wildlife monitoring site. If you have a smartphone, you can use the panorama setting to make the process much easier.

| Equipment | Time required |
|---|---|
| Camera or smartphone | 15 minutes |

### Instructions

1. **Position the camera**
   Turn your camera on and hold it on top of the star picket, resting it on the yellow cap to keep it steady.
2. **Take the first photo**
   Start off facing roughly east and take the first photo, making sure to keep the camera horizontal (not pointing up or down).
3. **Rotate and take a second photo**
   Turn the camera slightly to the south (15 degrees) and take another image. Make sure that there is some overlap between the two pictures. Picking a landmark like a small tree can help you line up your shots.
4. **Continue taking a series of photos**
   Take a series of photos continuing to rotate the camera slightly each time. Keep going until you've completed a full circle of the compass (360 degrees). It should take 20-30 photos to complete a full circle.
5. **Send the photos to us**
   Send the series of images to us by email or we can collect them on a USB drive when we collect the wildlife camera. We will use software to stitch together a panoramic image of the habitat surrounding your monitoring site and will send you a copy.

### Any questions?

Get in touch if you need advice or have any questions. Contact details are on the first page of this manual.

## *Recording Bird-Calls*

Using a digital sound recorder is a great way of documenting the birds on your property. Birds are most easily monitored by listening for their calls. While they are often hard to see, they are usually easy to hear. A trained ear can tell the call of every species.

### Equipment

Smartphone or digital sound recorder (Handy H2 or Handy H2N)

### Time required

30 minutes

### Instructions

1. **Familiarise yourself with the device**
   There are lots of different devices and apps for making sound recordings. Take some time to work out how to make a recording. The internet is a good source for this kind of information, or alternatively call one of us. Practice making a short recording at home using the instructions below before venturing into the field.
2. **Timing and conditions**
   Birds are most vocal early in the morning, so recordings should be made before 10am. Weather affects bird activity and the quality of the recording, so go when the weather is calm and clear, with little or no wind. Take one sound recording at each monitoring site indicated on your property map.
3. **Making a sound recording**
   - Attach the device to the top of the star picket using a rubber band.
   - Open up the app (e.g. voice memo for iPhone), or turn the digital sound recorder on using the sliding button on the side of the device.
   - Start recording. If you have a Handy H2 you need to press the red record button *twice*. If you have a Handy H2N then press the record button *once*.
   - Say your name, the time, date, location and monitoring site number (e.g. HUVA01). This will help us keep track of which recording has come from which location. You don't need to speak directly into the microphone.
   - Move away from the monitoring site as your presence can disturb some bird species. You will pick up more birds this way.
   - Leave the device to record for 20 minutes.
   - Collect the device, press the record button again to stop recording, switch the device off.
4. **What happens next?**
   After we've collected the sound recorder, we will pass on the recording to an expert birder who will listen to the recording and write down all the species they hear. We will send you a list of the birds that are identified on your property.

### Any questions?

Get in touch if you need advice or have any questions. Contact details are on the first page of this manual.

## *Classifying Wildlife Images*

If you are reasonably computer-savvy then it would be an enormous help if you could identify all of the animals that have been captured on camera. If you'd rather not, then that's ok too. A volunteer will classify the images and we will send you a list and some photos of the wildlife from your property.

### Equipment
Computer, software (Excel or similar)

### Time required
1-2 hours per camera

### Getting started

1. **Download the images**
   Take the memory card from the camera and insert it into your computer's card reader. Alternatively connect the camera to a USB port using the cable provided. Make a new folder on your desktop and name the folder with your surname and site number (if you have more than one – e.g. Taylor01). Copy the images from the memory card to the new folder.
2. **Open the data sheet**
   You will be sent an email with an Excel spread-sheet for recording the animals that have been captured on camera. Save the file to the same folder as the images. Make a copy of the spreadsheet if you have more than one folder. Open the spread-sheet.

### Classifying the images

Open the first image in the folder. The first image will probably be of you! First go through all the images and delete any that don't' contain an animal (there may be hundreds!) Next go through the images one by one and if you see an animal in the image then make a new entry in the spread-sheet. Record the following information:

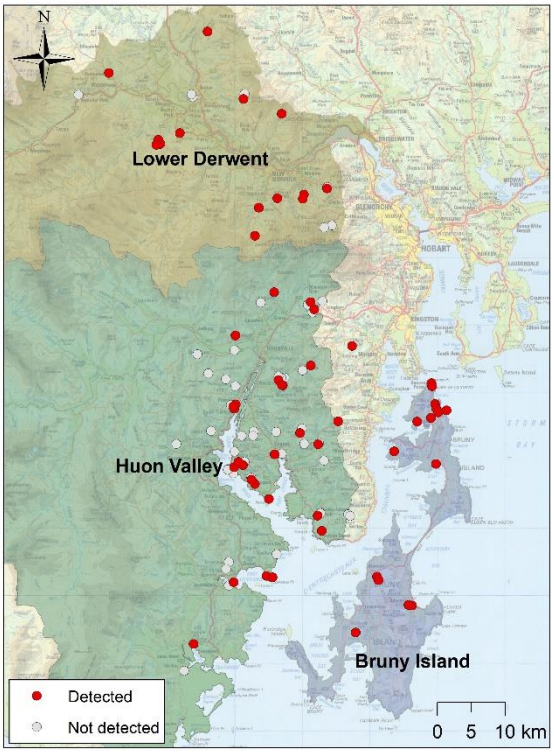
1. **Site number**
   The site number shown on your property map.
2. **Species**
   If you know what it is then select that animal from the drop-down list. If you are unsure then record – unsure. It is important not to guess!
3. **Photo number**
   The file name assigned by the camera (e.g. IMAG0159). The camera will often record a series of images of the same animal. Make a single entry for each series and record the first and last photo number (e.g. IMAG0159-IMAG0167).
4. **Time and date**
   This is recorded on the time-stamp in the corner of the image. If it's a series of images then enter the time and date of the first image.
5. **Number of animals**
6. **Disease status**
   If you see devils or wombats then it would be really valuable if you could note the disease status of each animal (diseased, healthy, unsure).
7. **Comments**
   Anything you think may be important.

### Any questions?

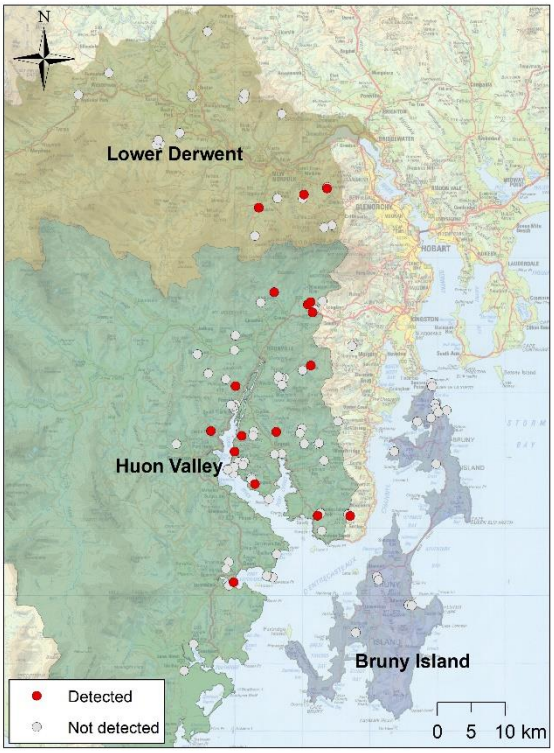
Get in touch if you need advice or have any questions. Contact details are on the first page of this manual.

*NOTES*

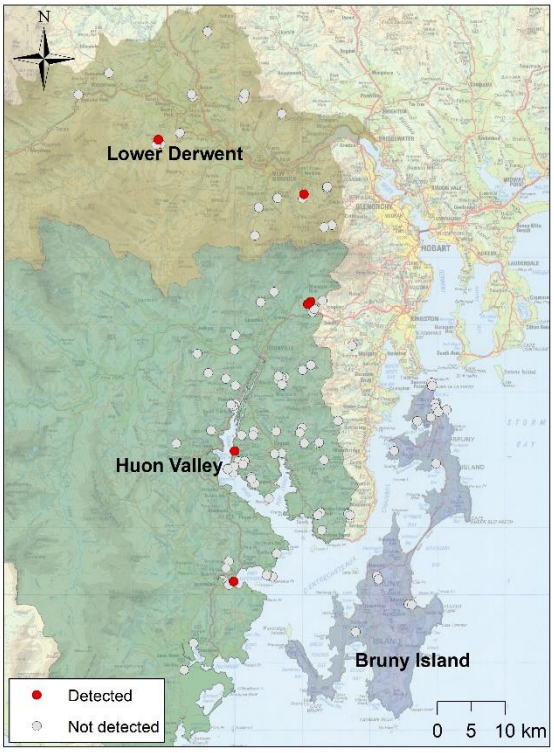
# Appendix 2 – Distribution of native and feral mammals in the three trial regions



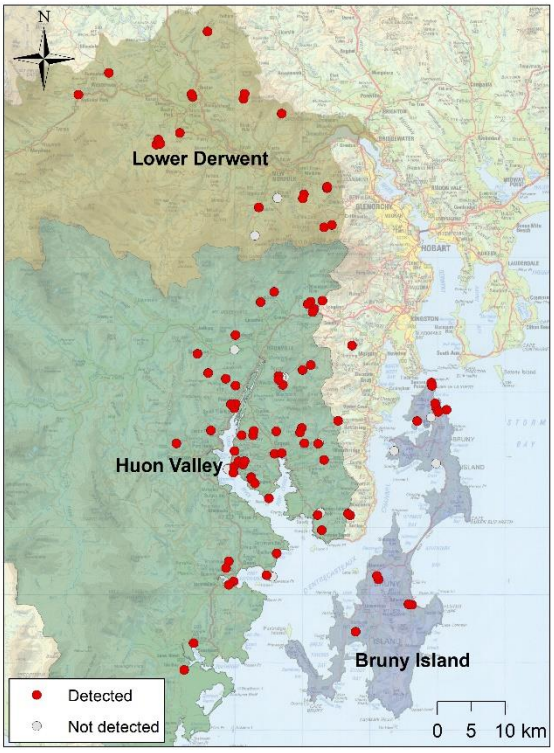

Bennetts wallaby (Macropus rufrogriseus)



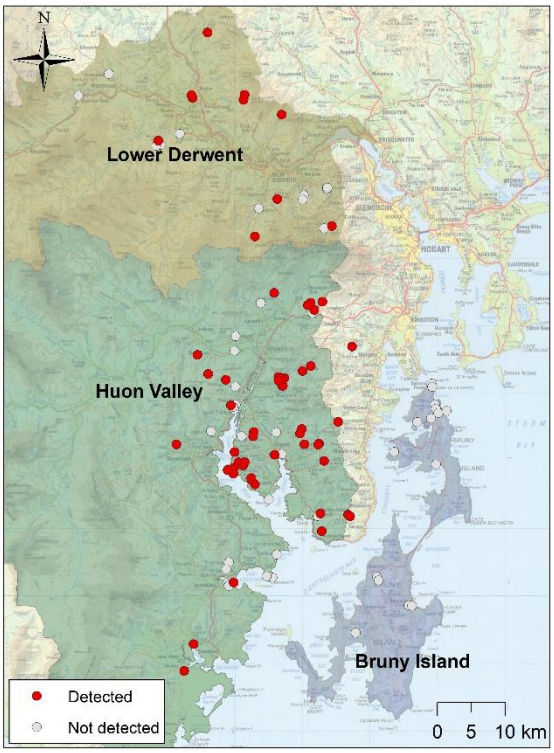

Tasmanian bettong (Bettongia gaimardi)



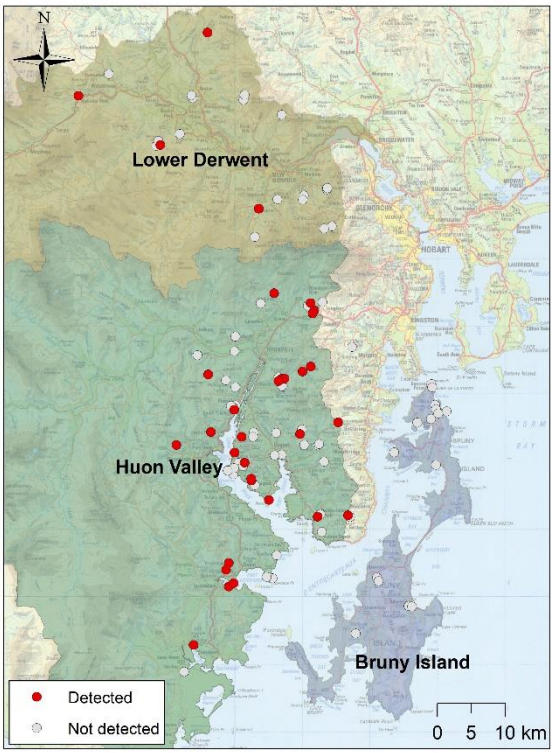

Southern brown bandicoot (Isoodon obesulus)



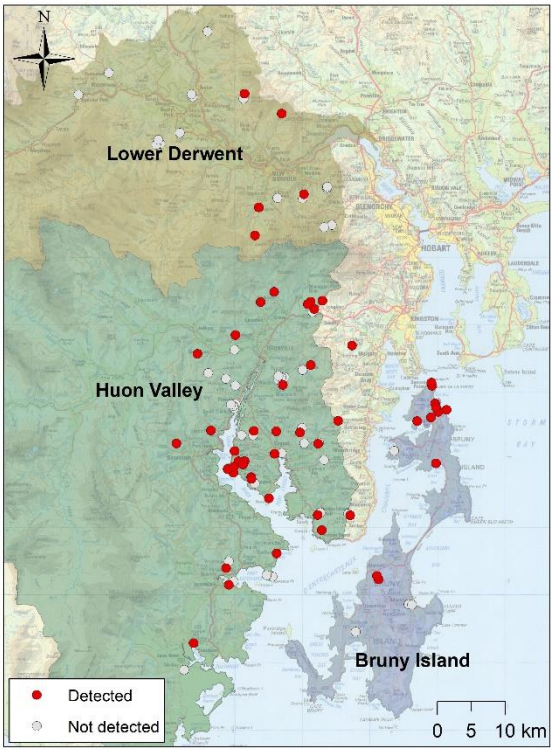

Brushtail possum (Trichosurus vulpecula)



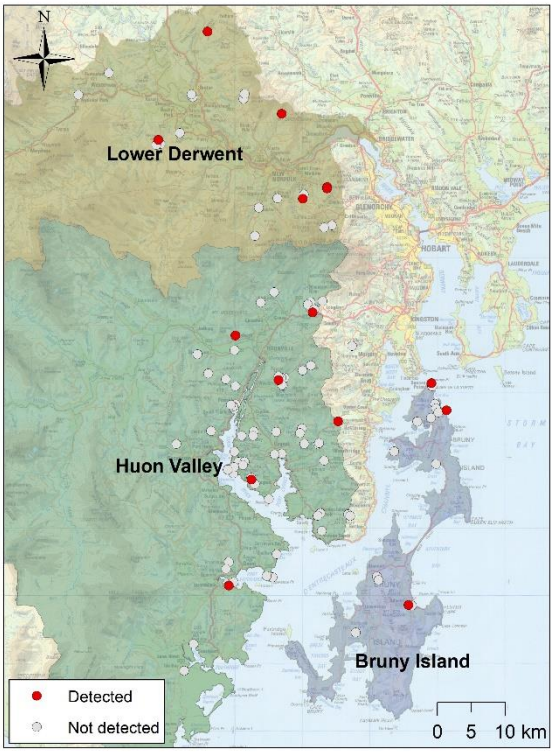

Tasmanian devil (Sarcophilus harrisii)



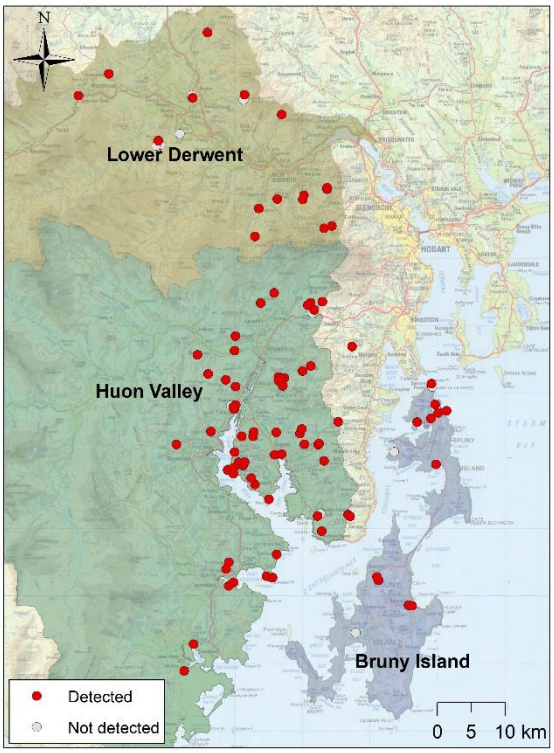

Eastern barred bandicoot (Perameles gunnii)



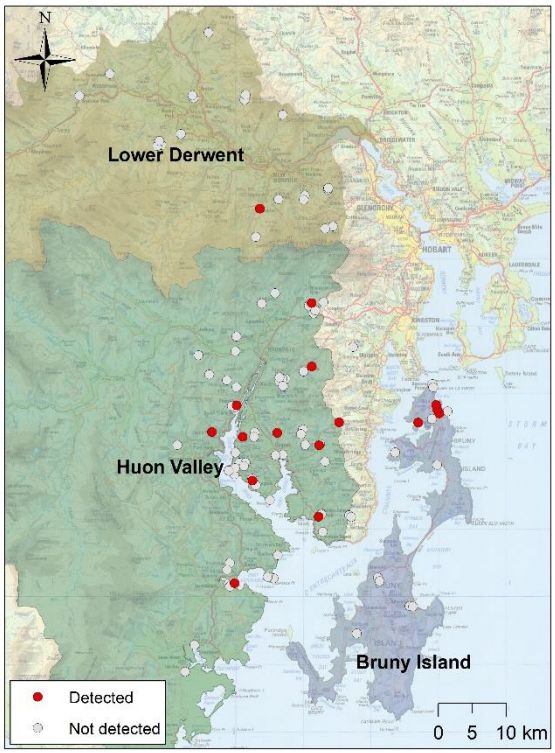

Eastern quoll (Dasyurus viverrinus)



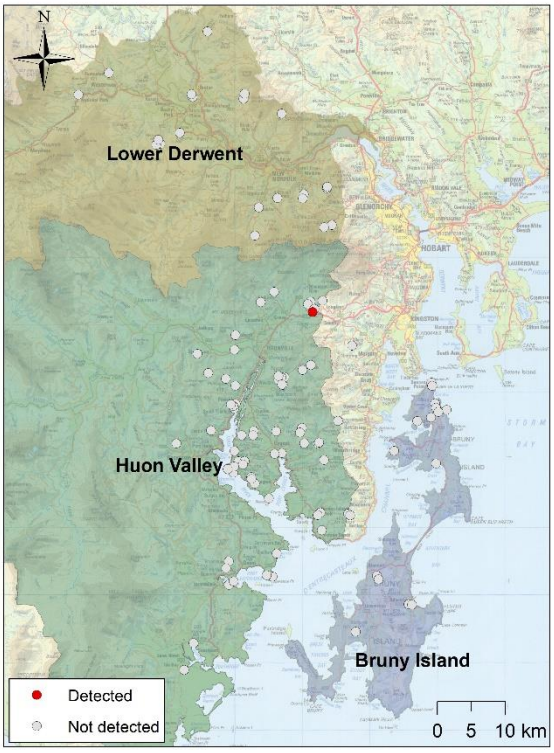

Echidna (Tachyglossus aculeatus)



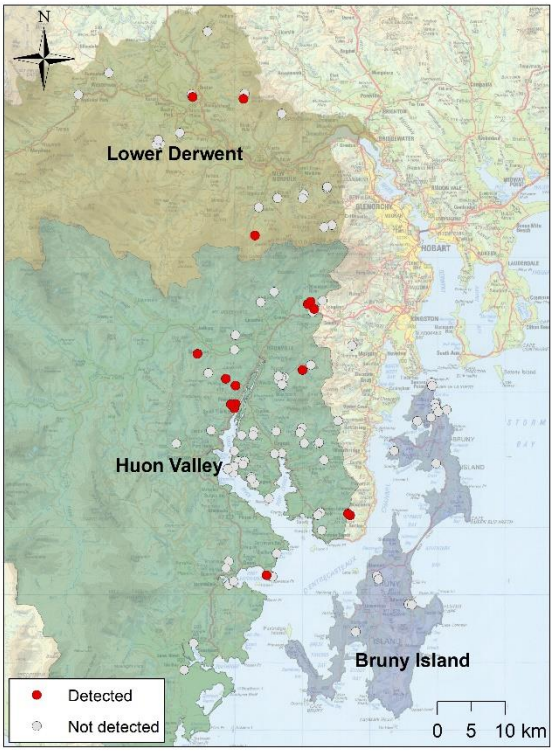

Tasmanian pademelon (Thylogale billardierii)



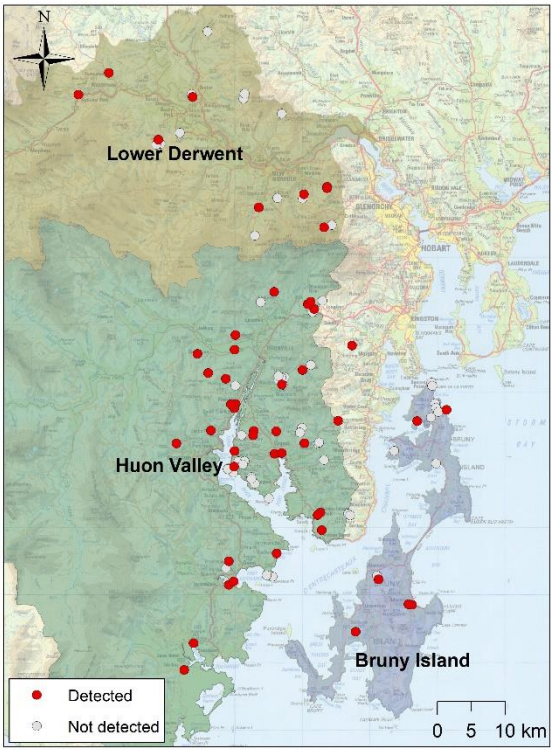

Long-nosed potoroo (Potorous tridactylus)



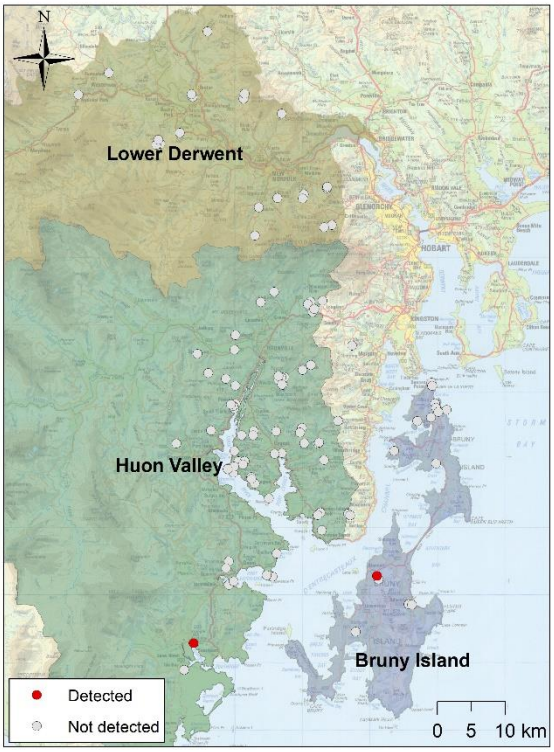

Spotted-tailed quoll (Dasyurus maculatus)



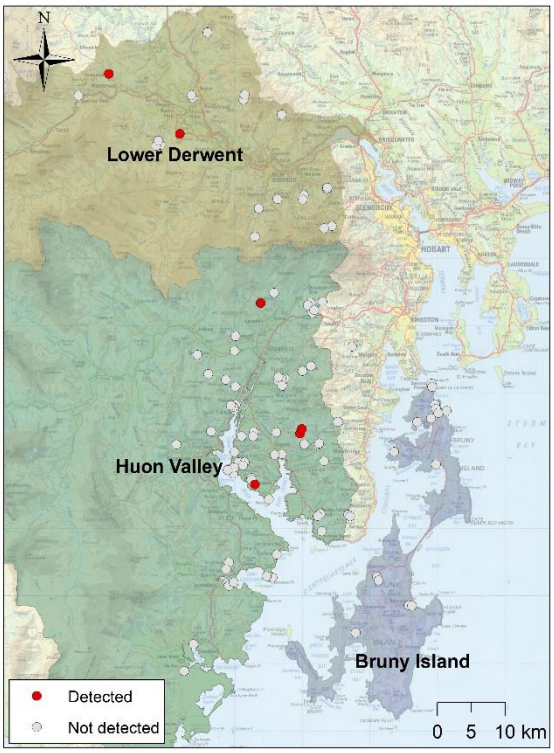

Common wombat (Vombatus ursinus)



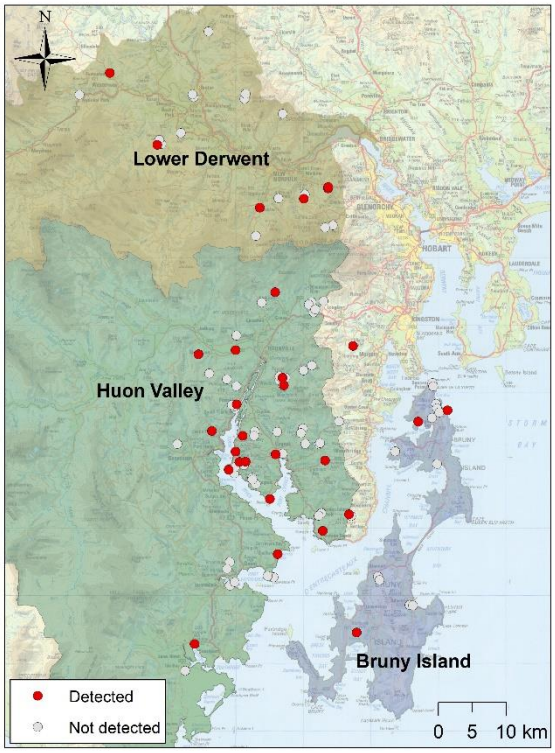

Cat (Felis catus)




Fallow deer (Dama dama)




Dog (Canis domesticus)




Rabbit (Oryctolagus cuniculus)

## Appendix 3 –Socio-Economic Drivers Identified by Landholders

| | |
|---|---|
| absentee landholder | land use zoning |
| age of landholder | length of time on property |
| artificial water points | livestock access |
| attitude towards conservation | livestock grazing |
| clearing native vegetation | local community attitudes to conservation |
| compliance with regulations | local demographic change |
| consistent point of contact | local ecological knowledge of landholders |
| corporate vs private ownership | local environmental group activities |
| cropping, horticulture | local resource based industries |
| cultural awareness of obligations | local tourism |
| education of landholders | marketing, certification, branding conservation |
| environmental advocacy | native animal control |
| extent of landholders social networks | need to generate financial return from land |
| feeling of personal connection to property, sense of place | neighbouring attitudes to conservation |
| fencing | new technologies |
| feral animal control | pets |
| financial cost of conservation | political environment |
| financial resources available for conservation | private investment |
| fire management | programs of larger conservation NRM organisations |
| forestry | restoring native vegetation |
| government policy priorities | road density and class |
| government regulations | source of income (off-farm vs farm business) |
| government support | terms of trade/markets/exchange rate |
| having time to undertake conservation work | tourism |
| historic practices | urbanisation, subdivision, population density |
| involvement in NRM and conservation programs | weed control |
| land management expertise | working together with neighbours |