

JUNE 2020

# Economic contribution of recreational hunting in Victoria

Final report

Department of Jobs, Precincts and Regions

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# List of acronyms

ACRONYM	DEFINITION
CATI	Computer Assisted Telephone Interview
DJPR	Department of Jobs, Precincts and Regions
GDP	Gross Domestic Product
GRP	Gross Regional Product
GSP	Gross State Product
LGA	Local Government Area
RISE	Regional Industry Structure and Employment

# Economic Contribution of Recreational Hunting

Victorian Game Licence holders contribute to regional economies across Victoria. They hunt to spend time in places special to them and to spend time outdoors.

Gross contribution **\$356 Million** and **3,138 jobs**

- ← Hunters are generally male, more likely to be in full time employment and have higher incomes than the average Victorian
- ← Deer hunters take more trips than other hunters
- ← Hunters took an average of 6 hunting trips during 2019
- ← Many hunters participate in other outdoor activities such as camping, target shooting, fishing and four-wheel driving.

Gross Regional Product (\$M)  
by LGA and Town

GSP 2013 - 2019

Overall GSP ▼ 28%



Deer

▲ 26%



Duck

▼ 46%



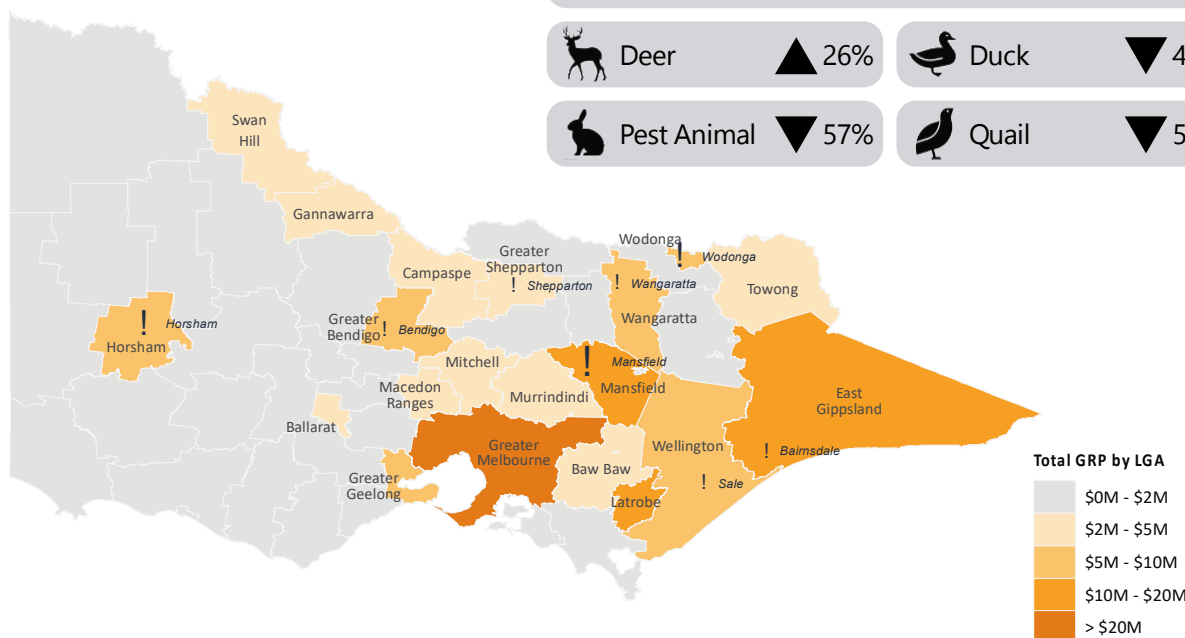
Pest Animal

▼ 57%

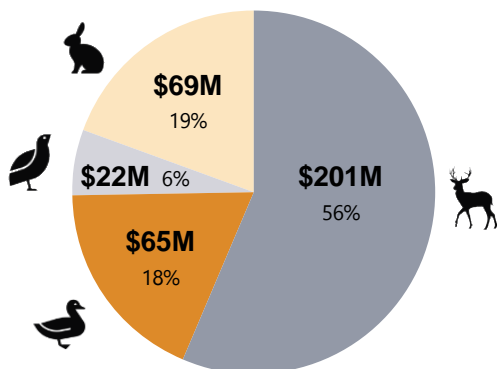


Quail

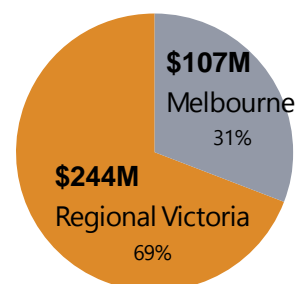
▼ 58%



Economic Contribution



Regional  
spend share



# Executive summary

## STUDY OBJECTIVES AND SCOPE

This report presents the results of research into the economic, health and wellbeing benefits of recreational hunting by Victorian game licence holders. The scope of the project is limited to expenditure on recreational hunting in Victoria by game licence holders and the resulting flow on economic contribution. This study is not a benefit-cost analysis that assesses the expected benefits and costs of recreational hunting.

The study was commissioned by the Department of Jobs, Precincts and Regions (DJPR) and was undertaken by RMCG in collaboration with BDO EconSearch, Action Market Research and JS Consulting. The study is an action under the Victorian Government's Sustainable Hunting Action Plan.

## METHOD

The project team developed a survey to collect information about game licence holders' expenditure 'on' and 'off-trip'. The information collected was used to model the size and geographic distribution within Victoria of the economic contribution of recreational hunting by Victorian game licence holders. Information about health and wellbeing was also collected. The survey was made available online and supplemented with targeted telephone interviews to correct any bias in the sample. In total there were 1671 fully completed responses (3% participation rate) that were used for the economic modelling (gross and net economic contribution) and to determine the wellbeing of recreational hunters.

## PROFILE OF RECREATIONAL GAME HUNTERS

Game licence holders span a wide range of ages, but are more likely to be aged between 35 and 50, and 97% of hunters are male. Game licence holders are more likely to be in full time employment and have higher incomes than the general population of Victoria. Interstate and overseas residents are eligible for a Victorian game licence, and 11% of licence holders reside outside Victoria, with 6% residing in NSW. Approximately 49% of hunters surveyed live in Greater Melbourne and 51% live in regional Victoria and interstate.

Over the 12 month survey period, the average number of trips per hunter was six trips (median number was three). Deer hunters take more trips than other hunters and two-thirds of hunting trips by people with Victorian game licences were in Victoria. Most game licence holders (68%) only hunted in Victoria, 24% hunted both within Victoria and interstate, and 17% hunted mostly interstate.

Game licence holders hunt to spend time in places special to them and to spend time outdoors. They report higher scores for personal wellbeing, social capital and general health than the general population. While it is likely that hunting provides health and wellbeing benefits, there are likely to be many contributing factors to the higher scores for hunters, such as their relatively high level of education, and income when compared with the Victorian population.



## GROSS ECONOMIC CONTRIBUTION

### Victoria

The gross economic contribution measures the footprint of recreational hunting by game licence holders in the regional and Victorian economies in terms of Gross State Product (GSP), Gross Regional Product (GRP) and employment. GSP and GRP are the regional equivalents of Gross Domestic Product, which is commonly used to measure the size of the national economy. The gross contribution to GSP from recreational hunting by game licence holders in Victoria in 2019 was \$356M. This is made up of \$160M of direct contribution and \$196M in flow-on economic activity. This represents 0.1 per cent of Victoria's GSP.

There were an estimated 1,626 full time equivalent (FTE) jobs generated directly by recreational hunting-related expenditure with a further 1,513 FTE jobs generated by flow-on activity. The total employment contribution was 3,138 FTE jobs, 0.1 per cent of Victoria's employment in 2019.

### Regional

The economic activity associated with recreational game hunting occurred across Victoria. The majority of expenditure was outside Melbourne, with 69% located in regional Victoria. The Local Government Areas with the highest gross economic contribution were Mansfield (\$12M), East Gippsland (\$11M) and Latrobe (\$11M). The towns with the highest hunting-related expenditure were Mansfield (\$21M), Horsham (\$11M), Wodonga (\$10M) and Bendigo (\$9M).

### Animal group

Deer hunting supported the largest amount of economic activity in 2019, at \$201M in GSP. The gross contribution from duck was \$65M and quail \$22M. The contribution in GSP from game animal hunting (excluding pest hunting) was \$287M of GSP. Pest hunting by game licence holders accounted for \$69M.

### Comparison with 2013 survey results

The contribution to GSP in 2019 was down 28% since the 2013 survey, after correcting for inflation. Expenditure on deer hunting has increased substantially while expenditure on duck, quail and pest animal hunting has reduced.

Differences in the numbers of game licences issued and hunter effort (measured by total hunting days and animals harvested per hunter) between the survey years help explain some of the results. Hunter effort and game licences for deer have increased considerably while changes in duck hunting seasonal conditions reduced opportunities to hunt duck.

A greater share of the total recreational hunting expenditure occurred in regional Victoria than in 2013. Much of the reduction in hunting-related economic activity between the two surveys occurred in Greater Melbourne, where there was a 43% reduction in gross expenditure (\$187M down to \$107M) compared with only a 13% reduction in regional Victoria (\$281M down to \$244M).

Deer hunting-related expenditure increased by more than 50% in Mansfield, East Gippsland and Wodonga LGAs.

## NET ECONOMIC CONTRIBUTION

If recreational game hunting did not occur, it is assumed that recreational game hunters would divert their hunting-related expenditure to either other outdoor activities or to general household expenditure. The impact of this shift is estimated by the net economic contribution. While it is important to model the net contribution, it is difficult to predict where hunters would spend their money, without hunting. Because of this uncertainty we have modelled two scenarios that represent the ends of a range:

- Low substitutability: a small proportion of hunting expenditure is diverted to substitute (or alternative) outdoor activities, with the bulk diverted to household expenditure. The net contribution is \$57 million to GSP and 627 FTE jobs
- High substitutability: the bulk of hunting expenditure is diverted to substitute outdoor activities. The net contribution is \$19 million to GSP and 246 FTE jobs.

The net contribution is positive because expenditure on recreational hunting has a higher proportion of Victorian-made content than general household expenditure. When hunting expenditure is diverted to general household discretionary expenditure, imports into the Victorian economy would increase.

## COMPARISON OF THE GROSS AND NET CONTRIBUTION

The gross and net contributions produce very different results at the state level. Without hunting, at the state level much of the economic activity would be replaced by expenditure related to other activities. The impact to the state economy would be small relative to the current footprint of hunting. However, the gross contribution provides a clear picture of the importance of hunting to regional and town economies. If hunting expenditure were replaced by other expenditures, some towns that are particularly reliant on hunting expenditure would be affected.





# Introduction and method



# 1 Background

## 1.1 THIS REPORT

This report presents the results of research into the economic, health and wellbeing benefits of recreational game hunting. Recreational hunting supports a range of businesses and jobs across Victoria from the sale of equipment and trip-related purchases such as fuel, accommodation, food and drink. In addition, these outdoor activities contribute to the health and wellbeing of participants. There are approximately 55,000 licenced game hunters<sup>1</sup> in Victoria (at December 2019).

The study was commissioned by the Department of Jobs, Precincts and Regions (DJPR) and was undertaken by RMCG in collaboration with BDO EconSearch, Action Market Research and JS Consulting. The study is an action under the Victorian Government's Sustainable Hunting Action Plan.

## 1.2 SCOPE

The research aims to provide a robust evidence base and high-quality analysis to inform the Victorian Government's strategic policy on recreational hunting and game management, inform investment decisions and improve services and regulatory outcomes.

The research has included a survey of game licence holders in Victoria. The data has been collected and collated at a spatial scale to enable an analysis regarding which communities, if any, are susceptible to changes in patterns of recreational hunting expenditure, and any potential impacts.

The objectives of this study were to:

- Estimate the gross and net economic contribution of recreational hunting to the Victorian economy
- Compare the findings of the economic results between 2013 and 2019, where geographical boundaries are consistent between the two time periods
- Explore the socio-economic profile of hunters and the impact of recreational hunting on their health and wellbeing.

The gross economic contribution measures the footprint of recreational hunting on the regional and state economy in Victoria i.e. its contribution to jobs, expenditure and associated economic activity arising from direct financial transactions in the economy, including flow on effects. The net economic contribution is the non-substitutable economic activity of recreational hunting that would be lost to the economy if (hypothetically) recreational hunting ceased in Victoria.

The scope of the project is limited to the expenditure that is associated with recreational hunting that occurred in Victoria and the economic flow on effects of this expenditure. This study is not a benefit-cost analysis that requires an assessment of all the expected benefits and costs of recreational hunting in Victoria.

Hunters were also asked questions to determine the impacts of recreational hunting on their health and wellbeing.

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<sup>1</sup> Licenced game hunters comprise 53,500 adult licence hunters and 1,500 under 18 year olds.

Further details on scope are described in Table 1-1.

**Table 1-1: Project scope**

ISSUE	IN SCOPE	OUT OF SCOPE
Geography	Recreational hunting that occurs in Victoria.	Hunting activity in other states or overseas, even if it is by a Victorian resident.
Residence of hunters	Victorian, interstate and international residents.	Nil.
Age	Licensed hunters 18 years and older.	Persons with a junior licence.
Purpose of recreational hunting	Recreational hunting only - including recreational game hunters who hunt pest animals.	Recreational hunting by those who don't hold a game licence. Pest animal control for primary production. Professional hunters.
Type of expenditure	All recreational hunting related expenditure including 'off-trip' expenditure, including vehicles and equipment.	When items are used for both recreational hunting and general use, i.e. vehicles, where a portion of expenditure does not relate to hunting.
Timeframe	The 12 months leading up to the survey roll out (November 2019).	Recreational hunting prior to this period.

### 1.3 ACKNOWLEDGEMENTS

We acknowledge the Traditional Aboriginal Owners of country throughout Victoria and their ongoing connection to this land. We pay our respects to their culture and their Elders past, present and emerging.

RMCG, BDO EconSearch and Action Market Research are grateful for the assistance provided by:

- Australian Deer Association
- Field and Game Australia
- Sporting Shooters Association Vic Branch
- Victorian Hound Hunters Inc
- Victorian Game and Deer Stalking
- Victorian Deer Association
- Blond Bay Hog Deer Advisory Committee
- Game Management Authority
- Department of Jobs, Precincts and Regions
- Survey participants.

## 2 Recreational game hunting in Victoria

### 2.1 INTRODUCTION

This section explains the licensing requirements, recreational hunting methods and animals that have been declared to be game in Victoria. The recreational hunting conditions during 2019 are also explained.

### 2.2 LICENSING AND TARGET ANIMALS<sup>2</sup>

In Victoria, it is permitted to hunt a selection of duck, pheasant, partridge, deer, quail and pest animals. Anyone hunting game in Victoria must hold a Victorian Game Licence that is endorsed for the types of game that they wish to hunt. Recreational pest animal hunting does not require a licence. Traditional owners are exempt from requiring a game licence if they are acting in accordance with a Natural Resource Agreement.

Licence types and the necessary tests are listed in Table 2-1.

**Table 2-1: Licence types - Game Management Authority Victoria (GMA, 2020)**

GAME SPECIES	TEST	LICENCE TYPE REQUIRED
Deer stalking (Sambar, Red, Fallow, Hog, Rusa and Chital).	None required.	Deer (stalking).
Duck and Stubble Quail, pheasants, partridge, introduced quail.	Waterfowl ID Test.	Game birds including ducks.
Duck and Stubble Quail, pheasants, partridge, introduced quail and deer stalking.	Waterfowl ID Test.	Deer (stalking) and Game Birds including ducks.
Stubble Quail, pheasants, partridge, introduced quail and deer stalking.	None required.	Deer (stalking) and Game Birds, not including ducks.
Duck and Stubble Quail, pheasants, partridge, introduced quail and deer stalking and Sambar Deer with hounds.	Waterfowl ID Test and Hound Hunting Tests.	Deer (stalking and hounds) and Game Birds, including ducks.
Stubble Quail, pheasants, partridge, introduced quail and deer stalking and Sambar Deer with hounds.	Hound Hunting Test.	Deer (stalking and hounds) and Game Birds, not including ducks.
Deer stalking and Sambar Deer with hounds.	Hound Hunting Test.	Deer (stalking and hounds).
Stubble quail and pheasants, partridge, introduced quail.	None required.	Game birds, not including ducks.
Pheasants, partridge, introduced quail on private game bird farms only.	None required.	Private Game Bird Reserve Game Licence (no cost).

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<sup>2</sup> All information in this section was sourced from the Game Management Authority.

## 2.3 RECREATIONAL HUNTING METHODS

In Victoria, there are three permitted methods of hunting game animals:

- Hunting with a firearm
- Hunting with a bow / cross bow
- Hunting with the assistance of certain dog breeds to locate, flush, trail or retrieve game.

### Hunting with a firearm

Hunting with a firearm is the most commonly used method to hunt game animals in Victoria. All people who possess, carry and use a firearm are required to be licenced under the *Firearms Act 1996* and carry a current Firearms Licence issued by Victoria Police or any equivalent interstate Firearms Licence. All firearms must be registered.

Hunters can use the following firearms for deer hunting (providing they meet the minimum calibre and projectile weights specified for each species):

- Centrefire rifle
- Muzzle-loading rifle
- Smooth-bore firearms.

Ducks, the native Stubble Quail and introduced game birds can only be hunted with a shotgun and must be no greater than 12 gauge.

### Hunting with bows

Hunters can use long, recurve and compound bows to hunt deer providing they meet the minimum draw weights specified for each species (GMA, 2018). Crossbows are permitted for recreational hunting in Victoria. Crossbows are regulated differently to firearms. They are listed as a prohibited weapon under the *Control of Weapons Act 1990* and Control of Weapons Regulations 2011. To be in possession of a crossbow, a person must have a Chief Commissioner's Approval or be covered by a Governor in Council exemption (Victoria Police, 2015).

### Hunting with dogs

Hunting with specific pure dog breeds is regulated under the Wildlife (Game) Regulations 2012. Different breeds of dogs have been developed over time to trail, flush, point or retrieve game species. There are three categories under the regulations. Each category contains a list of dog species that can be used for the purpose of hunting. The categories and types of hunting the dogs can participate in are:

- Gundogs can be used for hunting game birds and deer (Hog Deer excluded)
- Deer hunting dogs can be used to hunt deer only (excluding Hog Deer)
- Hounds can only be used to hunt Sambar Deer in season.

As per the Game Management Authority's hunting manual (GMA, 2018), different breeds of dogs are used for different hunting purposes:

- Pointers are used primarily to point and retrieve game birds and locate deer
- Setters are primarily used to search for and point game birds
- Retrievers are used primarily to retrieve waterfowl; they also can be trained to hunt other game birds
- Spaniels are used mainly as flushers of game birds
- Utility gundog breeds are used to point, flush, and retrieve game birds and to locate deer.

- Hounds are used to flush, trail, and bail Sambar Deer.

These dogs are specifically bred to hunt instinctively, obey commands from the hunter, hunt only certain types of game, and ignore distractions in the field. It is an offence for dogs, to attack, bite or maim game under the Wildlife (Game) Regulations 2012.

## **2.4 RECREATIONAL HUNTING CONDITIONS DURING 2019**

Due to dry conditions and a lesser number of waterfowl, the duck hunting season in 2019 was reduced. The length of the season was reduced to 65 days (between 16 March to 19 May) from the usual 87 days. Bag limits were also reduced from the prescribed ten birds per day to four birds per day on opening weekend and five per day from then on. In comparison, 2013 was a full 87-day season and ten birds per day bag limit. In 2019, later start times were also applied during opening weekend (9am on Saturday and 8am on the Sunday). On all other days, hunting start times were half hour before sunrise and closed half hour after sunset. One game species, the Australasian Shoveler, was prohibited from being hunted for the 2019 duck hunting season.

The 2019 Stubble Quail hunting season was similar to previous seasons. The seasons started on the 8 April and finished on the 30 June. The daily bag limit was 20 Stubble Quail per hunter (Moloney & Powell, 2019).

For introduced game birds there is no set season or daily bag limit. They can be hunted all year round (GMA 2020).

Hog Deer and Sambar Deer hunting with hounds have hunting seasons each year. The open season for hound hunting was 1 April (except between Good Friday until the Wednesday after Easter Saturday when Easter falls in April) until the 30 November. There is no bag limit for Sambar Deer (GMA, 2019). Hog Deer hunting season was for the month of April and only one female and one male can be taken (GMA, 2019). For all other deer there is no set hunting season, hunting can occur year-round.

Pest animal hunting can be undertaken all year round and there is no bag limit (GMA, 2019).

## 3 Survey method

### 3.1 INTRODUCTION

The purpose of the survey was to understand the size and geographic distribution of the economic contribution of recreational hunting in Victoria and the health and wellbeing benefits. The design of the survey was based on the study of the 2013 year.

Prior to broader public release, the survey was piloted with eight representatives from various government agencies and recreational hunting associations. Feedback from the pilot was addressed before the survey was sent via email to game licence holders and promotion on the Agriculture Victoria and Game Management Authority websites. Those aged over 65 and those who hunted quail were showing to be underrepresented in the results part way through the testing phase, so 102 computer assisted telephone interviews (CATI) were undertaken to address these biases in the sample. In total there were 1,677 completed responses (3% participation rate).

### 3.2 SURVEY DESIGN

#### SURVEY QUESTIONS

The survey was designed to inform the government's policy and operations. Consideration was given to recreational hunting methods, equipment, target animals, seasons and locations, all of which influence a hunter's expenditure. Respondents were asked to outline all of their expenses for one of their trips to inform the economic contribution modelling.

To understand the substitutability of recreational hunting for other recreational activities, respondents were asked about why they like to go hunting, other activities they participate in and how important those activities are to them. The survey also focused on the health and wellbeing benefits of recreational hunting by including standardised questions used in several other Australian surveys. The results from these questions were used to understand whether people who participate in hunting have a different level of health and wellbeing to the average Victorian.

The full survey instrument is in Appendix 1.

#### PRE-SURVEY RESEARCH

A total of eight invites were sent to pilot participants to test the flow and appropriateness of the survey questions. Among those included in the pilot study were:

- Australian Deer Association
- Field and Game Australia
- Sporting Shooters Association Vic Branch
- Victorian Hound Hunters
- Victorian Game and Deer Stalking
- Victorian Deer Association
- Blond Bay Hog Deer Advisory Committee
- Game Management Authority.



Of the pilot surveys completed, two pilot interviewees provided some feedback on the survey questionnaire and this feedback was addressed and the questionnaire amended as appropriate before the survey was distributed more broadly.

### **3.3 SAMPLING FRAME**

Contact details for game hunters were obtained through the Game Management Authority's game licence database. Game licence holders are notified at the time of applying for a licence that they may be surveyed on their recreational hunting experience.

### **3.4 SAMPLING PROCESS**

#### **3.4.1 SAMPLING METHOD**

Almost two thirds of game licence holders have a registered email address with the Game Management Authority (35,000 out of 55,000). Email addresses are an optional means of contact for the game licence holder, so this does not provide strong grounds for a conclusion that the population of licence holders with a recorded email address was significantly different to the population without an email address. Any bias created by using the email contact method was reduced by supplementing the online survey with computer assisted telephone interviews (CATI).

Links to the survey were provided on the Agriculture Victoria and Game Management Authority websites for hunters to opt in if they had not received the email. The Game Management Authority also promoted the survey on its Facebook page.

The survey was open to, and could be completed by, all game licence holders, regardless of where they live.

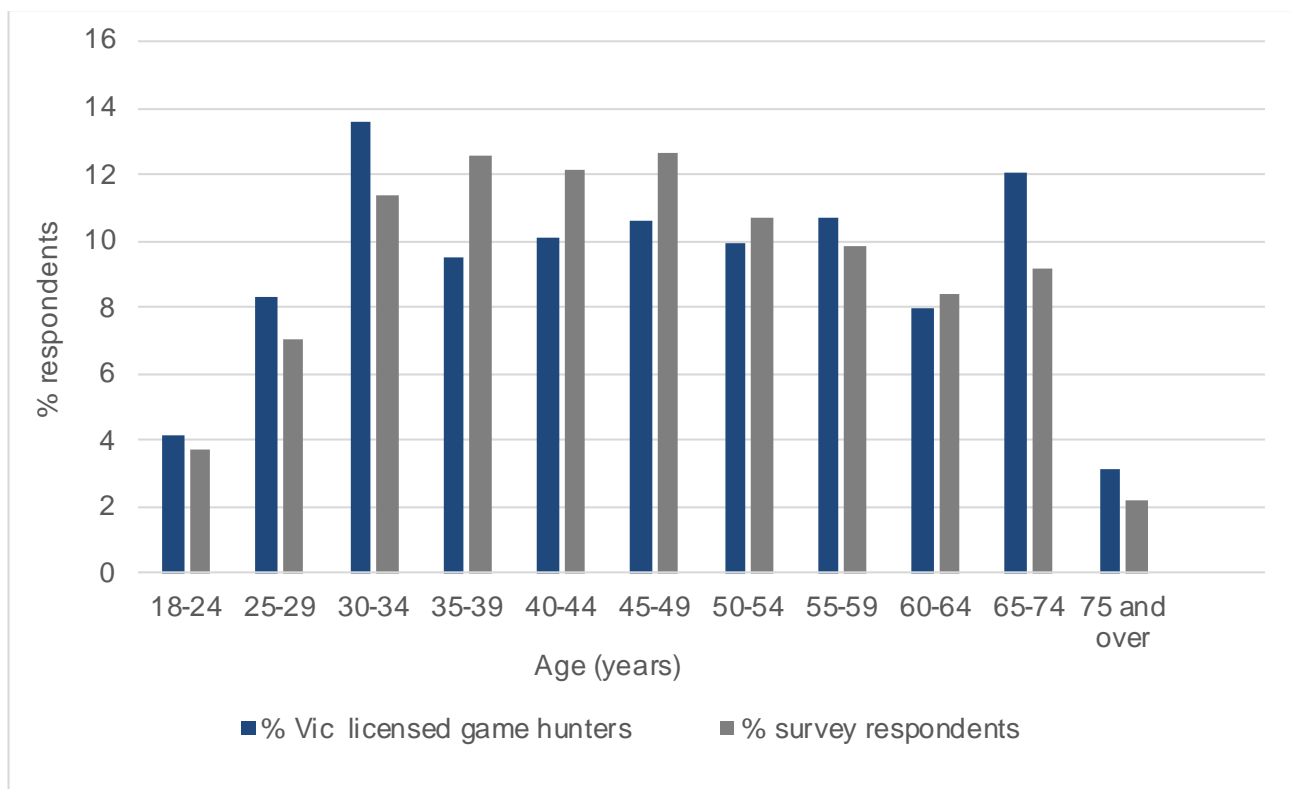
#### **3.4.2 SURVEY COMPLETION METHOD**

The online survey was used as the primary method for survey because of its efficiency. The survey link was emailed to those with a registered email address on the game licence database. CATI surveys were also used to contact game licence holders registered to hunt quail and those who are 65 years old and older as these two groups were underrepresented in the online surveys.

#### **3.4.3 ACHIEVED SAMPLE**

In total, **1,671** surveys were completed representing a **3%** participation rate from the population of game licence holders aged 18 years and over (comprising 53,500 people).

The age distribution of Victorian game licence holders is shown in Figure 3-1. The figure compares the age profile of people who responded to the survey with the age profile of the population of recreational hunters in the Victorian game licence database. The survey respondents were a good representation of the age profile of game license holders in Victoria.



**Figure 3-1: Age of licenced game hunters and survey respondents**

## 4 Economic modelling method

A detailed account of the economic modelling method is provided in Appendices 6 and 7.

### 4.1 EXPENDITURE

The first step in calculating economic contribution was to develop expenditure estimates for the recreational hunting population with game hunting licences in Victoria. Expenditure is a measure of how much hunters spend on recreational hunting trips and on equipment, training, etc., to support their hunting at other times of the year.

Estimation of expenditure required some data checking / adjustment, estimating the trip and non-trip expenditures by each sampled hunter and scaling that expenditure from the survey sample to the population.

These aggregated expenditure data were then converted from purchasers' prices to basic prices by reallocating net taxes, retail and transport margins and removing imports.

The closing adjustment to the aggregate expenditure data was allocating them to the relevant input-output sectors (78 intermediate sectors, other value added or imports) in which the expenditure occurred, compiling a final demand profile ready for input into the economic contribution estimation models.

### 4.2 GROSS ECONOMIC CONTRIBUTION

The gross economic contribution measures the footprint of recreational hunting in the regional and state economies.

The estimates of economic contribution presented in this report are generated by an extension of the conventional input-output method known as the RISE model (Regional Industry Structure and Employment) developed by BDO EconSearch. These extensions have included the addition of population and unemployment "sectors", as well as capacity to analyse productivity and price change effects.

The magnitude of various expenditures and where they occur is fed into the RISE model by the final demand profile. Also needed is information on how the sectors receiving this expenditure share their expenditures among the various sectors from whom they buy, and so on, for the further expenditure rounds. The RISE model provides industry multipliers (in terms of employment and, gross regional product (GRP)), which are applied directly to expenditure estimates to formulate economic contribution estimates.

### 4.3 ECONOMIC CONCEPTS USED

The primary focus in this report is on the concept of economic activity resulting from expenditure by game hunters. The key economic activity indicators considered in this analysis are gross state/regional product and employment.

**Gross regional/state product (GRP/GSP):** GRP/GSP is a measure of the contribution of an activity to the regional economy. GRP/GSP is measured as value of expenditure less the cost of goods and services (including imports) used in producing the output. It represents payments to the primary inputs of production (labour, capital and land). Using GRP as a measure of economic contribution avoids the problem of double counting that may arise from using value of expenditure for this purpose.

**Employment:** Employment numbers usually are reported in full time equivalent (FTE) units. FTE is a way to measure a worker's involvement in a project. An FTE of 1.0 means that the person is equivalent to a full-time worker, while an FTE of 0.5 signals that the worker is only half-time.

A useful way to think about the broader economic contribution is using the concept of a 'supply chain'. Taking employment as an example, there are four categories of activity along the supply chain:

1. *Direct employment* – this is employment in those firms, businesses and organisations that are directly supplying the goods and services purchased by the recreational hunters on the trips and in support of their hunting activities
2. *First round employment* – refers to employment in firms that supply inputs and services to the 'direct employment' businesses, i.e. those identified at point 1
3. *Industrial-support employment* – this term is applied to 'second and subsequent round' effects as successive waves of output increases occur in the economy to provide industrial support, as a response to the original expenditure. This category excludes any employment associated with increased household consumption
4. *Consumption-induced employment* – is the term applied to those effects induced by increased household income associated with the original expenditure. The expenditure of household income associated with all three categories of employment (direct, first round and industrial-support) will generate economic activity that will, in itself, generate jobs.

Flow-on (or indirect) employment is the sum of categories 2, 3 and 4. In this analysis direct and flow-on employment (FTE) and GRP/GSP generated by the supply chain have been reported. GRP/GSP can be interpreted along the same lines as the employment example given above.

### 4.4 NET ECONOMIC CONTRIBUTION

Without hunting, hunting expenditure would be reallocated among different economic activities. It is assumed that without hunting, money currently spent on hunting expenditure would be spent on other things, being either:

1. Other outdoor activities such as camping, fishing, and target shooting
2. General discretionary household expenditure.

Expenditures made on recreational hunting trips include only a small amount of imports as much occurs at businesses in Australia selling Australian services (i.e. restaurants, accommodation, and vehicle repairs). The same is true of spending on other outdoor activities. In contrast, general discretionary household expenditure (e.g. clothes, footwear, home furnishings etc.) includes a significant amount of spending that goes to imports.

Shifting expenditure from recreational hunting to discretionary household expenditure would increase the proportion of expenditure that goes to imports. For example, in the gross contribution case, an estimated 13

per cent of direct expenditures are made on imports, compared to about 39 per cent in the low substitutability case. This causes a reduction in economic activity in Victoria.

Questions were included in the survey to elicit the substitutability of recreational hunting and substitutability scores for each complete survey response were estimated. Using the substitutability scores, an expenditure profile was modelled where recreational hunting activities are replaced by other outdoor activities or general discretionary household expenditure.

The 'without hunting' expenditure scenario was analysed with the same input-output model that was used for the gross economic contribution scenario. The difference between the results of the 'with hunting' and 'without hunting' scenarios represents the net economic contribution. An input-output model is appropriate for this purpose, rather than requiring computable general equilibrium (CGE) modelling. The impact is unlikely to materially affect supply and demand for labour or goods and services within the Victorian economy, and will not therefore affect prices or wages.

## 4.5 GEOGRAPHY USED FOR THE ANALYSIS

The unit of geography used for the regional economic analysis was Local Government Area (LGA). A composite region for Greater Melbourne was used that covered the metropolitan LGAs as detailed in Table 4-1.

**Table 4-1: Melbourne region defined by LGA**

GREATER MELBOURNE REGION – LOCAL GOVERNMENT AREAS			
Banyule	Glen Eira	Maroondah	Port Phillip
Bayside	Greater Dandenong	Melbourne	Stonnington
Boroondara	Hobsons Bay	Melton	Whitehorse
Brimbank	Hume	Monash	Whittlesea
Cardinia	Kingston	Moonee Valley	Wyndham
Casey	Knox	Moreland	Yarra
Darebin	Manningham	Mornington Peninsula	Yarra Ranges
Frankston	Maribyrnong	Nillumbik	

We estimated economic contribution for the metropolitan region, as well as the 20 non-metropolitan LGAs (out of the total of 48) that had the highest recreational hunting expenditure from the survey. The selected regions are detailed in Table 4-2.

Overall, these 20 LGAs and Greater Melbourne region accounted for 91 per cent of the total expenditure by Victorian game hunting licence holders in this survey.

**Table 4-2: High expenditure LGAs<sup>3</sup> selected for the economic contribution analysis heading**

LOCAL GOVERNMENT AREAS			
Alpine	Gannawarra	Latrobe	Swan Hill
Ballarat	Greater Bendigo	Macedon Ranges	Towong
Baw Baw	Greater Geelong	Mansfield	Wangaratta
Campaspe	Greater Shepparton	Mitchell	Wellington
East Gippsland	Horsham	Murrindindi	Wodonga

<sup>3</sup> Includes Greater Melbourne region.



Gannawarra

Macedon Ranges

Towong

# Results





# 5 Profile of recreational game hunters

## 5.1 SOCIOECONOMIC CHARACTERISTICS

### 5.1.1 SUMMARY

Recreational game hunters in Victoria are nearly always male, are more likely to be aged between 35 and 50, will usually be in full time work and live with a partner. They are also likely to have a post school qualification and enjoy relatively higher household incomes than other Victorians.

Recreational game hunters' primary motivations for hunting are spending time in places that are special to them, spending time in the outdoors, meeting new people and spending time with friends. Recreational hunting is important to those who hunt. Some other activities were felt to be as important or more important than hunting, these included camping, recreational target shooting, and four-wheel driving.

The socio-demographic characteristics of Victorian hunters are described below.

### 5.1.2 AGE AND GENDER

Hunters can be any age but are more likely to be aged between 35 and 50. 97% of game licence holders were male and 3% were female.

The age and gender of hunters that responded to the survey accords with these statistics, indicating that the sample was representative of the population in those aspects.

### 5.1.3 PLACE OF RESIDENCE

The majority of game licence holders live in Victoria with 11% living interstate<sup>4</sup>. Approximately 49% of hunters surveyed live in Greater Melbourne and 51% live in regional Victoria and interstate.

### 5.1.4 EMPLOYMENT

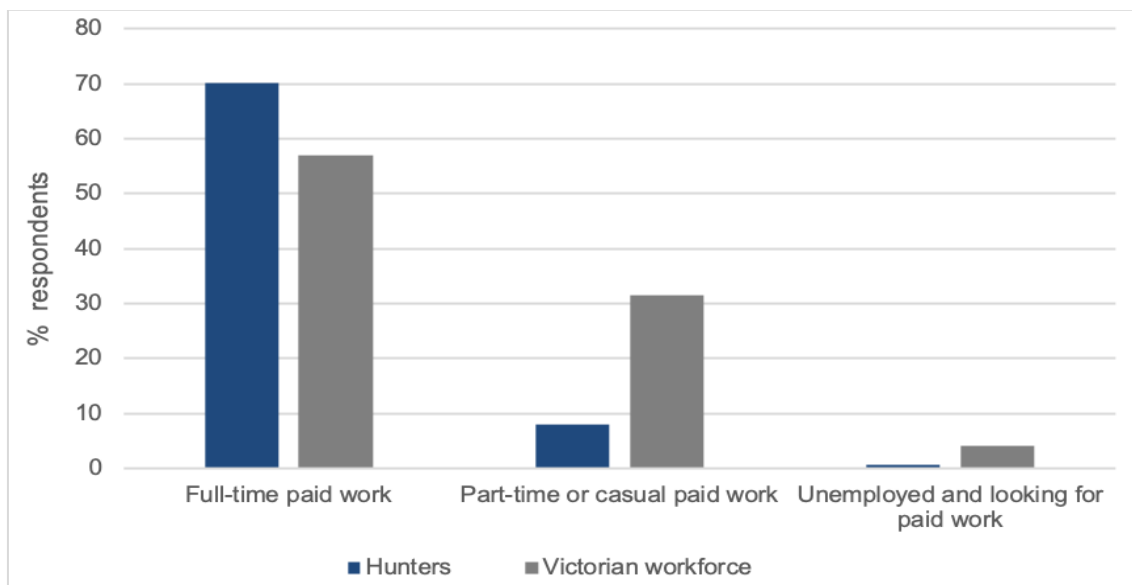
The majority of respondents indicated that they were in full-time paid employment (70%) and the next largest group were retired (15%). Less than 15% of respondents indicated that they fell into any other category such as part-time work (5%), other (4%), casual paid work (3%), home duties (1%), unemployed (0.6%) or student (0.3%).

In comparison 57% of Victorians are in full-time employment, 31% in part-time or casual employment and 4% are unemployed (ABS 2016). Hunters are more likely to be in full time employment and less likely to be in part time or casual employment than the average Victorian (Figure 5-1).

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<sup>4</sup> Game Management Authority (2019) pers comm

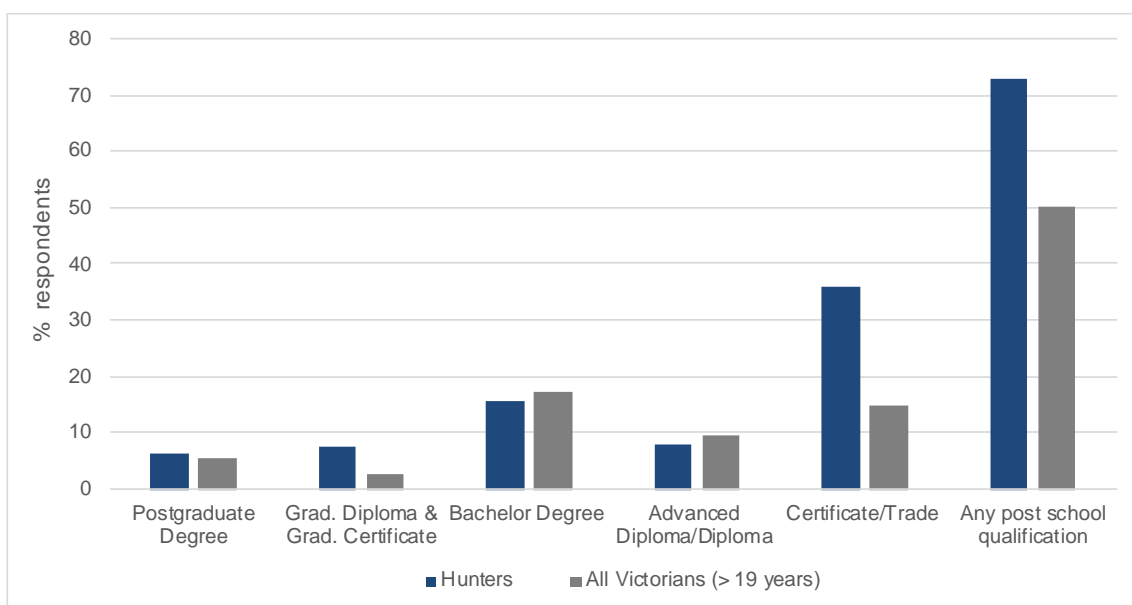




**Figure 5-1: Employment status of hunters compared with Victorian workforce<sup>5</sup>**

### 5.1.5 EDUCATIONAL ATTAINMENT

Hunters who responded to the survey were more likely to have achieved post school qualification than the State average. Educational attainment varied across respondents with a large majority (73%) indicating that they had completed a post-school qualification such as a certificate/trade, diploma or university degree (Figure 5-2). By comparison, only 50% of the general Victorian population has completed post-school qualifications. Survey respondents were most likely to have completed a certificate/trade or diploma level qualification. This may either indicate higher education amongst hunters, or it may also reflect relatively higher participation in the survey by those with higher levels of education.



**Figure 5-2: Post school qualifications of hunters compared with Victorians (age > 19 years)**

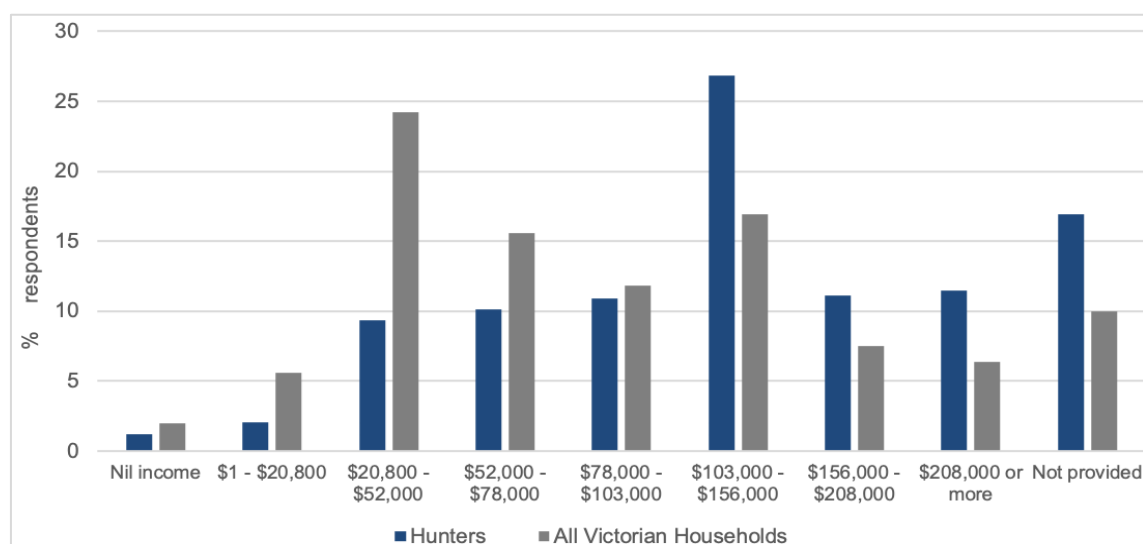
<sup>5</sup> Includes Greater Melbourne region sourced from 2016 ABS Census of Population and Housing.

### 5.1.6 HOUSEHOLD INCOME

Hunters have relatively high incomes compared with all Victorian households<sup>6</sup>. Respondents were asked to indicate what their gross household income was in the previous 12 months. Although 14% of respondents preferred not to answer the question, a large majority (86%) answered.

The largest group of respondents had a household income of between \$103,000 and \$156,000 (27%). Moreover, 60% of respondents reported household incomes of \$78,000 or greater compared with only 43% of Victorian households<sup>7</sup>. Additionally, 23% of hunters had incomes greater than \$156,000 compared with 14% of the general population of Victorians. This may either indicate higher income amongst hunters, or it may also reflect relatively higher participation in the survey by those with higher incomes.

The distribution of household income amongst Victorian hunters compared with Victorian households is shown in Figure 5-3.



**Figure 5-3: Household income reported by survey respondents compared with all Victorians**

## 5.2 RECREATIONAL HUNTING BEHAVIOUR

### 5.2.1 RECREATIONAL HUNTING TRIPS

According to research undertaken by the Game Management Authority, the average number of trips per hunter was six trips and the median was three trips.

This survey also collected information on hunters' trips, from which more detailed information can be presented. The average number of trips is higher than the data collected by the Game Management Authority because of the bias towards active hunters (which was corrected for in the economic modelling). Of those respondents who hunted over the previous 12 months, almost half (45%) took between one and six trips and the remaining hunters (55%) took more than six trips. A small group of hunters (3%) took over 50 trips and around one quarter of hunters took no trips during that period (Figure 5-4).

<sup>6</sup> Victorian population figures sourced from ABS Census of Population and Housing.

<sup>7</sup> Mean household income in Australia is in the order of \$116,000 per annum as a benchmark.

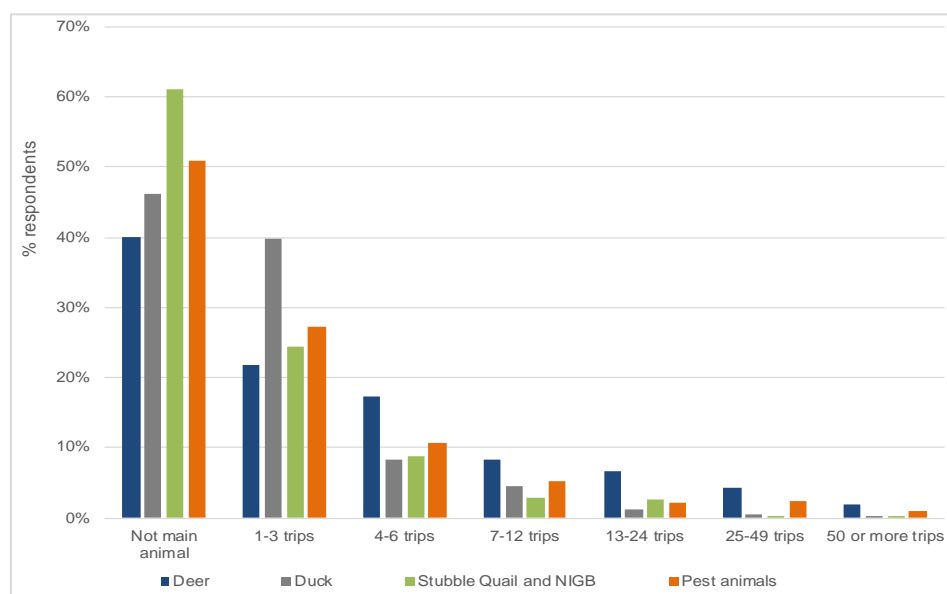


**Figure 5-4: Number of trips taken within Victoria in the past 12 months by hunters**

Of the trips taken, greater than 70% of trips were taken in Victoria. 68% of hunters only hunted in Victoria, 24% hunted both within Victoria and interstate, and 17% hunted mostly interstate.

Figure 5-5 helps illustrate the primary purpose of recreational hunting trips made in Victoria by showing the distribution of the number of trips by targeted animal group. Hunters were asked which main animal they intended to hunt on each trip.

Hunters whose main target animal was duck were most likely to take between one to three trips (46%). Hunters whose main target animal was deer were taking more trips, with 39% taking more than 4 trips. Duck hunting is limited by the length of the season, whereas most deer species can be hunted year-round. The small group of hunters who took 50 or more trips were most likely to hunt deer or pest animals as their main target animal with 2% of active<sup>8</sup> deer hunters and 1% of active pest hunters, taking 50 or more trips.



**Figure 5-5: Distribution of number of trips by target animal group for licensed hunters**

<sup>8</sup> Active hunters are hunters who undertook one or more hunting trips in the 2019 season for the animal group they are licenced to hunt.

In summary, Victorian hunters are most likely to take between one and six trips within Victoria per year and deer hunters are the most avid hunters and tend to take more trips than other hunters. Victorian hunters are most likely to hunt in Victoria where two thirds only hunt within their State.

## 5.2.2 MOTIVATIONS TO HUNT

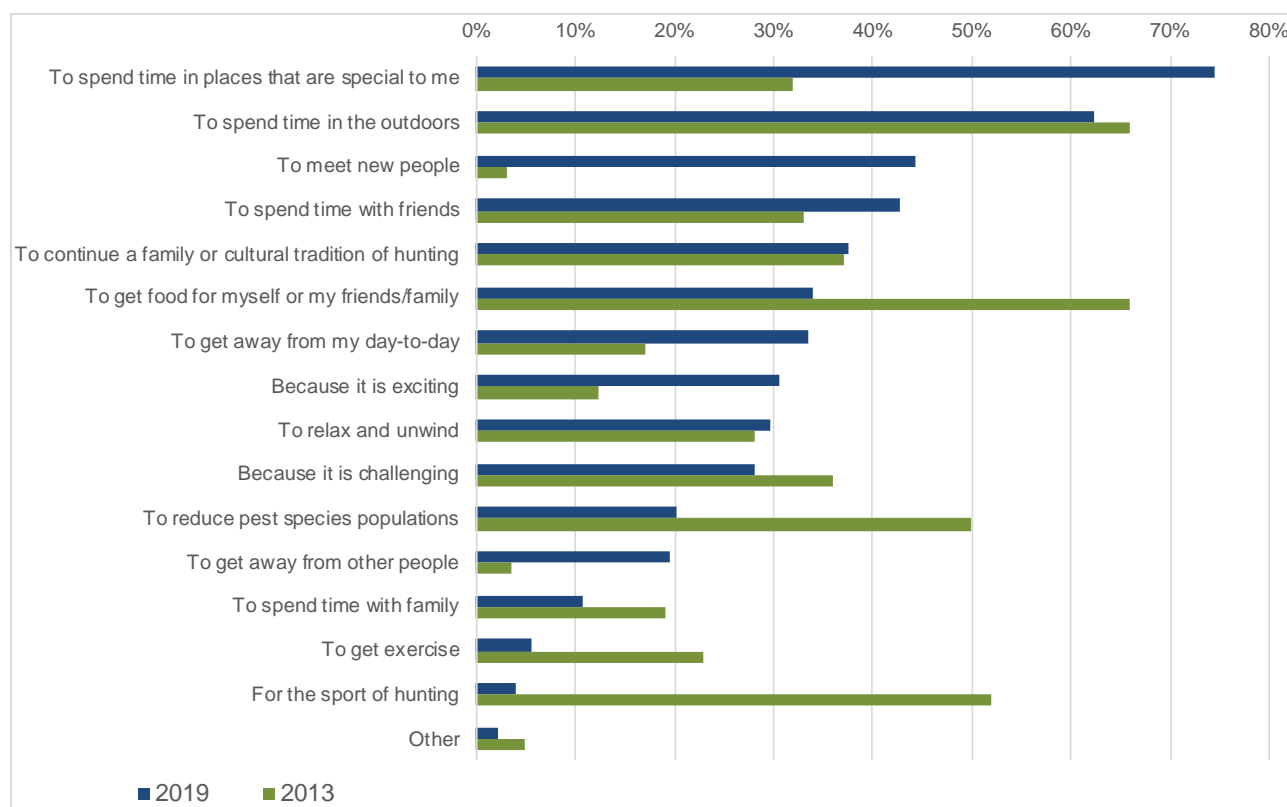
Respondents were asked to nominate the five most important reasons that they go recreational hunting from a list of 15. Each of these options represented a different type of social or utilitarian benefit.

Figure 5-6 shows the most important social benefits that Victorian game licence holders derive from recreational hunting, ordered from most to least common. These data are generated from the weighted data set and are therefore representative of the population of hunters.

The two most important social benefits identified were spending time in places that are special to the hunters (74%), followed by spending time in the outdoors (62%). Meeting new people (44%) and spending time with friends (43%) were also identified as being particularly important social benefits.

These results contrast with the most important social benefits of recreational hunting identified in the 2013 survey<sup>9</sup> which showed that obtaining food (70%), the sport of hunting (52%) and reducing pest animals (47%) were most important. Spending time outdoors was equally important (66%) in 2013 (RMCG 2014).

Differences between the two surveys are pronounced for some responses e.g. meeting new people, for the sport of hunting, to reduce pests, getting food. These could be explored further in futures surveys.



**Figure 5-6: Most important reasons for recreational hunting indicated by respondents**

<sup>9</sup> RMCG 2014, Estimating the economic impact of hunting in Victoria in 2013. Report prepared for Department of Environment and Primary Industries.

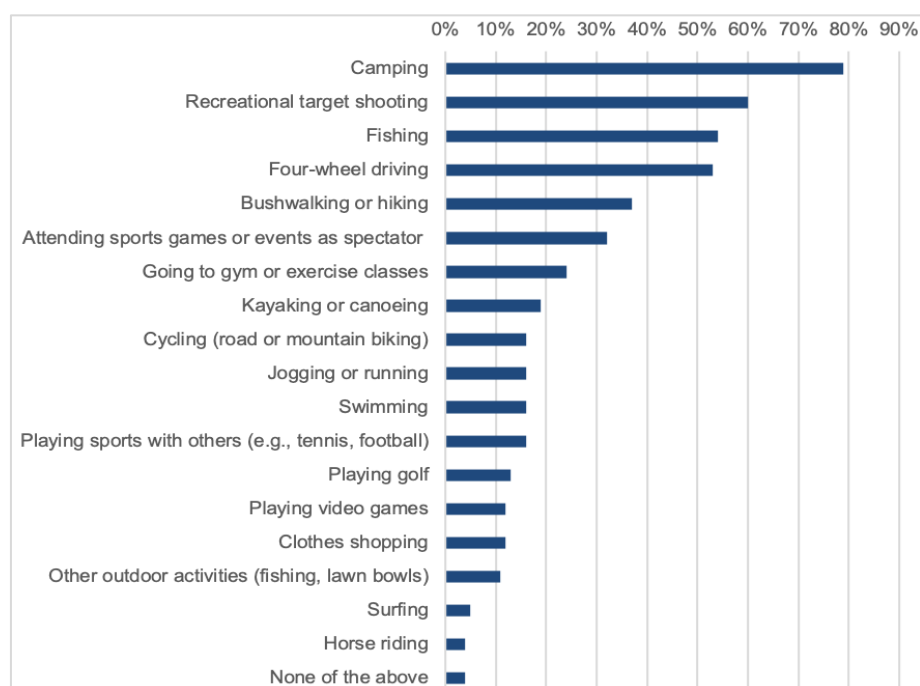
### 5.2.3 ACTIVITIES ENJOYED BY HUNTERS

#### OVERVIEW

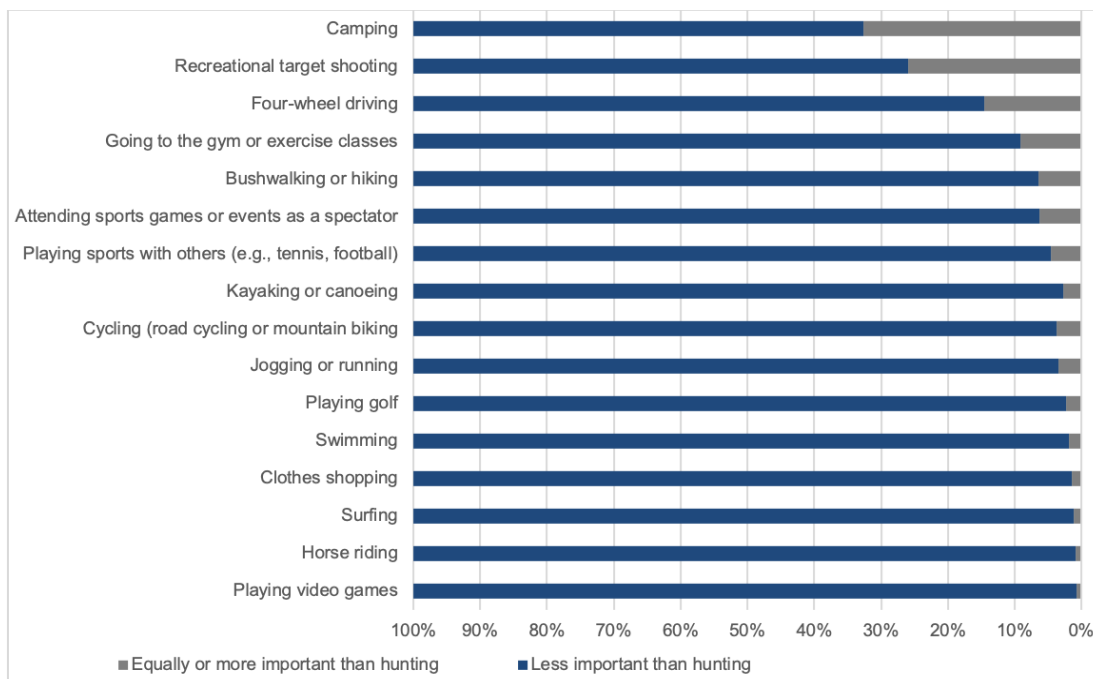
Many recreational hunters enjoy a range of outdoor activities in addition to hunting. Hunters are also often campers and enjoy recreational target shooting, fishing and four-wheel driving. For many hunters these activities are equally as important as hunting.

Figure 5-7 shows the proportion of hunters who also take part in other outdoor recreation activities. In total, 96% of hunters indicated that they participate in other outdoor recreation activities, with only 4% of hunters reporting that they took part in none of the suggested activities listed. The most popular activities were camping (79%), recreational target shooting (60%), fishing (54%) and four-wheel driving (53%).

The relative importance of a list of activities provided in the survey is shown in Figure 5-8. The activities most commonly rated as being as important as, or more important than recreational hunting were camping (33%), recreational target shooting (26%) and four-wheel driving (15%). This suggests that for some hunters, these activities are likely to be substitutable for recreational hunting. In the RMCG 2014 study fishing was rated as being as important as, or more important than hunting by approximately two thirds of respondents, however data for this activity was not collected in this survey.

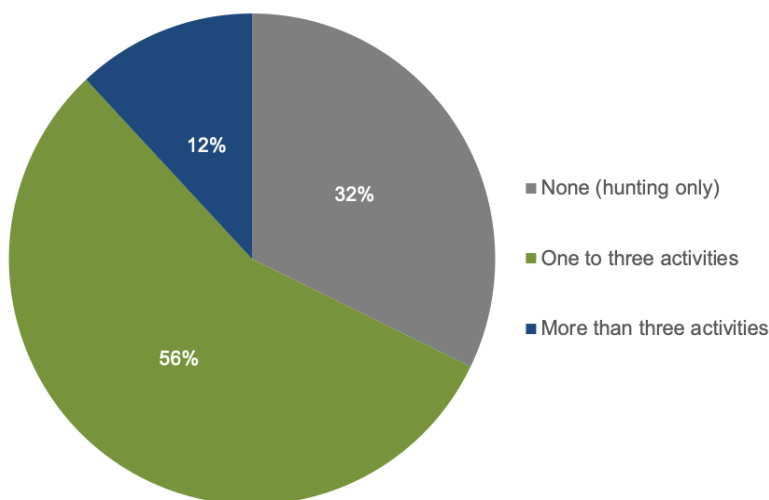


**Figure 5-7: Q. Do you do any of the following hobbies/sporting activities? - Proportion of hunters who also take part in other outdoor recreation activities**



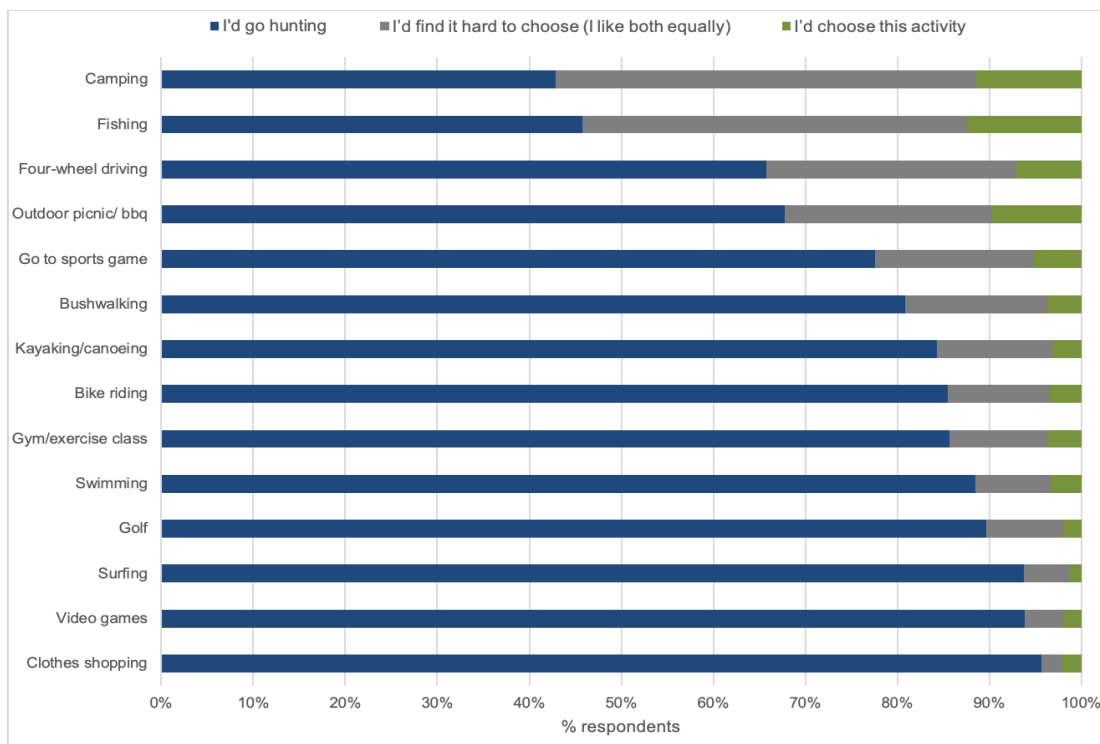
**Figure 5-8: Q. ‘How important is this activity to you?’ – Relative importance of 16 recreational activities compared to recreational hunting**

In summary, the majority of game hunters value another activity as highly, or more highly, than hunting. Figure 5-9 shows that 68% indicated that there were one or more activities they would find it hard to choose between or would prefer to be hunting. Conversely, one third (32%) of hunters would always choose recreational hunting over any of the other activities listed.



**Figure 5-9: Number of activities considered equally or more important than recreational hunting**

Secondly, participants were asked which activity they would choose to do if they were given both options on a nice weekend, at the same cost. Figure 5-10 shows that the activities most often chosen over recreational hunting were fishing, camping and four-wheel driving. The proportion of hunters who indicated that they would either find it hard to choose between recreational hunting and these activities or that they would choose the non-hunting activity were 57% for camping, 54% for fishing and 34% for four-wheel driving. These activities may provide the same social benefits to respondents as recreational hunting meaning that if hunting opportunities were to decrease, an increase in the other activity may provide a satisfactory substitute.



**Figure 5-10: Q 'If given the following options on a nice weekend, at the same cost, which would you choose to do? Imagine you have to choose between them and can't do them at the same time on this particular weekend (we know many of these things are sometimes done at the same time).'**

## 5.3 WELLBEING OF HUNTERS

### 5.3.1 OVERVIEW

The overall health and wellbeing of hunters was examined using three measures: personal wellbeing, social capital and general health. The analysis shows that game licence holders report higher scores in these measures than the general population, as measured by the Regional Wellbeing Survey<sup>10</sup>. There are likely to be many contributing factors to the relatively higher level of general health, personal wellbeing and social capital of hunters, for example, hunters have a relatively high level of education, income and economic prosperity when compared with the Victorian population, as shown in Section 5.1.5. This study does not examine the reasons behind the relative differences in wellbeing between hunters and the general population.

The types of hunters with the highest self-reported wellbeing were:

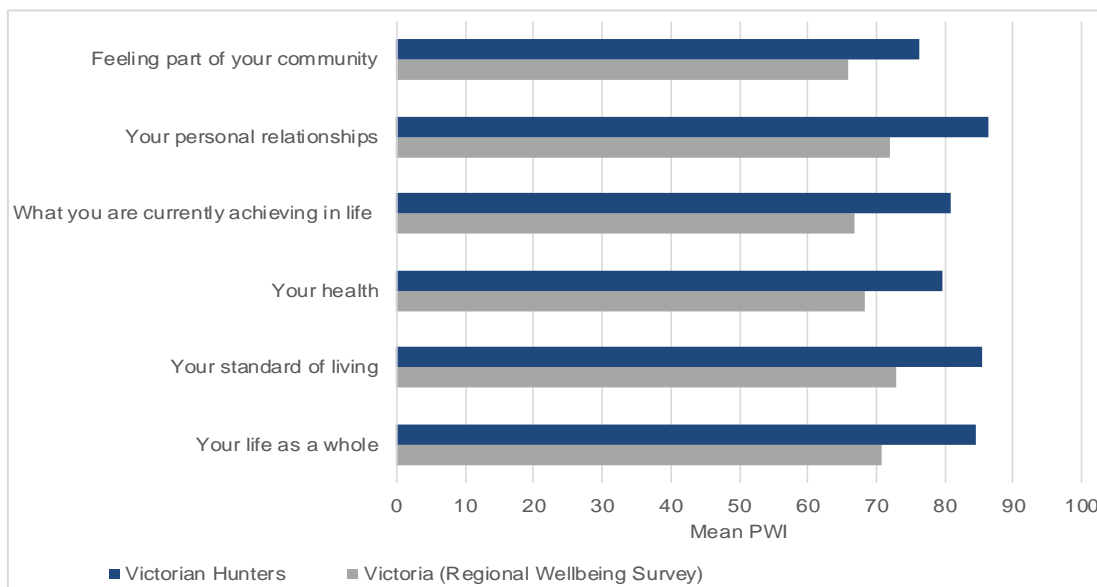
- Those who hunt to continue a family or cultural tradition of hunting
- Those who go hunting to spend time with friends, for the sport of hunting or to get exercise; and
- Duck or stubble quail hunters.

<sup>10</sup> The University of Canberra Regional Wellbeing Survey is an annual survey that examines the wellbeing of individuals and communities in rural and regional communities in Australia.



### 5.3.2 WELLBEING MEASURE 1: PERSONAL WELLBEING

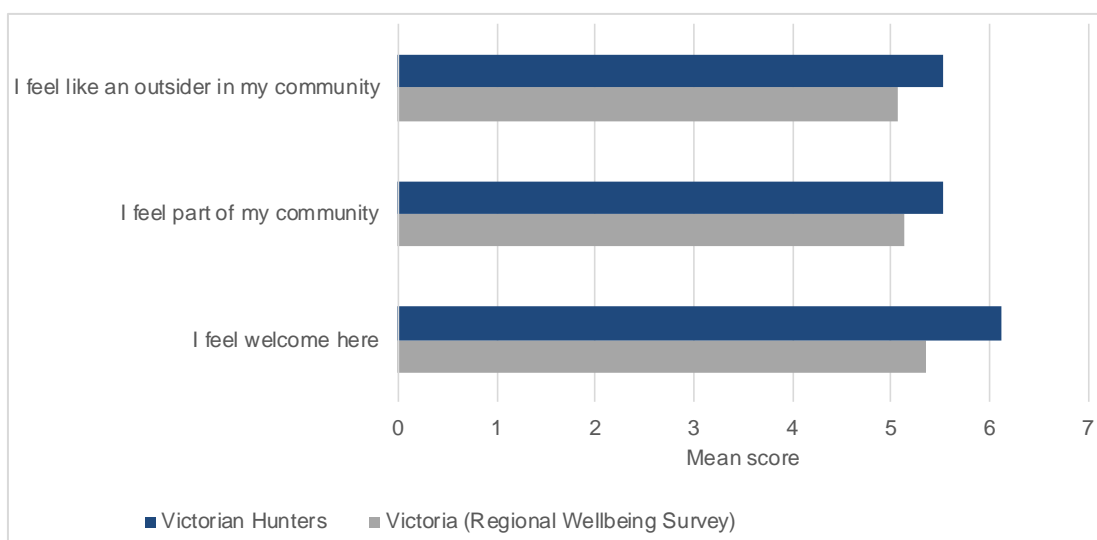
The Personal Wellbeing Index is calculated by asking participants how satisfied they are with different domains of their life, on a scale from zero (completely dissatisfied) to ten (completely satisfied). Victorian hunters had higher averages across all Personal Wellbeing Index domains than the general Victorian population (Figure 5-11). For instance, the average score for satisfaction with life as a whole for game licence holders was 85. In comparison, the Victorian average for 2018 was 71. This suggests that Victorian hunters have higher satisfaction with their lives as a whole than the general population in Victoria.



**Figure 5-11: Comparison of Personal Wellbeing Index domains with Victorian average**

### 5.3.3 WELLBEING MEASURE 2: SOCIAL CAPITAL

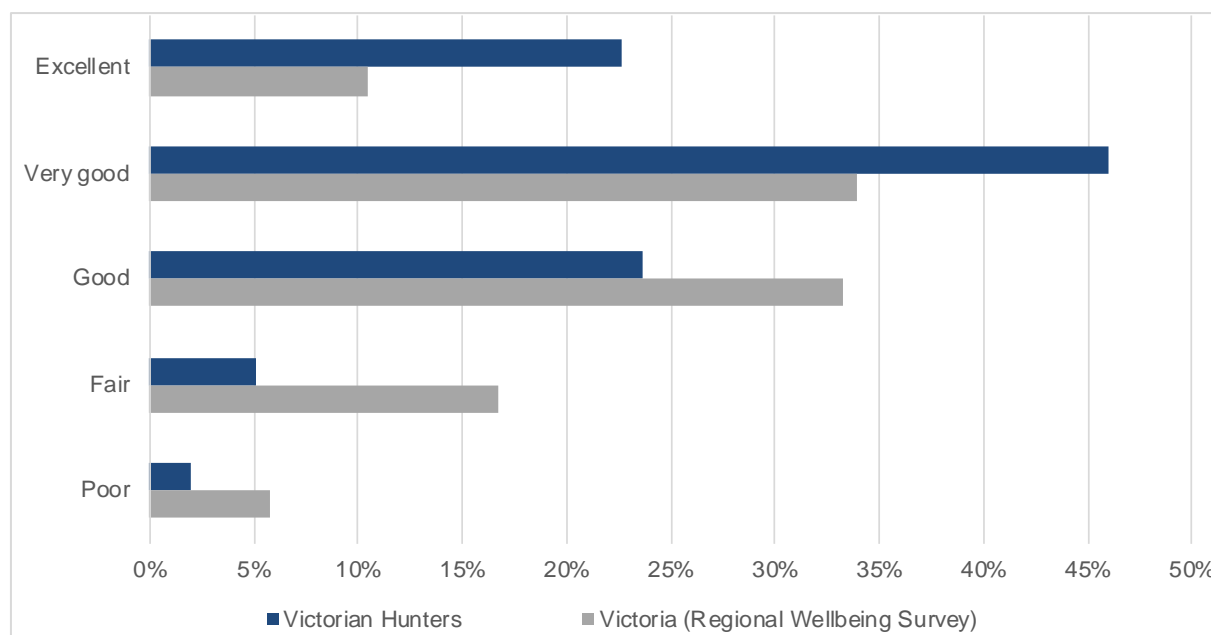
The social capital index measures an individual's strength of social ties and sense of belonging to social groups and community. Figure 5-12 shows that game licence holders had higher scores across all social capital domains than the general Victorian population.



**Figure 5-12: Comparison of social capital domains with Victorian average**

### 5.3.4 WELLBEING MEASURE 3: GENERAL HEALTH

Figure 5-13 shows that game licence holders rate their general health higher than the general Victorian population. For instance, 69% of survey respondents reported being in excellent or very good health, compared with 44% for the general Victorian population.



**Figure 5-13: Comparison of general health of Victorian hunters with Victorian average**

### 5.3.5 WELLBEING AND TYPES OF HUNTERS

#### Method of analysis

Exploratory bivariate analysis was used to investigate whether reasons for recreational hunting varied with three hunter characteristics:<sup>11</sup>

- Their hunting behaviour and spending
- Target animals
- Their wellbeing and social capital.

Bivariate analysis was performed on the 15 motivations for going recreational hunting (as shown in previous Figure 5-9) and hunters' general health, personal wellbeing and social capital. Only significant results<sup>12</sup> are presented and these are detailed more fully in Appendix 3.

The analysis found that:

- Those who go recreational hunting to continue a family or cultural tradition of hunting had better general health, personal wellbeing and social capital in comparison to hunters who go hunting for any other reason

<sup>11</sup> Two statistical measures, Spearman's rank correlation and Kruskal-Wallis chi-square tests, previously used to explore social data on recreational hunting behaviour (RMCg 2014), were used for the bivariate analysis. The software package SPSS Statistics was used to perform the bivariate analysis.

<sup>12</sup> Where they had a probability value of less than 0.05 i.e. the relationship identified is highly unlikely to have occurred by random chance.

- Hunters who go recreational hunting to spend time with friends, for the sport of hunting or to get exercise had better personal wellbeing and social capital in comparison to hunters who did not go hunting for this reason
- Duck or stubble quail hunters had higher social capital, personal wellbeing and general health in comparison to hunters who hunted for other animals
- Conversely, hunters who go recreational hunting to get away from their day to day life, to get away from other people or because it is exciting had lower personal wellbeing and social capital in comparison to hunters who did not go hunting for this reason.

The relationships between recreational hunting expenditure and hunting behaviours were also explored, based on the total hunting expenditure on hunting in Australia in the last 12 months.

The results suggest that:

- Hunters who hunt more, spend more on recreational hunting (with a strong correlation)
- Hunters with higher incomes tend to spend more on recreational hunting and those hunters who do spend more on hunting have better general health
- Hunters with lower expenditure are less likely to be willing to substitute other activities for recreational hunting.

## 6 Economic results

### 6.1 OVERVIEW

#### GROSS ECONOMIC CONTRIBUTION

In 2019, the gross economic contribution of hunting by game licence holders was estimated to be:

- \$356 million in GSP (\$160 million direct and \$196 million flow on)
- 3,138 FTE jobs (1,626 FTE direct and 1,513 FTE flow-on jobs).

#### NET ECONOMIC CONTRIBUTION

Without hunting by game licence holders in Victoria:

- It is expected that between \$19 million and \$57 million in GSP, or 246 and 627 FTE jobs would be lost to the Victorian economy.

The economic results have been analysed and presented for:

- Victoria as a whole (gross economic contribution and net economic contribution)
- Regional Partnership regions (gross economic contribution)
- LGAs (gross economic contribution)
- Towns (expenditure)
- A comparison of the 2013 and 2019 estimates (gross economic contribution).

The results of the study separate the estimated contributions into two categories: direct and flow-on effects.

The **direct contribution** is that associated with the direct expenditures. Typically, these will include impacts in the retail sector (e.g. groceries, ammunition, fuel), accommodation businesses (e.g. hotels, motels, caravan parks) and manufacturing industry (e.g. hunting equipment and accessories).

The **flow-on effects** are the effects of all expenditure rounds after the direct expenditure, such as the employment and GRP in the businesses that support and supply the retail, accommodation and manufacturing companies.

The gross economic contribution represents the current 'footprint' of hunting expenditures. Without recreational game hunting, hunters would redirect their hunting expenditures to other outdoor activities and to general discretionary expenditure. The impact of this shift is estimated by the net economic contribution. Estimates for both the gross and the net contributions are reported in this section.

### 6.2 VICTORIA

The gross economic contribution is the economic footprint of hunting by Victorian game licence holders. The economic contribution comes from money spent by game licence holders buying equipment or pursuing their sport.

The gross contribution to GSP was \$356M in 2019, comprising \$160M direct and \$196M as a result of flow-on economic activity (Table 6-1). There were an estimated 1,626 FTE jobs generated directly by recreational hunting-related expenditure with a further 1,513 flow-on (FTE) jobs giving a total employment contribution of 3,138 FTE jobs. This contribution represents 0.1 per cent of Victoria's GSP and employment in 2019.

**Table 6-1: Gross economic contribution of hunting by Victorian game licence holders, Victoria, 2019**

	DIRECT	FLOW ON	TOTAL
Gross State Product	160	196	356
Employment	1,626	1,513	3,138

Of the animal groups, the gross contribution from deer hunting was the highest, at \$201M, with duck at \$65M and quail \$22M. The economic contribution from game animal hunting was \$287M of GSP (Table 6-2).

**Table 6-2: Gross economic contribution of hunting by Victorian game licence holders, by animal group, Victoria, 2019**

	GROSS STATE PRODUCT (\$M)	EMPLOYMENT (FTE)
Deer	201	1,761
Duck	65	587
Quail	22	202
<i>Game animals only</i>	<i>287</i>	<i>2,550</i>
Pest Animals	69	588
<b>Total</b>	<b>356</b>	<b>3,138</b>

### 6.3 REGIONAL PARTNERSHIP REGIONS

The largest proportion of economic activity occurred in the Greater Melbourne Region, where contribution to total GRP was \$87M and total employment was 820 FTE jobs. Outside of Melbourne, Gippsland and Ovens Murray Regional Partnership areas had the highest contribution to total GRP at \$43M and \$30M, respectively, and employment at 413 and 343 FTE jobs (Table 6-3).

Inter-regional trade generating additional economic activity accounted for \$124M contribution to GRP and 837 FTE jobs. GRP attributed to inter-regional trade accounts for trade between regions where the flow on effects generated by each region do not occur within that same region but still occur within Victoria.

The expenditure, GRP and employment figures are provided in Table 6-3.

**Table 6-3: Gross economic contribution of hunting by Victorian game licence holders, by regional partnership, 2019**

Region	GROSS REGIONAL PRODUCT (\$M)			EMPLOYMENT (FTE)		
	Direct	Flow-on	Total	Direct	Flow-on	Total
Greater Melbourne	41	46	87	456	364	820
Gippsland	26	17	43	271	142	413
Ovens Murray	17	13	30	237	106	343
Goulburn	12	6	18	122	51	174
Loddon Campaspe	9	7	16	102	57	159
Barwon	7	5	12	77	43	119
Wimmera Southern Mallee	6	4	9	66	31	97
Mallee	5	4	9	59	30	88
Central Highlands	3	2	6	38	20	59
Great South Coast	2	1	3	21	10	30
Inter-regional trade	33	91	124	178	659	837
<b>Total Victoria</b>	<b>160</b>	<b>196</b>	<b>356</b>	<b>1,626</b>	<b>1,513</b>	<b>3,138</b>

The breakdown of economic contribution by animal group is provided in Appendix 4.

## 6.4 LOCAL GOVERNMENT AREAS

The LGAs with the highest gross economic contribution were Mansfield, East Gippsland, Latrobe and Greater Geelong. Table 6-4 provides a breakdown of the economic contribution (direct and flow on GRP and employment) for the top 20 LGAs.

Figure 6-3 shows the total contribution to GRP by animal group in the most important hunting jurisdictions in Victoria.

Deer hunting related economic activity was concentrated in Greater Melbourne and the eastern parts of the state, particularly Mansfield, East Gippsland, Wellington and Latrobe. By contrast, duck hunting related activity was spread between northern and central Victoria, south east Victoria and some LGAs to the west of the state.

The economic contribution from pest animal hunting was greatest in Greater Melbourne, Mansfield, East Gippsland, Horsham, Greater Bendigo and Geelong, whereas the contribution of quail hunting was mainly concentrated in Greater Melbourne and Horsham.

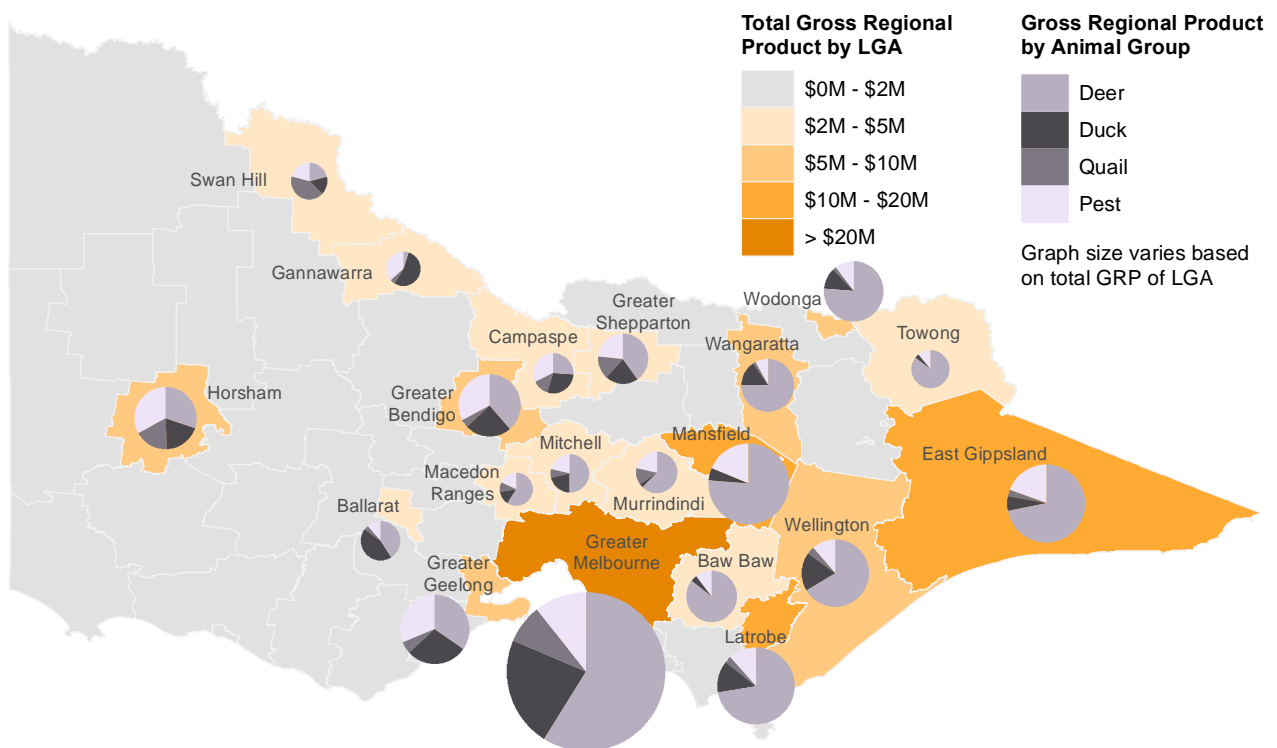
The breakdown by animal group for each LGA is provided in Appendix 4.

**Table 6-4: Gross economic contribution by Victorian game licence holders by LGA, all animal groups, 2019**

Region	GROSS REGIONAL PRODUCT (\$M)			EMPLOYMENT (FTE)		
	Direct	Flow-on	Total	Direct	Flow-on	Total
Mansfield	9	4	12	94	30	125
East Gippsland	7	4	11	77	35	112
Latrobe	7	5	11	68	39	107
Greater Geelong	5	4	9	64	34	99
Wellington	5	3	8	73	26	100
Greater Bendigo	4	3	7	51	28	78
Horsham	4	3	7	54	28	82
Wodonga	4	3	7	44	20	64
Wangaratta	3	2	5	40	21	61
Baw Baw	3	2	5	39	20	59
Greater Shepparton	3	1	5	40	14	54
Murrindindi	2	1	3	34	12	46
Campaspe	2	1	3	26	11	37
Ballarat	2	1	3	19	11	31
Mitchell	2	1	3	25	5	30
Towong	2	1	3	32	7	39
Swan Hill	1	1	2	18	10	28
Gannawarra	1	1	2	22	7	29
Macedon Ranges	1	1	2	18	8	26
Alpine	1	1	2	17	4	20
Other <sup>13</sup>	57	106	162	314	778	1092
Greater Melbourne	36	46	82	456	364	820
<b>Total Victoria</b>	<b>160</b>	<b>196</b>	<b>356</b>	<b>1,626</b>	<b>1,513</b>	<b>3,138</b>

<sup>13</sup> All other LGAs in Victoria (excluding Greater Melbourne) and interregional trade (including Greater Melbourne).

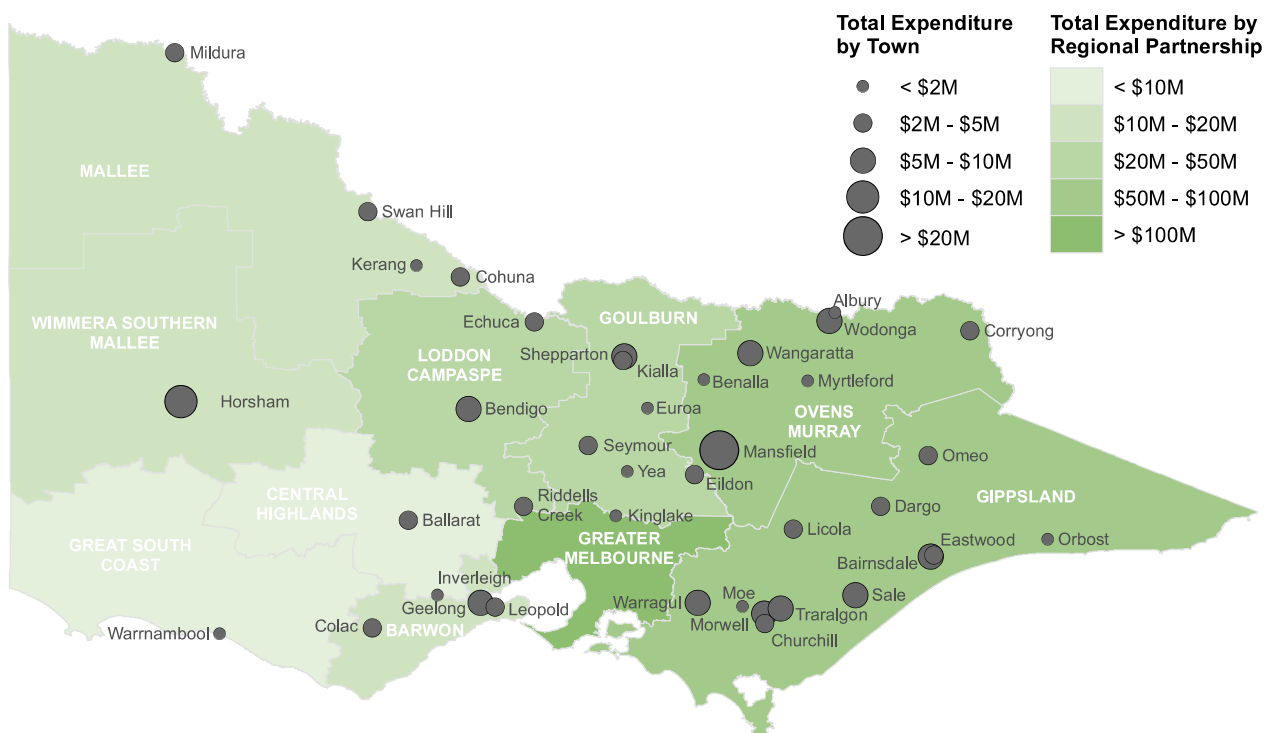




**Figure 6-1: Distribution of contribution to GRP across Victoria by LGA and animal group, 2019**

#### 6.4.1 TOWNS (EXPENDITURE)

Expenditure was estimated for Victorian towns and is shown in Figure 6-2. The towns with the highest expenditure were Mansfield (\$21M), Horsham (\$11M), Wodonga (\$10M) and Bendigo (\$9M).



**Figure 6-2: Total expenditure by Regional Partnerships region and town, all animal groups, 2019**

## 6.5 CHANGES FROM 2013 TO 2019

The contribution to GSP in 2019 was down 28% since the 2013 survey, after correcting for inflation (**Error! Reference source not found.**). Higher contribution to GSP was estimated for deer hunting and lower contribution to GSP for other animal groups.

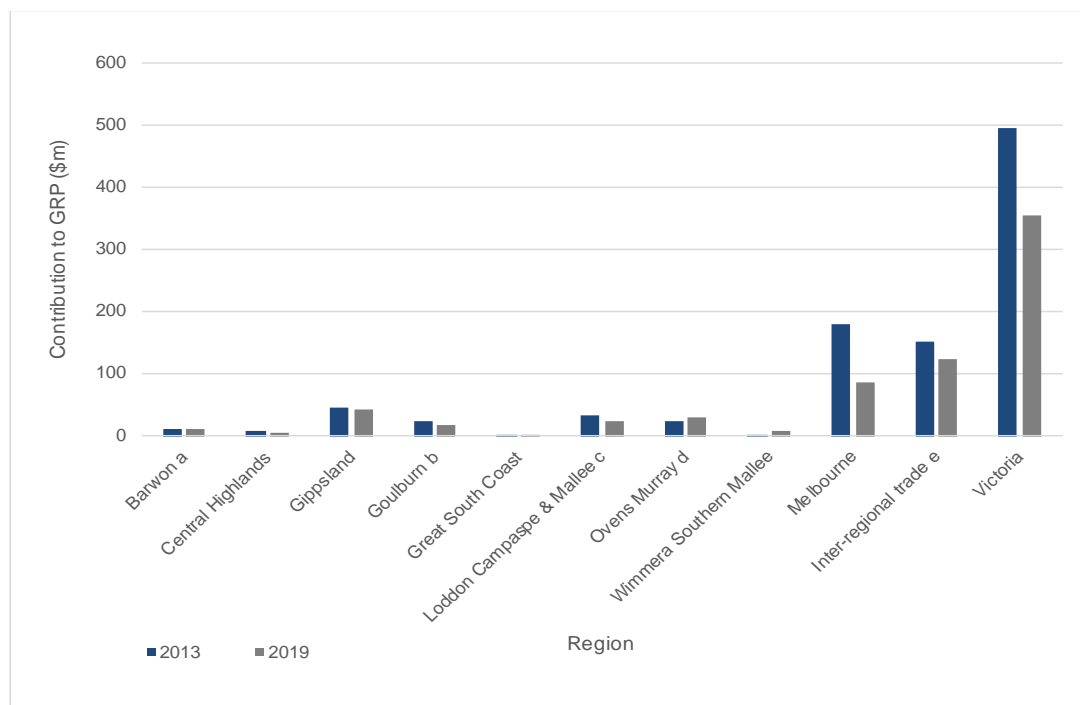
The estimated 3,480 FTE jobs (direct and flow on) contributed by hunting related expenditure in 2013 had reduced by 10% to 3,138 FTE jobs in 2019 (Table 6-6).

**Table 6-5: Comparison of economic results – Employment 2013 and 2019**

	TOTAL EMPLOYMENT (FTE JOBS)		
Animal group	2013	2019	% change
Deer	1,140	1,761	55%
Duck	857	587	-31%
Quail	385	202	-48%
<b>Game hunting sub-total</b>	<b>2382</b>	<b>2,550</b>	<b>7%</b>
Pest Animals	1,097	588	-46%
<b>Total</b>	<b>3,480</b>	<b>3,138</b>	<b>-10%</b>

Figure 6-3 shows that much of the reduction in hunting-related economic activity between the two surveys occurred in Greater Melbourne, which declined sharply between the two surveys, while regional areas only experienced a small decline. There was a 43% reduction in gross expenditure in Greater Melbourne (\$187M down to \$107M) compared with only a 13% reduction in regional Victoria (\$281M down to \$244M).

Notably there was an increase in deer hunting related gross expenditure of greater than 50% in Mansfield, East Gippsland and Wodonga LGAs. Detailed data showing the change in expenditure and GRP in individual LGAs and Regional Partnership regions are provided in Appendix 5.



**Figure 6-3: GRP by Regional Partnership: comparison 2013 (current dollars) and 2019**

Note:

- a. formerly G21 region
- b. formerly Goulburn Valley and Lower Hume regions
- c. formerly Loddon Mallee South and Loddon Mallee North regions
- d. formerly Upper Hume and Central Hume regions.

### 6.5.1 CONTRIBUTING FACTORS TO THE REDUCTION IN GROSS STATE PRODUCT

The overall change in recreational hunting expenditure between the two survey years is shown in Table 6-6. This table shows that deer expenditure had increased and expenditure on other animal groups had decreased.

**Table 6-6: Change in recreational hunting expenditure \$M – 2013 and 2019 surveys**

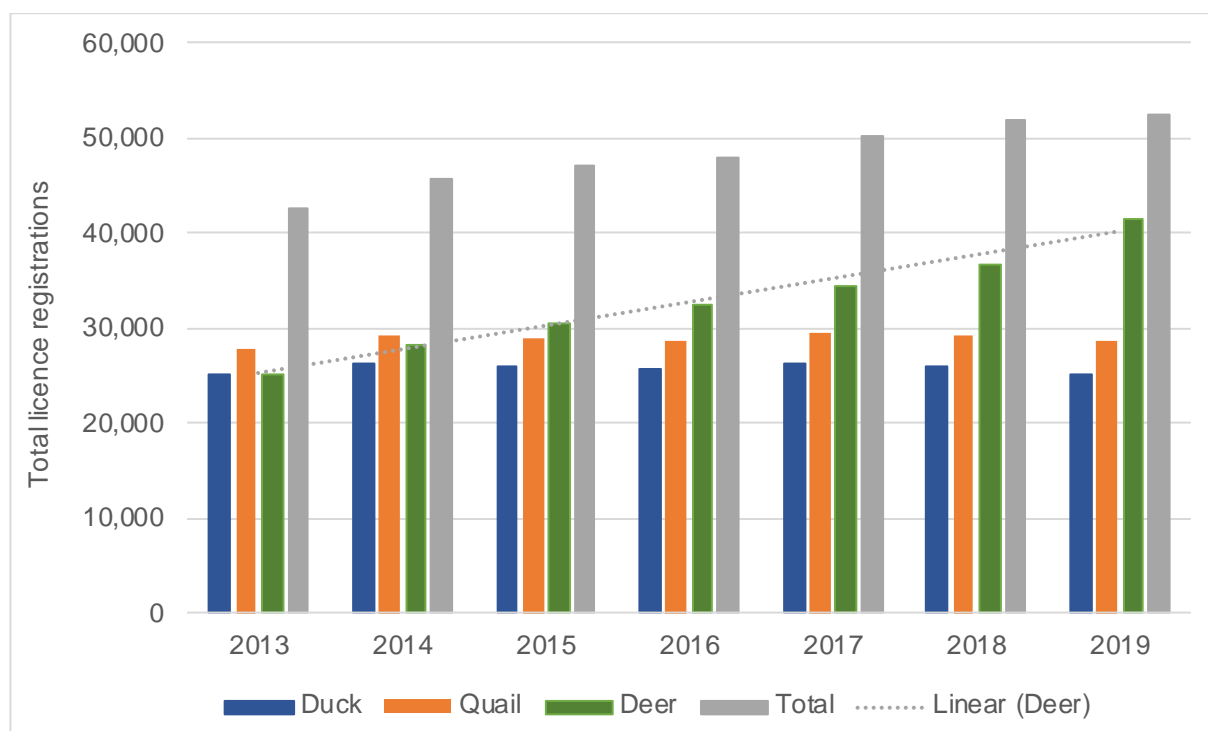
YEAR	DEER	DUCK	QUAIL	PEST ANIMAL	TOTAL
2013 (current dollars)	155	112	50	152	468
2019 (current dollars)	199	64	21	68	351
% change	28%	-43%	-58%	-55%	-25%

The following section provides some explanation for these changes.

Differences in the numbers of game licences issued and hunter effort (indicated by total hunting days and animals harvested per hunter) between the survey years help explain some of the results i.e. the increase in deer hunting expenditure and some of the reduction in duck expenditure.

## Game licences

Game licences issued have been increasing steadily; a 23% increase over the past seven years (Figure 6-4). Deer registrations have increased by 65% whereas quail and duck registrations have remained steady. This helps explain the increase in spend on deer hunting, but not the decline in spending on duck hunting.



**Figure 6-4: Trend in game licence registrations state wide 2013 – 2019** (Source: GMA 2019)

## Hunter effort

Hunter effort in this paper is measured by total hunting days and animals harvested per hunter. Good recreational hunting conditions encourage higher number of hunters to be active in the field, increase their success rate and lead to greater economic activity. Hunting conditions are influenced by environmental conditions, for example, favourable seasons will provide good habitat, encourage breeding and provide for healthy populations of game species. There can be a lag between the impact of environmental conditions and response in recreational hunting effort.

Duck hunting is particularly sensitive to climatic fluctuations and the State government determines if there will be a season and its duration. This has a significant impact on duck hunters and their expenditure. There has been five consecutive years of restricted duck seasons (2015 to 2019).

During the previous survey year, 2013, there had been a return to 'normal' conditions after three historically wet years and the success of game bird hunters was good. Due to more recent dry conditions and reduced numbers of game birds, the duck hunting season in 2019 was condensed and recreational hunting opportunities were reduced. The length of the season was reduced to 65 days from the usual 86 days. Later start times were applied and bag limits were also cut.

These changes in duck hunting conditions are reflected in the change in two indicators of hunter effort (total recreational hunting days and animals per hunter), as shown in Table 6-7.

**Table 6-7: Recreational hunting effort in Victoria 2013 and 2019**

	2013	2019	CHANGE
<b>Total hunting days</b>			
Duck	91,748	81,023	-12%
Quail	21,958	22,351	+2%
Deer*	135,854	237,594	+75%
<b>Animals harvested per hunter</b>			
Duck	17.2	9.6	- 44%
Quail	6.7	5.3	-21%
Deer*	1.8	3.5	+98%

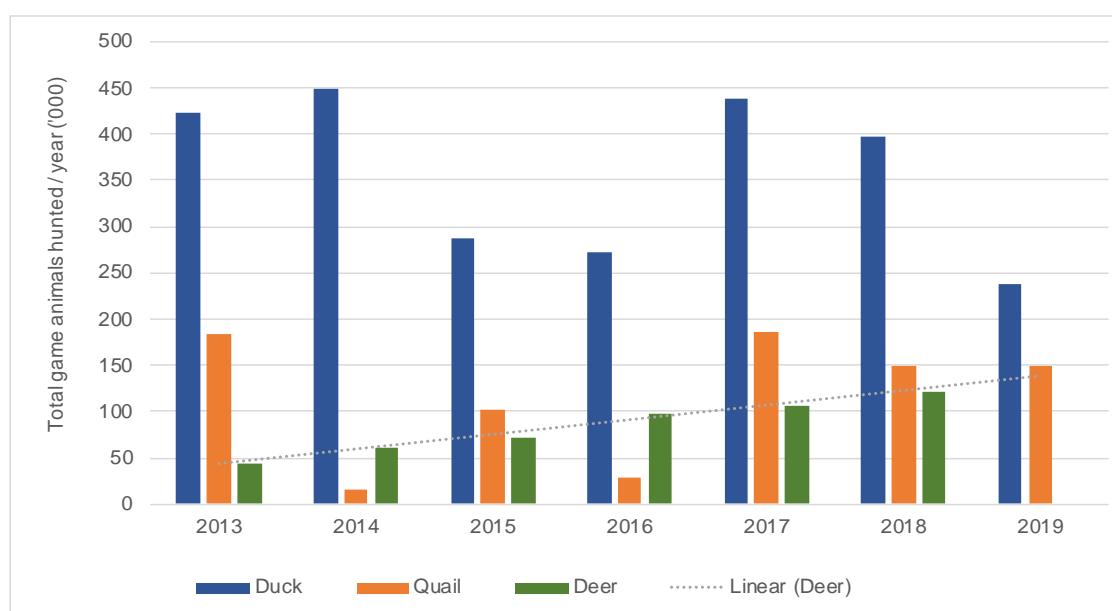
Note: \* Deer represents 2018 season data (Source: Moloney & Powell 2019a, b).

In 2019, duck hunters spent less time in the field (just over 10%) and they took considerably less birds (44%). Spending had reduced by 43% (in current dollars), when compared with 2013. Although quail hunting effort had been relatively steady, spending and economic contribution had fallen by around half. This reduction in quail spend is not able to be explained.

On the other hand, deer hunting effort has been increasing steadily over the seven-year period since 2013 and this aligns with an increase in spending of around 28% and matching increase in economic contribution.

These differences in hunter effort between the survey years help explain some of the results i.e. the increase in deer hunting expenditure and some of the reduction in duck expenditure.

Trends in total game animals hunted per year since 2013 also correspond with the increase in deer hunting related expenditure and the reduction in duck hunting related expenditure (Figure 6-8)



**Figure 6-5: Numbers of animals harvested 2013 to 2019 state wide (Source: Moloney & Powell 2019a, b)**

## Pest animals

There was a large reduction (55%) in expenditure on pest animals hunting between the surveys. This reduction in expenditure is more difficult to explain especially given that hunting of pest animals by game licence hunters is generally opportunistic.

The proportion of club or association members in the samples were similar, being 52% in 2013 and 62% in 2019. However, a comparison of the results from the 2013 and 2019 surveys on recreational hunting trips made in Victoria found that whilst the average cost per pest animal trip were similar (\$460 in 2013 and \$530 in 2019), the estimated number of hunting trips, where pest animals were the main animal hunted, were significantly reduced, with the number of trips in 2019 being approximately 40% of the 2013 number<sup>14</sup>.

## 6.6 NET ECONOMIC CONTRIBUTION

The gross economic contribution detailed above measures the current footprint of hunting. It is not an estimate of the impact on the Victorian economy if hunting ceased.

If recreational game hunting did not occur, it is assumed that recreational game hunters would divert their hunting-related expenditure to either other outdoor activities or to general household expenditure. The impact of this shift is estimated by the net economic contribution. It is difficult to predict what hunters would do, and where they would spend their money, in the absence of hunting. Because of this uncertainty we have modelled two scenarios that represent the ends of a range:

- Low substitutability: a small proportion of hunting expenditure is diverted to substitute outdoor activities, with the bulk diverted to general discretionary household expenditure. The net contribution is \$57 million to GSP and 627 FTE jobs
- High substitutability: the bulk of hunting expenditure is diverted to substitute outdoor activities with the remainder going to general discretionary household expenditure. The net contribution is \$19 million to GSP and 246 FTE jobs.

The net contribution is positive because expenditure on recreational hunting has a higher proportion of Victorian-made content than general household expenditure. Where that expenditure is diverted to general household discretionary expenditure, the amount of imports into the Victorian economy increases.

**Table 6-8: Net economic contribution of hunting by Victorian game licence holders, 2019, Victoria**

INDICATOR	LOW SUBSTITUTABILITY	HIGH SUBSTITUTABILITY
GSP (\$m)	57	19
Employment (FTE)	627	246

There would be a spatial movement of expenditure between regions within Victoria depending on the activities people substitute towards. For instance, if people hunting inland substitute to surfing then trip expenditures will move from the inland region to the coastal one.

There is also likely to be a lag period after which hunters are likely to take up alternative activities more readily. If this is the case, then the impact may decline over time.

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<sup>14</sup> Estimated number of hunting trips by Victorian game licence holders where pest animals were the main animal hunted: approximately 329,000 in 2013 and approximately 128,000 in 2019.



# 7 Conclusions

## 7.1 PROFILE OF RECREATIONAL GAME HUNTERS

Game licence holders span a wide range of ages, but are more likely to be aged between 35 and 50, and 97% of hunters are male. Game licence holders are more likely to be in full time employment and have higher incomes than the general population of Victoria. Interstate and overseas residents are eligible for a Victorian game licence, and 11% of licence holders reside outside Victoria, with 6% residing in NSW. Approximately 49% of hunters surveyed live in Greater Melbourne and 51% live in regional Victoria and interstate.

Over the 12 month survey period, the average number of trips per hunter was six trips (median number was three). Deer hunters take more trips than other hunters and two-thirds of hunting trips by people with Victorian game licences were in Victoria. Most game licence holders (68%) only hunted in Victoria, 24% hunted both within Victoria and interstate, and 17% hunted mostly interstate.

Game licence holders hunt to spend time in places special to them and to spend time outdoors. They report higher scores for personal wellbeing, social capital and general health than the general population. While it is likely that hunting provides health and wellbeing benefits, there are likely to be many contributing factors to the higher scores for hunters, such as their relatively high level of education, and income when compared with the Victorian population.

## 7.2 GROSS ECONOMIC CONTRIBUTION

### VICTORIA

The gross economic contribution measures the footprint of recreational hunting by game licence holders in the regional and Victorian economies in terms of GSP, GRP and employment. GSP and GRP are the regional equivalents of Gross Domestic Product, which is commonly used to measure the size of the national economy. The gross contribution to GSP from recreational hunting by game licence holders in Victoria in 2019 was \$356M. This is made up of \$160M of direct contribution and \$196M in flow-on economic activity. This represents 0.1 per cent of Victoria's GSP.

There were an estimated 1,626 full time equivalent (FTE) jobs generated directly by recreational hunting-related expenditure with a further 1,513 FTE jobs generated by flow-on activity. The total employment contribution was 3,138 FTE jobs, 0.1 per cent of Victoria's employment in 2019.

### REGIONAL

The economic activity associated with recreational game hunting occurred across Victoria. The majority of expenditure was outside Melbourne, with 69% located in regional LGAs. The LGAs with the highest gross economic contribution were Mansfield (\$12M), East Gippsland (\$11M) and Latrobe (\$9M). The towns with the highest hunting-related expenditure were Mansfield (\$21M), Horsham (\$11M), Wodonga (\$10M) and Bendigo (\$9M).

## ANIMAL GROUP

Deer hunting supported the largest amount of economic activity in 2019, at \$201M. The gross contribution from duck was \$65M and quail \$22M. Pest hunting (by game licence holders) accounted for \$69M in GSP. The economic contribution from game animal hunting alone was \$287M of GSP.

## COMPARISON WITH 2013 SURVEY RESULTS

The contribution to GSP in 2019 was down 28% since the 2013 survey, after correcting for inflation. Expenditure on deer hunting has increased substantially while expenditure on duck, quail and pest animal hunting has reduced.

Differences in the numbers of game licences issued and hunter effort (total hunting days and animals harvested per hunter) between the survey years help explain some of the results. Hunter effort and game licences for deer has increased considerably while changes in duck hunting seasonal conditions reduced opportunities to hunt duck.

A greater share of the total recreational hunting expenditure occurred in regional Victoria than in 2013. Much of the reduction in hunting-related economic activity between the two surveys occurred in Greater Melbourne, where there was a 43% reduction in gross expenditure (\$187M down to \$107M) compared with only a 13% reduction in regional Victoria (\$281M down to \$244M).

Deer hunting-related expenditure increased by more than 50% in Mansfield, East Gippsland and Wodonga LGAs.

### 7.3 NET ECONOMIC CONTRIBUTION

If recreational game hunting did not occur, it is assumed that recreational game hunters would divert their hunting-related expenditure to either other outdoor activities or to general household expenditure. The impact of this shift is estimated by the net economic contribution. While it is important to model the net contribution, it is difficult to predict where hunters would spend their money, without hunting. Because of this uncertainty we have modelled two scenarios that represent the ends of a range:

- Low substitutability: a small proportion of hunting expenditure is diverted to substitute (or alternative) outdoor activities, with the bulk diverted to household expenditure. The net contribution is \$57 million to GSP and 627 FTE jobs
- High substitutability: the bulk of hunting expenditure is diverted to substitute outdoor activities. The net contribution is \$19 million to GSP and 246 FTE jobs.

The net contribution is positive because expenditure on recreational hunting has a higher proportion of Victorian-made content than general household expenditure. When hunting expenditure is diverted to general household discretionary expenditure, imports into the Victorian economy would increase.

### 7.4 COMPARISON OF GROSS AND NET CONTRIBUTION

The gross and net contributions produce very different results at the state level. Without hunting, at the state level much of the economic activity would be replaced by expenditure related to other activities. The impact to the state economy would be small relative to the current footprint of hunting. However, the gross contribution provides a clear picture of the importance of hunting to regional and town economies. If hunting expenditure were replaced by other expenditures, some towns that are particularly reliant on hunting expenditure would be affected.

## 8 References

- Australian Bureau of Statistics (ABS) 2000, Research Paper: Weighting and Standard Error Estimation for ABS Household Surveys (Methodology Advisory Committee), ABS Cat No. 1352.0.55.029, Canberra, November.
- ABS 2013, Australian National Accounts: Tourism Satellite Account, 2011-12, ABS Cat No. 5249.0, April.
- ABS 2016, Australian Industry, ABS Cat No. 8155.0, Canberra, May.
- ABS 2016b, Census of Population and Housing, Cat No. 2001.0, Canberra.
- ABS 2016c, Employment, Income and Education, TableBuilder. Findings based on use of ABS TableBuilder data.
- ABS 2017a, Retail Trade, ABS Cat No. 8501.0, Canberra, April.
- ABS 2017b, Labour Force, Australia, ABS Cat No. 6202.0, Canberra, April.
- ABS 2017c, Household Expenditure Survey 2015-16, Australia, ABS Cat No. 6530.0, Canberra, September.
- BDO EconSearch 2020, Input-Output Tables for South Australia and its Regions 2017/18 Update: Technical Report, report prepared for Department of the Premier and Cabinet, February.
- Bethlehem, J. G. and W. J. Keller 1987, "Linear weighting of sample survey data", Journal of Official Statistics. 3(2): 141.
- Game Management Authority 2020, Licencing, available: <https://www.gma.vic.gov.au/licencing>.
- Game Management Authority 2020, Hunting introduced game birds, <https://www.gma.vic.gov.au/hunting/quail/hunting-introduced-game-birds>.
- Game Management Authority 2019, Hunting with Hounds, <https://www.gma.vic.gov.au/hunting/deer/where-to-hunt/fact-sheets/hunting-with-hounds>.
- Game Management Authority 2019, Hog Deer Hunting, <https://www.gma.vic.gov.au/hunting/deer/where-to-hunt/fact-sheets/hog-deer-hunting>.
- Game Management Authority 2019, Pest animals, <https://www.gma.vic.gov.au/hunting/introduced-gamebird-hunting>.
- Game Management Authority 2019, 2019 duck season arrangements, <https://www.gma.vic.gov.au/hunting/duck/when-to-hunt/2019-duck-season-arrangements>.
- Game Management Authority 2019, Game Licence statistics summary report 2109.
- Game Management Authority 2018, Game Hunting in Victoria, A manual for responsible and sustainable hunting, second edition.
- Hartig, T, Mitchell, R, de Vries, S & Frumkin, H. 2014, 'Nature and Health', Annual Review of Public Health, vol. 35, no. 1, pp. 207-28.

International Wellbeing Group 2013, Personal Wellbeing Index: 5th Edition. Melbourne: Australian Centre on Quality of Life, Deakin University.

Menkhorst, P., Stamation, K. and Brown, G. 2019, Hunters' Bag Survey: 2019 Victorian duck hunting season. Arthur Rylah Institute for Environmental Research. Unpublished Report to Ecological Policy Section, Department of Environment, Land, Water & Planning, Melbourne, Victoria.

Moloney, P.D. and Powell, Z. 2019a, Estimate of duck and Stubble Quail harvest in Victoria for 2019: Results from surveys of Victorian Game Licence holders in 2019. Unpublished Client Report for the Game Management Authority. Arthur Rylah Institute for Environmental Research, Department of Environment, Land, Water and Planning, Heidelberg, Victoria.

Moloney, P.D. and Powell, Z. 2019b. Estimates of the 2018 deer harvest in Victoria: results from surveys of Victorian Game Licence holders in 2018. Unpublished Client Report for the Game Management Authority. Arthur Rylah Institute for Environmental Research, Department of Environment, Land, Water and Planning, Heidelberg, Victoria.

Regional Wellbeing Survey 2017, Eastern Victoria data tables, Version 1.01 August 2018.

Regional Wellbeing Survey 2018, Eastern Victoria data tables, Version 1.02 January 2020.

RMCG 2014, Estimating the economic impact of hunting in Victoria in 2013, The State of Victoria Department of Environment and Primary Industries, Bendigo.

Victoria Police 2015, Control of weapons, prohibited weapons list, version 2.0.

# Appendix 1: Survey instrument

Victorian Recreational Game Hunting Survey Questionnaire - FINAL 25 November 2019

## Introduction

Intro	<p><b>We are undertaking a survey to better understand the experiences of people who hunt game in Victoria. Thank you very much for your time and assistance.</b></p> <p><b>The questionnaire should take about 15 to 20 minutes to complete.</b></p> <p><i>This research is being conducted by Action Market Research, an independent market research company, on behalf of the Victorian Government Department of Jobs, Precincts and Regions. The information collected will be used for research purposes only. None of your personal details will be disclosed unless you give your permission, and will be held as strictly confidential, according to the Code of Professional Behaviour set out by the Australian Market and Social Research Society and the Privacy Act.</i></p> <p><b>Please click “Next” to begin the survey.</b></p>	Next button
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## Ask all

S1	<p><b>Firstly, we have a few questions about you.</b></p> <p><b>Are you...</b></p> <ol style="list-style-type: none"> <li>1. Male</li> <li>2. Female</li> <li>3. Other</li> <li>4. Do not wish to answer</li> </ol>	<p>Compulsory</p> <p>Single response</p>
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## Ask all

S2	<p><b>And which of the following age ranges do you fall into?</b></p> <ol style="list-style-type: none"> <li>1. Under 18 [TERMINATE]</li> <li>2. 18-24</li> <li>3. 25-29</li> <li>4. 30-34</li> <li>5. 35-39</li> <li>6. 40-44</li> <li>7. 45-49</li> <li>8. 50-54</li> <li>9. 55-59</li> <li>10. 60-64</li> <li>11. 65-74</li> <li>12. 75 and over</li> <li>13. Do not wish to answer</li> </ol>	<p>Compulsory</p> <p>Single response</p>
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Ask all

S3a	<p>Which state or territory do you currently live in?</p> <ol style="list-style-type: none"> <li>1. New South Wales</li> <li>2. Queensland</li> <li>3. Victoria</li> <li>4. South Australia</li> <li>5. Tasmania</li> <li>6. Western Australia</li> <li>7. Northern Territory</li> <li>8. Australian Capital Territory</li> <li>9. Outside Australia</li> </ol>	<p>Compulsory</p> <p>Single response</p>
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Ask S3b if response to S3a=3 'Victoria'

S3b	<p><b>Where do you live in Victoria?</b></p> <p>Please enter your postcode and town/suburb.</p> <p><b>POSTCODE:</b> _ _ _ _ _ <b>Town/location</b> _____</p>	<p>Open ended</p> <p>Compulsory</p> <p>Limit to four digit legitimate Victorian postcodes</p>
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INTRO2	<p><b>Now we would like to ask you some questions about the ways in which you hunt and your hunting activity.</b></p>
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Ask all

Sx1	<p><b>Have you hunted in Victoria in the past 12 months?</b></p> <ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> </ol>	<p>Compulsory</p> <p>Single response</p>
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Ask if Sx1=2 (No) (not hunted in VIC in past 12 months)

Sx2	<p><b>Do you plan to go hunting in Victoria in the next 12 months?</b></p> <ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No [TERMINATE]</li> </ol>	<p>Compulsory</p> <p>Single response</p>
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Ask all

S4a	<p><b>Please select from the list below what animals or ways you are licensed to hunt in Victoria</b></p> <p><b>Please select all that apply</b></p> <ol style="list-style-type: none"> <li>1. Deer (Stalking)</li> <li>2. Deer (Hounds)</li> <li>3. Duck</li> <li>4. Stubble quail</li> <li>5. Non-indigenous Game Birds (farm hunting licence only)</li> <li>6. Unsure</li> <li>7. None of these [TERMINATE]</li> </ol>	<p>Compulsory</p> <p>Multiple response (single response option 6 'unsure' &amp; 7 'none of these')</p>
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Ask all

S5	<p><b>Are you a member of a hunting association?</b></p> <ol style="list-style-type: none"> <li>1. Yes</li> <li>2. No</li> <li>3. Unsure</li> </ol>	<p>Compulsory</p> <p>Single response</p>
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Ask all

INTRO3	<p><b>Now we would like to find out about hunting trips you have been on in the last 12 months, including Victoria and interstate/overseas hunting trips.</b></p>	<p>Show on same screen as Q1</p>
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Ask all

Q1	<p><b>Firstly, how many hunting trips have you been on in the last 12 months?</b></p> <p>Please count both <b>overnight</b> and <b>day trips</b>. An <b>overnight trip</b> is where you stayed overnight in another location. A <b>day trip</b> is where you travelled more than 50km and were away from home for at least 4 hours.</p> <p>_____ trips</p>	<p>Numeric field (open text) restricted to 0 to 999 range</p> <p>Compulsory</p> <p>Single response</p> <p>(Number must be &gt;0 if S1=Yes)</p>
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Ask if Sx1=1 (hunted in Victoria)

Q3a	<p><b>Did you hunt outside of Victoria in the past 12 months?</b></p> <ol style="list-style-type: none"> <li>1. No, hunted within Victoria only</li> <li>2. Yes, hunted both within and outside Victoria</li> </ol>	<p>Compulsory</p> <p>Single response</p>
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Ask if Q3a=2 (hunted in Victoria and outside Victoria)

Q3b	<b>Approximately how many of these hunting trips in the last 12 months were in Victoria?</b> _____ trips	Numeric field (open text) restricted to 0 to 999 range Compulsory Single response (Number must be >0 and also <= Q1)
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Ask if Sx1=1 (hunted in Victoria)

Q4	<b>Just thinking about your hunting trips in Victoria in the past 12 months, on how many trips was each of the following animals the MAIN ANIMAL hunted, that is the animal that you intended to hunt?</b> Count <b>one</b> animal per trip. If you didn't hunt for the animal please choose "Never main animal"								Radio button Grid Compulsory Single response per row
		<b>ROTATE</b>	<b>Never main animal</b>	<b>1-3 trips</b>	<b>4-6 trips</b>	<b>7-12 trips</b>	<b>13-24 trips</b>	<b>25-49 trips</b>	<b>50 or more trips</b>
	1.	Deer [DP Note: show if S4a=1, 2, 6]							
	2.	Duck [DP Note: show if S4a=3, 6]							
	3.	Stubble quail [DP Note: show if S4=4, 6]							
	4.	Non-indigenous game birds at a game bird farm [DP Note: show if S4=, 5, 6]							
	5.	Pest animals (e.g. rabbits, foxes, pigs, goats) [DP Note: show all]							

Ask if Q4\_1 'Deer' = Never

Q5a	Thinking about all the times when you hunted DEER in Victoria in the last 12 months, which were the nearest town/s where the DEER were hunted? Please indicate the most frequent town under "Town 1", second most frequent under "Town 2", etc.					Text Grid Compulsory Specify up to four locations.
	<b>NB i.) If you hunted on private land or in the bush, please name the closest town to where you were hunting.</b> <b>NB ii.) You only need to name each town you have hunted in once. If you only hunted in one town but across multiple trips just enter the town under "Town 1".</b>					
			Town 1	Town 2	Town 3	
a.	Deer					

Ask if Q4\_2 'Duck' = Never

Q5b	Thinking about all of the times when you hunted DUCK in Victoria in the last 12 months, which were the nearest town/s where the DUCK were hunted? Please indicate the most frequent town under "Town 1", second most frequent under "Town 2", etc.					Text Grid Compulsory Specify up to four locations.
	<b>NB i.) If you hunted on private land or in the bush, please name the closest town to where you were hunting.</b> <b>NB ii.) You only need to name each town you have hunted in once. If you only hunted in one town but across multiple trips just enter the town under "Town 1".</b>					
			Town 1	Town 2	Town 3	
b.	Duck					

Ask if Q4\_3 'Stubble Quail' = Never

Q5c	Thinking about all of the times when you hunted STUBBLE QUAIL in Victoria in the last 12 months, which were the nearest town/s where the STUBBLE QUAIL were hunted? Please indicate the most frequent location under "Town 1", second most frequent under "Town 2", etc.					Text Grid Compulsory Specify up to four locations.
	<b>NB i.) If you hunted on private land or in the bush, please name the closest town to where you were hunting.</b> <b>NB ii.) You only need to name each town you have hunted in once. If you only hunted in one town but across multiple trips just enter the town under "Town 1".</b>					
			Town 1	Town 2	Town 3	
c.	Stubble quail					

Ask if Q4\_4 'Non-native game birds' = Never

Q5d	Thinking about all of the times when you hunted NON INDIGENOUS GAME BIRDS in Victoria in the last 12 months, which were the nearest town/s where the GAME BIRDS were hunted? Please indicate the most frequent location under "Town 1", second most frequent under "Town 2", etc.					Text Grid Compulsory Specify up to four locations.
	<b>NB i.) If you hunted on private land or in the bush, please name the closest town to where you were hunting.</b> <b>NB ii.) You only need to name each town you have hunted in once. If you only hunted in one town but across multiple trips just enter the town under "Town 1".</b>					
			Town 1	Town 2	Town 3	
	d.	Non-indigenous game bird at a game farm				

Ask if Q4\_5 'Pest Animals' = Never

Q5e	Thinking about when you hunted PEST ANIMALS in Victoria in the last 12 months, which were the nearest town/s where the PEST ANIMALS were hunted? Please indicate the most frequent location under "Town 1", second most frequent under "Town 2", etc.					Text Grid Compulsory Specify up to four locations.
	<b>NB i.) If you hunted on private land or in the bush, please name the closest town to where you were hunting.</b> <b>NB ii.) You only need to name each town you have hunted in once. If you only hunted in one town but across multiple trips just enter the town under "Town 1".</b>					
			Town 1	Town 2	Town 3	
	e.	Pest animals (e.g. rabbits, foxes, pigs, goats)				



Ask if Q4=never for all animals (At least one trip for at least one of the animals listed)

If Q4=only one animal that is not 'never', Q6 is skipped.

Q6	<p><b>Which of the following animals did you hunt during your <u>most recent hunting trip</u> in Victoria?</b></p> <p><b>Please only consider the animal you hunted the most.</b></p> <p>[DP Note: Only show animals where Q4≠Never]</p> <ol style="list-style-type: none"> <li>1. Deer</li> <li>2. Duck</li> <li>3. Stubble quail</li> <li>4. Non-indigenous game birds</li> <li>5. Pest animals (e.g. rabbits, foxes, pigs, goats)</li> </ol>	<p>Radio button</p> <p>Compulsory</p> <p>Single response.</p>
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The next section will be based on order of priority of:

1 Duck

2 Quail

3 Deer

4 Game Birds

5 Pest

e.g. if a respondent at Q4 says they hunted Duck, Quail and Deer, this section will ask for responses on Duck

If a respondent only hunted Deer, then they'll be asked on that.

Ask if Sx1=1 (hunted in Victoria) and Q4=never for all animals (At least one trip for a listed animal)

INTRO4	<p><b>Now we would like you to think about your <u>most recent hunting trip</u> in Victoria where you hunted [QUOTA GROUP]</b></p> <p><b>So thinking about your most recent hunting trip where you hunted [QUOTA GROUP]</b></p> <p><b>Please note that the above animal may or may not be most recent animal you have hunted.</b></p>	Show on same screen as Q6a
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INTRO	<b>When did you take this trip?</b>	Text
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If QUOTA=DEER

Q6a	<p><b>[DP NOTE: If deer:]</b></p> <ol style="list-style-type: none"> <li>1. December 2018</li> <li>2. January-February 2019</li> <li>3. March-April 2019</li> <li>4. May-June 2019</li> <li>5. July-August 2019</li> <li>6. September-October 2019</li> <li>7. November 2019</li> </ol>	<p>Radio button</p> <p>Compulsory</p> <p>Single response</p>
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If QUOTA=DUCK

Q6b	<p><b>[DP NOTE: If duck:]</b></p> <ol style="list-style-type: none"> <li>1. Opening weekend in 2019</li> <li>2. Other March 2019</li> <li>3. April 2019</li> <li>4. May 2019</li> </ol>	<p>Radio button</p> <p>Compulsory</p> <p>Single response</p>
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If QUOTA=QUAIL

Q6c	<p><b>[DP NOTE: If stubble quail:]</b></p> <ol style="list-style-type: none"> <li>1. April 2019</li> <li>2. May 2019</li> <li>3. June 2019</li> <li>4. July 2019</li> </ol>	<p>Radio button</p> <p>Compulsory</p> <p>Single response</p>
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If QUOTA=GAME BIRD/PEST

Q6d	<b>[DP NOTE: If non indigenous game birds at a game farm and/or pests:]</b> <ol style="list-style-type: none"> <li>1. December 2018</li> <li>2. January 2019</li> <li>3. February 2019</li> <li>4. March 2019</li> <li>5. April 2019</li> <li>6. May 2019</li> <li>7. June 2019</li> <li>8. July 2019</li> <li>9. August 2019</li> <li>10. September 2019</li> <li>11. October 2019</li> <li>12. November 2019</li> </ol>	Radio button Compulsory Single response
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Ask if Sx1=1 (hunted in Victoria) and Q4=never for all animals (At least one trip for a listed animal)

Q7	<b>Where did you mainly hunt on that trip?</b> <b>[Text box to specify location]</b>	Text box
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Ask if Sx1=1 (hunted in Victoria) and Q4=never for all animals (At least one trip for a listed animal)

INTROS	<b>Still thinking about your <u>most recent hunting trip</u> in Victoria where you hunted [QUOTA]</b>	Show on same screen as Q17
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Ask if Sx1=1 (hunted in Victoria) and Q4=never for all animals (At least one trip for a listed animal)

Q17	<b>During this hunting trip in Victoria, what did you spend money on?</b> Please include anything <u>you</u> paid for, whether by cash, EFTPOS, cheque, credit card or any other means. If you paid for other people at any stage (for example, if you paid for someone else's dinner) then do include that amount. But if someone else paid for you, then exclude that amount. <ol style="list-style-type: none"> <li>1. Fuel</li> <li>2. Groceries (including dog food), drinks and alcohol for self-catering/consumption at your accommodation</li> <li>3. Ammunition</li> <li>4. Takeaways and restaurant meals</li> <li>5. Hunting equipment (e.g. decoys, clothing)</li> <li>6. Accommodation</li> <li>7. Vehicle/motorbike/boat repairs</li> <li>8. Hunting tours/package tour, hunting guide fees</li> <li>9. Other items needed for your hunting trip</li> <li>10. Not applicable – I did not spend any money on this trip</li> </ol>	Check box Compulsory Multiple response except Not applicable
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Ask if at least one item selected at Q17 (i.e. Q17=10)

Q18	<p><b>And during your <u>most recent hunting trip</u> in Victoria where you hunted [QUOTA], approximately how much did you spend on these items?</b></p> <p>Please include:</p> <ul style="list-style-type: none"> <li>Anything <u>you</u> paid for, whether by cash, EFTPOS, cheque, credit card or any other means.</li> <li>Any money you paid for other people and you were not reimbursed (e.g. if paid for someone else's meal)</li> <li>Any money paid for you by someone who didn't go on the hunting trip (e.g. employer or parents)</li> </ul> <p>Please exclude:</p> <ul style="list-style-type: none"> <li>Any money paid on your behalf by someone else who travelled with you on the hunting trip.</li> </ul>							<p>Radio button Grid</p> <p>Compulsory</p> <p>Single response per row</p>
		\$1- \$20	\$21- \$50	\$51- \$100	\$101 - \$200	\$201 - \$500	\$501 or more	
a.	[DP Note: Populate with responses from Q17]							

Ask If Q17 = 1, 2, 3, 4, 5, 7, 8, 9 (Not accommodation or not applicable)

Q19a	<p><b>What was the location of the business/es from which you bought these items? For example, were the items bought in your home town/city, at the main hunting destination or at another location?</b></p> <p><b>If you bought items from more than one location, please select the location where the most money was spent.</b></p>					<p>Radio button Grid</p> <p>Compulsory</p> <p>Single response per row</p>
		Home	At the destination	Another town in Victoria	Other	
a.	[DP Note: Populate with responses from Q17]					

Ask if Q19a = 3 'Another town in Victoria'

Q19b	Which Victorian town/s did you buy these item/s from?		<p>Text box</p> <p>Compulsory</p> <p>At least one response per row</p>
		Which Victorian town or city?	
a.	[DP Note: Populate with responses from Q17]	[Specify]	

Ask all

INTRO6	<p><b>Now we'd like you to consider what you've spent when you've NOT been on a hunting trip, to support your hunting activities.</b></p> <p><b>Please don't include expenses made during hunting trips</b> [if Sx1=1, display “; this type of expense has been addressed in the previous section.”, else display “.”]</p>	Show on same screen as Q20
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Ask all [including those who have not been hunting in the last 12 months]

Q20	<p>During the last 12 months, which of the items from the following list have you spent money on to <b>support your hunting activities</b>?</p> <ol style="list-style-type: none"> <li>1. Firearms, bows and other firearm equipment</li> <li>2. Ammunition</li> <li>3. Hunting club memberships</li> <li>4. Licenses (game, firearm)</li> <li>5. Training to support your hunting activities (e.g. target practice)</li> <li>6. Vehicles/motorbikes/boats (purchased with hunting in mind)</li> <li>7. Vehicle/motorbike/boat maintenance</li> <li>8. Other equipment to support your hunting activities (eg. Vehicle equipment/accessories, safety equipment, camping equipment, clothing, knives, binoculars, etc.)</li> <li>9. Other items to support your hunting activities</li> <li>10. Not applicable – I did not spend any money to support hunting activities in the past 12 months</li> </ol>	<p>Check box</p> <p>Compulsory</p> <p>Multiple response</p> <p>Except Not applicable</p>
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Ask if at least one item selected at Q20 (i.e. Q20=10)

Q21	<p><b>And during the past 12 months, approximately how much have you spent on these items?</b></p>	<p>Radio button</p> <p>Grid</p> <p>Compulsory</p> <p>Single response per row</p>
		<p>\$1-\$100</p> <p>\$101-\$500</p> <p>\$501-\$1,000</p> <p>\$1,001 - \$2,000</p> <p>\$2,001 - \$5,000</p> <p>\$5,001 - \$10,000</p> <p>\$10,001 or more</p>
a.	[DP Note: Populate with responses from Q20]	



Ask if 6-9 selected at Q20

Q22	<b>And approximately what percentage of the use of these items has been on <u>hunting activities</u> versus non hunting activities?</b>					Radio button Grid  Compulsory Single response per row
	<b>Percentage accounted for by hunting...</b>	<b>1%-25%</b>	<b>26%-50%</b>	<b>51%-75%</b>	<b>76%-100%</b>	
a.	[DP Note: Populate with responses from Q20]					

Ask if at least one item selected at Q20 (i.e. Q20=10)

Q23	<b>What is the <u>main</u> location of the business/es from which you usually buy these items?</b> For example, for online purchases, please consider the town or city (if within Victoria) or state or country (if outside Victoria) where your usual vendor is located.					Radio button Compulsory At least one response per row
		<b>Melbourne</b>	<b>In a Victorian town or city other than Melbourne</b>	<b>Interstate (e.g. NSW, QLD)</b>	<b>Overseas</b>	<b>Unsure</b>
a.	[DP Note: Populate with responses from Q20]					

Ask if at least one response in column 2 of Q23 'In a Victorian town or city other than Melbourne'

Q24	<b>At which Victorian town or city do you usually buy these items?</b>		Text box Compulsory At least one response per row
		<b>Which Victorian town or city?</b>	
a.	[DP Note: Populate with responses from Q23]	<i>[Specify]</i>	

INTRO7	<b>Now just a few questions about you, to help us better understand who is involved in hunting in Victoria.</b>	Show on same screen as D1 and D2
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Ask all – show D1 & D2 on single screen

D1	<b>Which of the following best describes you...?</b> <ol style="list-style-type: none"> <li>1. Indigenous - Australian</li> <li>2. Australian born (non-indigenous)</li> <li>3. Overseas born (English speaking background)</li> <li>4. Overseas born (non-English speaking background)</li> <li>5. Do not wish to answer [DP display in grey font]</li> </ol>	Radio button Compulsory Single response
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Ask all – show D1 & D2 on single screen

D2	<b>Which of the following is <u>the highest level</u> of formal education that you have completed?</b> <ol style="list-style-type: none"> <li>1. Primary school</li> <li>2. Third year of high school (completed year 9 or equivalent)</li> <li>3. Fourth year of high school (completed year 10 or equivalent)</li> <li>4. High school certificate (completed year 12 or equivalent)</li> <li>5. Certificate I or II</li> <li>6. Certificate III or IV (e.g. trade certificate, apprenticeship)</li> <li>7. TAFE diploma (post high-school)</li> <li>8. Graduate diploma or graduate certificate (from a university)</li> <li>9. University degree (e.g. Bachelors degree)</li> <li>10. Postgraduate degree (e.g. Masters, PhD)</li> <li>11. Do not wish to answer [DP display in grey font]</li> </ol>	Radio Button Compulsory Single response
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Ask all

D3	<b>Which of the following best describes you...?</b> <ol style="list-style-type: none"> <li>1. In full-time paid work</li> <li>2. In part-time paid work (e.g. you work an agreed number of hours per week)</li> <li>3. In casual paid work (e.g. your hours vary and are not set)</li> <li>4. Unemployed and looking for paid work</li> <li>5. Home duties</li> <li>6. Retired</li> <li>7. Student not in paid work</li> <li>8. Other</li> <li>9. Do not wish to answer [DP display in grey font]</li> </ol>	Radio button Compulsory Single response
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Ask all

D4	<p><b>Which of the following best describes your living situation...?</b></p> <ol style="list-style-type: none"> <li>1. Living as a couple, no children aged under 15 years at home</li> <li>2. Living as a couple, with 1 or more children aged under 15 years at home</li> <li>3. Single parent, no children aged under 15 years at home</li> <li>4. Single parent, with 1 or more children aged under 15 years at home</li> <li>5. Living with other non-family members (e.g. flatmates)</li> <li>6. Living alone</li> <li>7. Other</li> </ol>	<p>Radio button Compulsory Single response</p>
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Ask all

D6	<p><b>What is your gross or pre-tax <u>household</u> income?</b></p> <p><i>Please include the income earned by all working people in your household. Include income received from government pensions investments/dividends, and salaried employment.</i></p> <ol style="list-style-type: none"> <li>1. Negative or nil income</li> <li>2. \$1 - \$10,399</li> <li>3. \$10,400 - \$20,799</li> <li>4. \$20,800-\$31,199</li> <li>5. \$31,200-\$41,599</li> <li>6. \$41,600-\$51,999</li> <li>7. \$52,000-\$64,999</li> <li>8. \$65,000-\$77,999</li> <li>9. \$78,000-\$102,999</li> <li>10. \$103,000-\$129,999</li> <li>11. \$130,000-\$155,999</li> <li>12. \$156,000-\$207,999</li> <li>13. \$208,000 or more</li> <li>14. Don't know [DP Display in grey text]</li> <li>15. Prefer not to say [DP Display in grey text]</li> </ol>	<p>Radio button Compulsory Single response</p>
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Ask all

D9	<p><b>Do you speak a language other than English at home?</b></p> <ol style="list-style-type: none"> <li>1. Yes, I speak another language other than English at home</li> <li>2. No, I only speak English at home</li> </ol>	<p>Compulsory Single Response</p>
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INTRO9	<b>This next section asks some questions about the main reasons you hunt, and the types of benefits you get from hunting. We also ask a bit more about what is the most important to you about hunting – for example, the type of hunting you do, or the places you go hunting.</b>	Show on same screen as Q14
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Ask all

28	<p><b>What are the top 5 reasons you like to go hunting? (If the most important reason/s you hunt aren't given, please type them in the space provided).</b></p> <p><i>[Please select up to 5 of the following]</i></p> <ol style="list-style-type: none"> <li>1. ...to relax and unwind</li> <li>2. ...to spend time in the outdoors</li> <li>3. ...to spend time with family</li> <li>4. ...to spend time with friends</li> <li>5. ...to meet new people</li> <li>6. ...to get away from my day-to-day life</li> <li>7. ...to continue a family or cultural tradition of hunting</li> <li>8. ...to get away from other people</li> <li>9. ...for the sport of hunting</li> <li>10. ...because it is challenging</li> <li>11. ...because it is exciting</li> <li>12. ...to get food for myself or my friends/family</li> <li>13. ...to get exercise</li> <li>14. ...to spend time in places that are special to me</li> <li>15. ...to reduce pest species populations</li> <li>16. ...other (please describe)</li> </ol>	<p>Compulsory</p> <p>Minimum 1, Maximum 5 responses</p> <p>Check box</p> <p>Randomise (exclude code 16 'other')</p>
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Ask all

25

If given the following options on a nice weekend, at the same cost, which would you choose to do? Imagine you have to choose between them and can't do them at the same time on this particular weekend (we know many of these things are sometimes done at the same time).

	I'd choose this activity	I'd find it hard to choose (I like both equally)	I'd go hunting
Fishing			
Camping			
Bushwalking			
Four-wheel driving			
Outdoor picnic/bbq			
Clothes shopping			

Compulsory  
Single Response  
per row

	Video games				
	Go to sports game (e.g. AFL, rugby, other game you follow)				
	Gym/exercise class				
	Bike riding				
	Swimming				
	Surfing				
	Kayaking/canoeing				
	Golf				

Ask all

26a	<p><b>Do you do any of the following hobbies/sporting activities?</b></p> <ol style="list-style-type: none"> <li>1. Bushwalking or hiking</li> <li>2. Jogging or running</li> <li>3. Cycling (road riding or mountain biking)</li> <li>4. Playing video games</li> <li>5. Swimming</li> <li>6. Surfing</li> <li>7. Playing sports with others (e.g., tennis, football)</li> <li>8. Going to gym or exercise classes</li> <li>9. Camping</li> <li>10. Horse riding</li> <li>11. Kayaking or canoeing</li> <li>12. Four-wheel driving</li> <li>13. Clothes shopping (no, we're not kidding and yes, there's a reason we're asking!)</li> <li>14. Attending sports games or events as spectator (e.g. football game)</li> <li>15. Recreational target shooting</li> <li>16. Recreational hunting (other than fishing)</li> <li>17. Playing golf</li> <li>18. Other outdoor or sports activities (please describe e.g. lawn bowls)</li> <li>19. None of the above [exclusive option]</li> </ol>	<p>Check box</p> <p>Compulsory</p> <p>Multiple response</p>
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Ask if at least one item selected at Q26a (Q26a 1-18)

26b	And how important are these activities to you?										Compulsory Single Response per row
	Not at all important to me							Very important to me			
	1	2	3	4	5	6	7	8	9	10	
	DP Note: Populate with responses from Q26a]										

	Always Show: Recreational Hunting (other than fishing)													
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Ask all

INTRO8	<b>Finally, we have some <u>optional</u> questions about your overall health and wellbeing.</b> Participating in recreational activities like hunting can influence your health and wellbeing. The following questions about your health and wellbeing are used in several Australian surveys, and will be used to help us understand whether people who participate in hunting have different health and wellbeing to the average Victorian.	Show on same screen as H1
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Ask all

H1	<b>How would you rate your general health?</b>  1. Excellent 2. Very good 3. Good 4. Fair 5. Poor	Radio button  Non-Compulsory  Single response
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Ask all

H2	<b>Thinking about your own life and personal circumstances, how satisfied are you with the following? Please indicate how satisfied or dissatisfied you are with each of the following.</b>												Radio button  Non-Compulsory
		<div> <div>Completely Dissatisfied</div> <div>Completely Satisfied</div> </div>										Don't Know	
		0	1	2	3	4	5	6	7	8	9	10	11
a.	Your life as a whole												
b.	Your standard of living												
c.	Your health												
d.	What you are currently achieving in life												
e.	Your personal relationships												
f.	Feeling part of your community												
g.	The amount of free time you have												



Ask all

<p><b>H3 What is your broader community like? (answer in general if you interact with multiple communities)?</b></p> <p><b>Please Indicate how much you agree or disagree with each statement.</b></p> <p><i>Additional explanation if unclear: We all have 'communities' – groups of people we spend time with, who might live in the same place as us, or live in different places but have common interests. These questions relate to your connection with society around you, not just that relating to hunting only.</i></p>								
		Strongly Disagree				Strongly Agree		
		1	2	3	4	5	6	7
a.	I feel welcome in my social group/s							
b.	I feel part of my community							
c.	I belong in my community							
d.	We are all 'in it together' in my community							
e.	I feel like an outsider in my community							
f.	I get on well with most people in my community							
g.	People look out for me in my community							
h.	If I need help or support I can easily find it							
i.	I enjoy spending time with my extended family							
j.	I enjoy spending time doing organised community activities							
k.	I enjoy spending time with my friends							
l.	Most people can be trusted							

OUTRO	<p><b>That's the end of the survey. Thank you very much for your time and assistance today</b></p> <p><b>Your response has been successfully submitted.</b></p>	
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Ask if at least one item selected at Q17 (i.e. Q17=10)

Q18	<p><b>And during your <u>most recent hunting trip</u> in Victoria where you hunted [QUOTA], approximately how much did you spend on these items?</b></p> <p>Please include:</p> <ul style="list-style-type: none"> <li>Anything <u>you</u> paid for, whether by cash, EFTPOS, cheque, credit card or any other means.</li> <li>Any money you paid for other people and you were not reimbursed (e.g. if paid for someone else's meal)</li> <li>Any money paid for you by someone who didn't go on the hunting trip (e.g. employer or parents)</li> </ul> <p>Please exclude:</p> <ul style="list-style-type: none"> <li>Any money paid on your behalf by someone else who travelled with you on the hunting trip.</li> </ul>							Radio button Grid  Compulsory Single response per row
		\$1- \$20	\$21- \$50	\$51- \$100	\$101 - \$200	\$201 - \$500	\$501 or more	
a.	[DP Note: Populate with responses from Q17]							

Ask If Q17 = 1, 2, 3, 4, 5, 7, 8, 9 (Not accommodation or not applicable)

Q19a	<p><b>What was the location of the business/es from which you bought these items? For example, were the items bought in your home town/city, at the main hunting destination or at another location?</b></p> <p><b>If you bought items from more than one location, please select the location where the most money was spent.</b></p>					Radio button Grid  Compulsory Single response per row
		Home	At the destination	Another town in Victoria	Other	
a.	[DP Note: Populate with responses from Q17]					

Ask if Q19a = 3 'Another town in Victoria'

Q19b	Which Victorian town/s did you buy these item/s from?		Text box Compulsory At least one response per row
		Which Victorian town or city?	
a.	[DP Note: Populate with responses from Q17]	[Specify]	

Ask all

INTRO6	<p><b>Now we'd like you to consider what you've spent when you've NOT been on a hunting trip, to support your hunting activities.</b></p> <p><b>Please don't include expenses made during hunting trips</b> [if Sx1=1, display “; this type of expense has been addressed in the previous section.”, else display “.”]</p>	Show on same screen as Q20
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Ask all [including those who have not been hunting in the last 12 months]

Q20	<p>During the last 12 months, which of the items from the following list have you spent money on to <b>support your hunting activities</b>?</p> <ol style="list-style-type: none"> <li>1. Firearms, bows and other firearm equipment</li> <li>2. Ammunition</li> <li>3. Hunting club memberships</li> <li>4. Licenses (game, firearm)</li> <li>5. Training to support your hunting activities (e.g. target practice)</li> <li>6. Vehicles/motorbikes/boats (purchased with hunting in mind)</li> <li>7. Vehicle/motorbike/boat maintenance</li> <li>8. Other equipment to support your hunting activities (eg. Vehicle equipment/accessories, safety equipment, camping equipment, clothing, knives, binoculars, etc.)</li> <li>9. Other items to support your hunting activities</li> <li>10. Not applicable – I did not spend any money to support hunting activities in the past 12 months</li> </ol>	<p>Check box</p> <p>Compulsory</p> <p>Multiple response</p> <p>Except Not applicable</p>
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Ask if at least one item selected at Q20 (i.e. Q20=10)

Q21	<p><b>And during the past 12 months, approximately how much have you spent on these items?</b></p>	<p>Radio button</p> <p>Grid</p> <p>Compulsory</p> <p>Single response per row</p>
		<p>\$1-\$100</p> <p>\$101-\$500</p> <p>\$501-\$1,000</p> <p>\$1,001 - \$2,000</p> <p>\$2,001 - \$5,000</p> <p>\$5,001 - \$10,000</p> <p>\$10,001 or more</p>
a.	[DP Note: Populate with responses from Q20]	

Ask if 6-9 selected at Q20

Q22	<b>And approximately what percentage of the use of these items has been on <u>hunting activities</u> versus non hunting activities?</b>					Radio button Grid  Compulsory Single response per row
	<b>Percentage accounted for by hunting...</b>	<b>1%- 25%</b>	<b>26%- 50%</b>	<b>51%- 75%</b>	<b>76%- 100%</b>	
a.	[DP Note: Populate with responses from Q20]					

Ask if at least one item selected at Q20 (i.e. Q20=10)

Q23	<b>What is the <u>main</u> location of the business/es from which you usually buy these items?</b> For example, for online purchases, please consider the town or city (if within Victoria) or state or country (if outside Victoria) where your usual vendor is located.					Radio button Compulsory At least one response per row
		<b>Melbourne</b>	<b>In a Victorian town or city other than Melbourne</b>	<b>Interstate (e.g. NSW, QLD)</b>	<b>Overseas</b>	<b>Unsure</b>
a.	[DP Note: Populate with responses from Q20]					

Ask if at least one response in column 2 of Q23 'In a Victorian town or city other than Melbourne'

Q24	<b>At which Victorian town or city do you usually buy these items?</b>		Text box Compulsory At least one response per row
		<b>Which Victorian town or city?</b>	
a.	[DP Note: Populate with responses from Q23]	<i>[Specify]</i>	

INTRO7	<b>Now just a few questions about you, to help us better understand who is involved in hunting in Victoria.</b>	Show on same screen as D1 and D2
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Ask all – show D1 & D2 on single screen

D1	<b>Which of the following best describes you...?</b> <ol style="list-style-type: none"> <li>1. Indigenous - Australian</li> <li>2. Australian born (non-indigenous)</li> <li>3. Overseas born (English speaking background)</li> <li>4. Overseas born (non-English speaking background)</li> <li>5. Do not wish to answer [DP display in grey font]</li> </ol>	Radio button Compulsory Single response
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Ask all – show D1 & D2 on single screen

D2	<b>Which of the following is <u>the highest level</u> of formal education that you have completed?</b> <ol style="list-style-type: none"> <li>1. Primary school</li> <li>2. Third year of high school (completed year 9 or equivalent)</li> <li>3. Fourth year of high school (completed year 10 or equivalent)</li> <li>4. High school certificate (completed year 12 or equivalent)</li> <li>5. Certificate I or II</li> <li>6. Certificate III or IV (e.g. trade certificate, apprenticeship)</li> <li>7. TAFE diploma (post high-school)</li> <li>8. Graduate diploma or graduate certificate (from a university)</li> <li>9. University degree (e.g. Bachelors degree)</li> <li>10. Postgraduate degree (e.g. Masters, PhD)</li> <li>11. Do not wish to answer [DP display in grey font]</li> </ol>	Radio Button Compulsory Single response
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Ask all

D3	<b>Which of the following best describes you...?</b> <ol style="list-style-type: none"> <li>1. In full-time paid work</li> <li>2. In part-time paid work (e.g. you work an agreed number of hours per week)</li> <li>3. In casual paid work (e.g. your hours vary and are not set)</li> <li>4. Unemployed and looking for paid work</li> <li>5. Home duties</li> <li>6. Retired</li> <li>7. Student not in paid work</li> <li>8. Other</li> <li>9. Do not wish to answer [DP display in grey font]</li> </ol>	Radio button Compulsory Single response
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Ask all

D4	<p><b>Which of the following best describes your living situation...?</b></p> <ol style="list-style-type: none"> <li>1. Living as a couple, no children aged under 15 years at home</li> <li>2. Living as a couple, with 1 or more children aged under 15 years at home</li> <li>3. Single parent, no children aged under 15 years at home</li> <li>4. Single parent, with 1 or more children aged under 15 years at home</li> <li>5. Living with other non-family members (e.g. flatmates)</li> <li>6. Living alone</li> <li>7. Other</li> </ol>	<p>Radio button Compulsory Single response</p>
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Ask all

D6	<p><b>What is your gross or pre-tax <u>household</u> income?</b></p> <p><i>Please include the income earned by all working people in your household. Include income received from government pensions investments/dividends, and salaried employment.</i></p> <ol style="list-style-type: none"> <li>1. Negative or nil income</li> <li>2. \$1 - \$10,399</li> <li>3. \$10,400 - \$20,799</li> <li>4. \$20,800-\$31,199</li> <li>5. \$31,200-\$41,599</li> <li>6. \$41,600-\$51,999</li> <li>7. \$52,000-\$64,999</li> <li>8. \$65,000-\$77,999</li> <li>9. \$78,000-\$102,999</li> <li>10. \$103,000-\$129,999</li> <li>11. \$130,000-\$155,999</li> <li>12. \$156,000-\$207,999</li> <li>13. \$208,000 or more</li> <li>14. Don't know [DP Display in grey text]</li> <li>15. Prefer not to say [DP Display in grey text]</li> </ol>	<p>Radio button Compulsory Single response</p>
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Ask all

D9	<p><b>Do you speak a language other than English at home?</b></p> <ol style="list-style-type: none"> <li>1. Yes, I speak another language other than English at home</li> <li>2. No, I only speak English at home</li> </ol>	<p>Compulsory Single Response</p>
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INTRO9	This next section asks some questions about the main reasons you hunt, and the types of benefits you get from hunting. We also ask a bit more about what is the most important to you about hunting – for example, the type of hunting you do, or the places you go hunting.	Show on same screen as Q14
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Ask all

28	<p><b>What are the top 5 reasons you like to go hunting?</b> (If the most important reason/s you hunt aren't given, please type them in the space provided).</p> <p><i>[Please select up to 5 of the following]</i></p> <ol style="list-style-type: none"> <li>1. ...to relax and unwind</li> <li>2. ...to spend time in the outdoors</li> <li>3. ...to spend time with family</li> <li>4. ...to spend time with friends</li> <li>5. ...to meet new people</li> <li>6. ...to get away from my day-to-day life</li> <li>7. ...to continue a family or cultural tradition of hunting</li> <li>8. ...to get away from other people</li> <li>9. ...for the sport of hunting</li> <li>10. ...because it is challenging</li> <li>11. ...because it is exciting</li> <li>12. ...to get food for myself or my friends/family</li> <li>13. ...to get exercise</li> <li>14. ...to spend time in places that are special to me</li> <li>15. ...to reduce pest species populations</li> <li>16. ...other (please describe)</li> </ol>	<p>Compulsory</p> <p>Minimum 1, Maximum 5 responses</p> <p>Check box</p> <p>Randomise (exclude code 16 'other')</p>
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Ask all

25

If given the following options on a nice weekend, at the same cost, which would you choose to do? Imagine you have to choose between them and can't do them at the same time on this particular weekend (we know many of these things are sometimes done at the same time).

	I'd choose this activity	I'd find it hard to choose (I like both equally)	I'd go hunting
Fishing			
Camping			
Bushwalking			
Four-wheel driving			
Outdoor picnic/bbq			
Clothes shopping			

Compulsory  
Single Response  
per row



	Video games				
	Go to sports game (e.g. AFL, rugby, other game you follow)				
	Gym/exercise class				
	Bike riding				
	Swimming				
	Surfing				
	Kayaking/canoeing				
	Golf				

Ask all

26a	<p><b>Do you do any of the following hobbies/sporting activities?</b></p> <ol style="list-style-type: none"> <li>1. Bushwalking or hiking</li> <li>2. Jogging or running</li> <li>3. Cycling (road riding or mountain biking)</li> <li>4. Playing video games</li> <li>5. Swimming</li> <li>6. Surfing</li> <li>7. Playing sports with others (e.g., tennis, football)</li> <li>8. Going to gym or exercise classes</li> <li>9. Camping</li> <li>10. Horse riding</li> <li>11. Kayaking or canoeing</li> <li>12. Four-wheel driving</li> <li>13. Clothes shopping (no, we're not kidding and yes, there's a reason we're asking!)</li> <li>14. Attending sports games or events as spectator (e.g. football game)</li> <li>15. Recreational target shooting</li> <li>16. Recreational hunting (other than fishing)</li> <li>17. Playing golf</li> <li>18. Other outdoor or sports activities (please describe e.g. lawn bowls)</li> <li>19. None of the above [exclusive option]</li> </ol>	<p>Check box</p> <p>Compulsory</p> <p>Multiple response</p>
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Ask if at least one item selected at Q26a (Q26a 1-18)

26b	And how important are these activities to you?										Compulsory Single Response per row
	Not at all important to me							Very important to me			
	1	2	3	4	5	6	7	8	9	10	
	DP Note: Populate with responses from Q26a]										

	Always Show: Recreational Hunting (other than fishing)													
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Ask all

INTRO8	<p><b>Finally, we have some <u>optional</u> questions about your overall health and wellbeing.</b> Participating in recreational activities like hunting can influence your health and wellbeing. The following questions about your health and wellbeing are used in several Australian surveys, and will be used to help us understand whether people who participate in hunting have different health and wellbeing to the average Victorian.</p>	Show on same screen as H1
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Ask all

H1	<p><b>How would you rate your general health?</b></p> <ol style="list-style-type: none"> <li>1. Excellent</li> <li>2. Very good</li> <li>3. Good</li> <li>4. Fair</li> <li>5. Poor</li> </ol>	<p>Radio button</p> <p>Non-Compulsory</p> <p>Single response</p>
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Ask all

H2	Thinking about your own life and personal circumstances, how satisfied are you with the following? Please indicate how satisfied or dissatisfied you are with each of the following.												Radio button  Non-Compulsory	
		Completely Dissatisfied										Completely Satisfied		Don't Know
		0	1	2	3	4	5	6	7	8	9	10	11	
a.	Your life as a whole													
b.	Your standard of living													
c.	Your health													
d.	What you are currently achieving in life													
e.	Your personal relationships													
f.	Feeling part of your community													
g.	The amount of free time you have													

Ask all

<p><b>H3 What is your broader community like? (answer in general if you interact with multiple communities)?</b></p> <p><b>Please Indicate how much you agree or disagree with each statement.</b></p> <p><i>Additional explanation if unclear: We all have 'communities' – groups of people we spend time with, who might live in the same place as us, or live in different places but have common interests. These questions relate to your connection with society around you, not just that relating to hunting only.</i></p>								
		Strongly Disagree				Strongly Agree		
		1	2	3	4	5	6	7
a.	I feel welcome in my social group/s							
b.	I feel part of my community							
c.	I belong in my community							
d.	We are all 'in it together' in my community							
e.	I feel like an outsider in my community							
f.	I get on well with most people in my community							
g.	People look out for me in my community							
h.	If I need help or support I can easily find it							
i.	I enjoy spending time with my extended family							
j.	I enjoy spending time doing organised community activities							
k.	I enjoy spending time with my friends							
l.	Most people can be trusted							

OUTRO	<p><b>That's the end of the survey. Thank you very much for your time and assistance today</b></p> <p><b>Your response has been successfully submitted.</b></p>	
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# Appendix 2: Hunting expenditure

## INTRODUCTION

This Appendix provides a breakdown of the expenditure results by item, Regional Partnership regions, LGA and by the top 40 ranking towns for expenditure.

## VICTORIA

Total expenditure in Victoria across game and pest animals, was estimated to be \$351M. This is divided between on-trip (60%) and off-trip (40%) gross expenditure.

Expenditure was also categorised by whether it was spent while on a recreational hunting trip or to support recreational hunting (non-trip expenditure). Total recreational hunting trip related expenditure was estimated to be \$211.6M (60%), and hunting expenditure not on a hunting trip was estimated to be \$139.7M (40%). The main expenses occurred while on a recreational hunting trip were fuel (\$48.9M), groceries (\$36.7M), hunting equipment (\$36.5M), and ammunition (\$19.8M). The main expenses not related to a specific recreational hunting trip were firearms / bows / other equipment (\$45.3M), vehicles / motorbikes / boat (for hunting) (\$24.7M).

Trip related expenditure where deer was the primary target animal accounted for 54% (\$114.1M) of all expenditure. For other animal groups, 32% (\$67.8M) was associated with pest animal hunting, 10% (\$22.9M) was associated with duck hunting and 3% was related to quail hunting (\$6.9M). Non-trip related expenditure was primarily spent on items for deer hunting (60%) and duck hunting (30%).

Details of the total trip and non-trip related expenses are provided in Table A2-1.

**Table A2-1: Expenditure (\$M) by Victorian game licence holders by on-trip and off-trip items, Victoria, by animal group, 2019**

	DEER	DUCK	QUAIL	PEST ANIMAL	TOTAL
<b>Trip Expenditure</b>					
Fuel	28.4	4.8	1.5	14.2	48.9
Groceries etc. for self-catering	20.3	4.8	1.1	10.5	36.7
Hunting equipment	19.2	3.2	0.7	13.4	36.5
Ammunition	8.2	3.1	0.8	7.7	19.8
Vehicle / motorbike / boat repairs	8.7	1.4	0.4	6.0	16.5
Takeaways & restaurant meals	8.7	1.6	0.6	5.0	15.9
Accommodation	5.6	1.1	1.3	2.9	10.9
Hunting tours, hunting guide fees	1.6	0.0	0.2	0.4	2.2
Other	13.3	2.9	0.3	7.7	24.3
<b>Total Trip Expenditure</b>	<b>\$114.1</b>	<b>\$22.9</b>	<b>\$6.9</b>	<b>\$67.8</b>	<b>\$211.6</b>

	DEER	DUCK	QUAIL	PEST ANIMAL	TOTAL
<b>Proportion of expenditure</b>	<b>54%</b>	<b>11%</b>	<b>3%</b>	<b>32%</b>	
<b>Non-Trip Expenditure</b>					
Firearms, bows, other firearm equipment	29.4	11.4	4.5	-	45.3
Vehicle / motorbike / boat (for hunting)	14.4	7.9	2.4	-	24.7
Other hunting equipment	13.5	6.0	1.5	-	21.1
Vehicle / motorbike / boat maintenance	7.8	4.0	1.6	-	13.5
Ammunition	7.0	4.5	1.7	-	13.3
Licenses (game, firearm)	3.7	2.2	0.6	-	6.5
Training (hunting related)	2.6	1.8	0.8	-	5.2
Hunting club memberships	2.0	1.5	0.4	-	3.9
Other	4.3	1.4	0.5	-	6.2
<b>Total Non-Trip Expenditure</b>	<b>\$84.8</b>	<b>\$40.7</b>	<b>\$14.1</b>	<b>-</b>	<b>\$139.7</b>
	<b>61%</b>	<b>29%</b>	<b>10%</b>		
<b>Total Expenditure</b>	<b>\$198.9</b>	<b>\$63.6</b>	<b>\$21.0</b>	<b>\$67.8</b>	<b>\$351.3</b>

## REGIONAL PARTNERSHIP REGIONS

In Victoria, there are designated Regional Partnership regions which are overseen by the corresponding regional partnership.

Outside of the Greater Melbourne region, expenditure was largest in the Gippsland region which accounted for 19% of total expenditure in Victoria, followed by Ovens Murray (17% or \$59.6M), Goulburn (8% or \$31.3M) and Loddon Campaspe (6% or \$23.5M). Expenditure associated with each animal group was highest in the Greater Melbourne region with \$64M associated with deer hunting, \$22.7M with duck hunting, \$8.3M with quail hunting and \$12.3 for pest animal hunting. The Greater Melbourne regional partnership region accounted for 30% (\$107.2M) of the expenditure across all animal groups.

Outside of the Greater Melbourne region, deer hunting related expenditure was highest in Gippsland (\$49M) and Ovens Murray (\$45M) and duck hunting related expenditure was the highest in Loddon Campaspe (\$6.4M). Quail hunting related expenditure (outside Melbourne) was similar across Wimmera Southern Mallee (\$2.2M), Mallee (\$2.4M) and Goulburn (\$2.5M), and pest animal hunting related expenses were highest in Gippsland (\$10.2M).

Details of expenditure by Regional Partnership regions are provided in Table A2-2.

**Table A2-2: Expenditure (\$M) by Victorian game licence holders by Regional Partnership regions, by animal group, 2019**

REGION	DEER	DUCK	QUAIL	PEST ANIMALS	TOTAL (\$M)
Barwon	6.0	5.2	0.9	5.8	18.0
Central Highlands	2.7	3.3	0.4	3.4	9.9
Gippsland	49.0	7.1	1.8	10.2	68.0
Goulburn	16.9	4.4	2.5	7.4	31.3
Great South Coast	1.2	1.8	0.3	1.8	5.1
Loddon Campaspe	8.4	6.4	1.7	7.1	23.5
Mallee	1.9	4.5	2.4	5.2	14.0
Ovens Murray	45.0	4.5	0.6	9.5	59.6
Wimmera Southern Mallee	3.8	3.5	2.2	5.0	14.5
Greater Melbourne	64.0	22.7	8.3	12.3	107.2
<b>Total Victoria</b>	<b>\$198.9</b>	<b>\$63.6</b>	<b>\$21.0</b>	<b>\$67.8</b>	<b>\$351.3</b>
<b>Proportion of regional expenditure</b>	<b>68%</b>	<b>64%</b>	<b>60%</b>	<b>82%</b>	<b>69%</b>

## LOCAL GOVERNMENT AREA

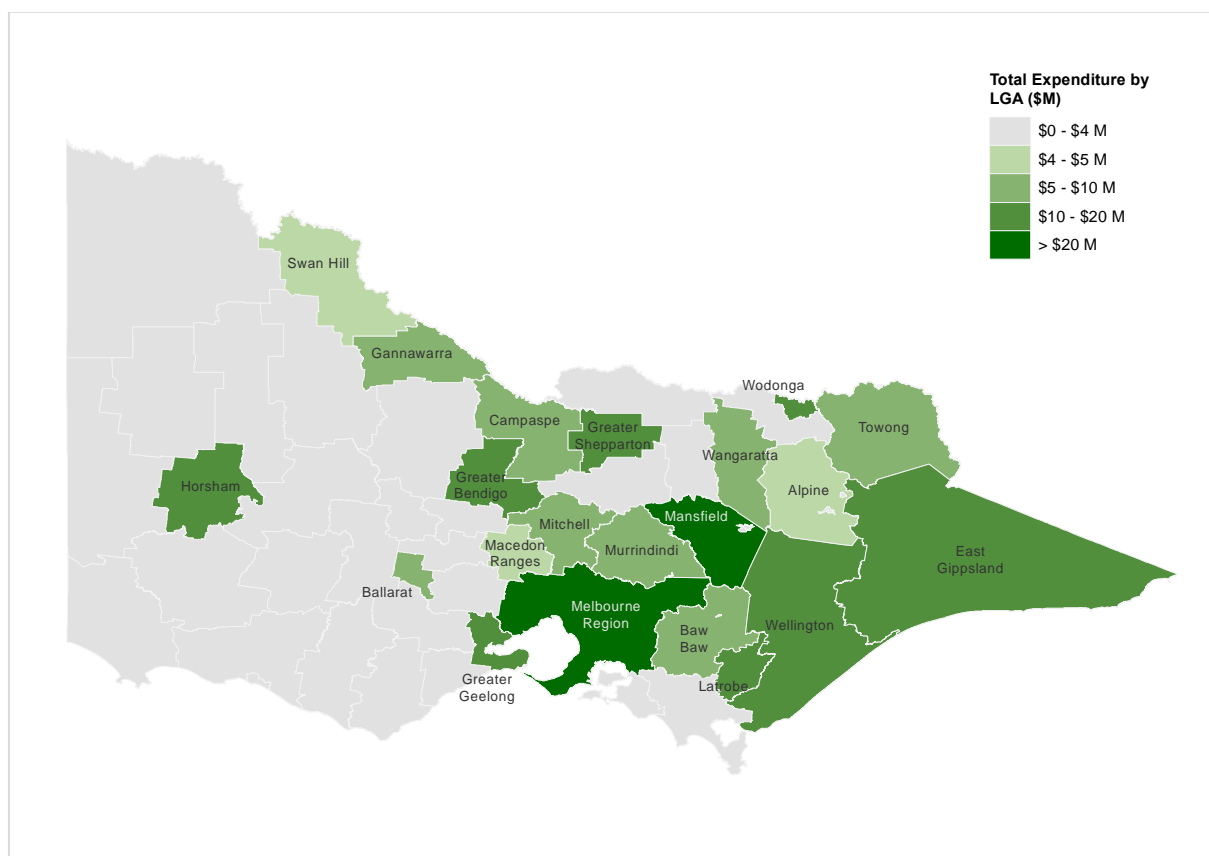
The largest expenditure across all animal groups by LGA was in Greater Melbourne, which accounted for 30% (\$107.1M) of the total expenditure in Victoria. The next largest expenditures occurred in Mansfield (\$23.7M), East Gippsland (\$19.1M), Wellington (\$18.3M) and Latrobe (\$18.3M).

Expenditure specifically related to deer hunting was also highest in Greater Melbourne (\$63.9M), Mansfield (\$17.9M), East Gippsland (\$13.7M), Wellington (\$12.M) and Latrobe (\$12.5M). Whereas duck hunting related expenses were the largest in Greater Melbourne (\$22.7M), followed by Greater Geelong (\$4.3M), Wellington (\$3.1M) and Greater Bendigo (\$3M).

Expenditure associated with quail hunting was the lowest of all animal groups across all areas (\$21M), of this, \$8.3M was estimated to have been spent in Greater Geelong, \$2M in Horsham and less than \$2M in all other LGAs.

Pest animal hunting related expenditure in total was \$67.8M across all LGAs. The breakdown showed that 18% was spent in Greater Melbourne (\$12.3M), followed by Greater Geelong (\$5.1M), Mansfield (\$4.5M), Greater Bendigo (4.2M) and Horsham (\$4.1M). In all other LGAs, expenditure was less than \$4M.

Further details on expenditure across LGAs and animal groups are provided in Table A2-3.



**Figure A2-1: Total expenditure by Local Government Area**

**Table A2-3: Expenditure (\$M) by Victorian game licence holders by Local Government Area, by animal group, 2019**

LGA	DEER	DUCK	QUAIL	PEST ANIMALS	TOTAL
Greater Melbourne	63.9	22.7	8.3	12.3	107.1
Mansfield	17.9	1.1	0.1	4.5	23.7
East Gippsland	13.7	1.0	0.5	3.9	19.1
Wellington	12.5	3.1	0.5	2.2	18.3
Latrobe	13.3	2.3	0.5	2.2	18.3
Greater Geelong	4.7	4.3	0.8	5.1	14.9
Horsham	3.6	2.4	2.0	4.1	12.1
Greater Bendigo	4.3	3.0	0.5	4.2	12.1
Wodonga	9.1	1.3	0.3	1.2	11.9
Greater Shepparton	4.2	2.2	1.6	2.8	10.8
Wangaratta	7.5	1.4	0.1	0.8	9.9



LGA	DEER	DUCK	QUAIL	PEST ANIMALS	TOTAL
Murrindindi	6.6	0.2	0.4	2.4	9.7
Baw Baw	7.8	0.4	0.0	1.0	9.3
Towong	5.6	0.1	0.0	1.0	6.7
Mitchell	3.3	1.2	0.3	1.4	6.2
Gannawarra	0.3	2.9	0.2	2.0	5.3
Campaspe	1.1	1.8	0.8	1.5	5.2
Ballarat	2.0	2.3	0.3	0.6	5.1
Alpine	3.5	0.1	0.0	1.0	4.6
Macedon Ranges	2.9	0.6	0.2	0.8	4.5
Swan Hill	0.9	0.7	1.7	0.9	4.3
Other <sup>15</sup>	10.2	8.4	1.8	11.8	32.2
<b>Total Victoria</b>	<b>\$198.9</b>	<b>\$63.6</b>	<b>\$21.0</b>	<b>\$67.8</b>	<b>\$351.3</b>

## KEY TOWNS

These data should be treated with caution as the expenditure allocation process, necessitated by the questionnaire format, means that expenditure estimates for some locations, particularly for smaller towns, may be overstated. Expenditure on some on-trip items (accommodation, groceries, etc.) was attributed solely to the respondent's destination town which means for a small town destination like Rosedale, for example, there is a high likelihood that some of those items would be purchased in larger nearby centres, such as Traralgon (25 km away) and Sale (30km), with total expenditure in Rosedale thereby overstated.

There were 40 towns where expenditure was estimated to \$1M or more. Estimated expenditure for a single town was highest in Mansfield (\$21.4M). There were an additional two towns, Horsham and Wodonga, where expenditure was estimated to be more than \$10M. There were a further eight towns where expenditure was between \$5M and \$10M.

Further details on the breakdown of expenditure between towns and across animal groups are provided in Table A2-4.

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<sup>15</sup> Other includes all other LGAs in Victoria. This list shows the top 20 LGAs where expenditure was highest.

**Table A2-4: Expenditure (\$M) by Victorian game licence holders by towns, all animal groups, 2019 - \$1million or more**

TOWN	LGA	DEER	DUCK	QUAIL	PEST ANIMALS	TOTAL
Mansfield	Mansfield	16.3	1.0	0.1	4.0	21.4
Horsham	Horsham	3.5	2.3	2.0	3.1	10.9
Wodonga	Wodonga	7.8	1.1	0.2	0.9	10.0
Bendigo	Greater Bendigo	3.5	2.6	0.3	3.0	9.3
Shepparton	Greater Shepparton	3.3	2.1	1.4	1.3	8.1
Sale	Wellington	4.1	2.3	0.4	1.0	7.8
Bairnsdale	East Gippsland	5.3	0.6	0.3	1.3	7.6
Wangaratta	Wangaratta	5.7	0.9	0.1	0.6	7.2
Geelong	Greater Geelong	2.4	3.1	0.5	0.9	7.0
Morwell	Latrobe (Vic.)	4.9	1.0	0.3	0.8	7.0
Traralgon	Latrobe (Vic.)	4.5	1.0	0.2	0.7	6.4
Warragul	Baw Baw	4.6	0.3	0.0	0.4	5.4
Ballarat	Ballarat	1.7	2.1	0.2	0.3	4.3
Leopold	Greater Geelong	1.6	0.5	0.0	2.0	4.1
Swan Hill	Swan Hill	0.9	0.6	1.7	0.6	3.9
Dargo	Wellington	3.1	0.0	0.0	0.5	3.6
Omeo	East Gippsland	3.0	0.1	0.0	0.4	3.5
Seymour	Mitchell	1.8	0.8	0.2	0.4	3.2
Mildura	Mildura	0.5	0.8	0.2	1.3	2.9
Echuca	Campaspe	0.2	1.2	0.6	0.7	2.8
Cohuna	Gannawarra	0.2	1.4	0.1	1.1	2.7
Licola	Wellington	2.4	0.0	0.0	0.1	2.5
Riddells Creek	Macedon Ranges	2.4	0.0	0.1	0.0	2.5
Churchill	Latrobe (Vic.)	2.1	0.0	0.0	0.3	2.4
Kialla	Greater Shepparton	0.8	0.0	0.2	1.5	2.4
Colac	Colac-Otway	1.2	0.7	0.1	0.3	2.3
Eildon	Murrindindi	1.8	0.1	0.0	0.3	2.2
Corryong	Towong	1.8	0.0	0.0	0.3	2.1

TOWN	LGA	DEER	DUCK	QUAIL	PEST ANIMALS	TOTAL
Eastwood	East Gippsland	0.9	0.0	0.0	1.2	2.1
Myrtleford	Alpine	1.4	0.1	0.0	0.4	2.0
Yea	Murrindindi	1.3	0.0	0.0	0.6	2.0
Euroa	Strathbogie	1.6	0.0	0.0	0.3	1.9
Kerang	Gannawarra	0.1	1.1	0.1	0.4	1.6
Orbost	East Gippsland	1.2	0.0	0.0	0.3	1.6
Benalla	Benalla	0.8	0.4	0.0	0.3	1.5
Moe	Latrobe (Vic.)	1.2	0.2	0.0	0.2	1.5
Warmambool	Warmambool	0.2	0.5	0.2	0.5	1.4
Albury-Wodonga	Wodonga	0.8	0.1	0.1	0.3	1.3
Inverleigh	Golden Plains	0.0	0.1	0.0	1.2	1.3
Kinglake	Murrindindi	0.7	0.0	0.4	0.2	1.3
Other <sup>a</sup>		97.3	34.5	10.9	33.6	176.3
<b>Victoria</b>		<b>\$198.9</b>	<b>\$63.6</b>	<b>\$21.0</b>	<b>\$67.8</b>	<b>\$351.3</b>

# Appendix 3: Results of wellbeing analysis

## MOTIVATIONS FOR RECREATIONAL HUNTING

- Hunters who go recreational hunting to spend time with family had much better general health, slightly better personal wellbeing and similar social capital in comparison to hunters who did not go hunting for this reason
- Hunters who go recreational hunting to meet new people had significantly better health, similar personal wellbeing, similar social capital in comparison to hunters who did not go hunting for this reason
- Hunters who go recreational hunting to spend time with friends had slightly better personal wellbeing, slightly better social capital but the same level of general health in comparison to hunters who did not go hunting for this reason
- Hunters who go recreational hunting to get away from their day to day life had slightly lower personal wellbeing and lower social capital, there was no significant difference in general health in comparison to hunters who did not go hunting for this reason
- Hunters who go recreational hunting to continue a family or cultural tradition of hunting had better general health, slightly better personal wellbeing and slightly better social capital in comparison to hunters who did not go hunting for this reason
- Hunters who go recreational hunting to get away from other people had lower personal wellbeing and much lower social capital but not significantly different general health in comparison to hunters who did not go hunting for this reason
- Hunters who go recreational hunting for the sport of hunting had slightly better personal wellbeing and slightly better social capital but the same general health in comparison to hunters who did not go hunting for this reason
- Hunters who go recreational hunting because it is challenging had the same general health, slightly better personal wellbeing, and slightly lower social capital in comparison to hunters who did not go hunting for this reason
- Hunters who go recreational hunting because it is exciting had better general health, slightly lower personal wellbeing and slightly lower social capital in comparison to hunters who did not go hunting for this reason
- Hunters who go recreational hunting to get food for their friends and family had similar personal wellbeing and slightly better social capital but the same general health in comparison to hunters who did not go hunting for this reason
- Hunters who go recreational hunting to get exercise had slightly better personal wellbeing and slightly better social capital but similar general in comparison to hunters who did not go hunting for this reason
- Hunters who hunt to spend time in places that are special to them had the same general health, slightly worse personal wellbeing and slightly better social capital in comparison to hunters who did not go recreational hunting for this reason
- Hunters who hunt to reduce pest species populations had slightly better social capital but the same general health and similar personal wellbeing in comparison to hunters who did not go recreational hunting for this reason
- Hunters who hunt to relax and unwind and spend time in the outdoors did not show significant differences in comparison to hunters who did not go recreational hunting for these reasons.

## TARGET ANIMALS

- Hunters who hunt for more than one main type of animal had slightly higher social capital, slightly higher personal wellbeing but the same general health in comparison to hunters who only hunted for a single type of animal
- Hunters who hunt for duck had higher social capital, higher personal wellbeing and better general health in comparison to hunters who hunted for other animals
- Hunters who hunt for stubble quail had higher social capital, higher personal wellbeing and higher general health in comparison to hunters who hunted for other animals
- No significant relationships were found for hunters who hunt deer.

## RECREATIONAL HUNTING EXPENDITURE

- Higher expenditure on recreational hunting is strongly positively correlated with frequency of hunting with a correlation of 0.788
- Smaller but significant correlations are also evident between expenditure and overall life satisfaction with a correlation of 0.092, personal wellbeing 0.112 and social capital 0.158
- Hunters who spend more on recreational hunting tend to have higher household incomes
- Hunters who spend more on recreational hunting are much more likely to be a member of a hunting association
- Hunters who spend more on recreational hunting had better general health in comparison to hunters who spend less
- Expenditure is negatively correlated with overall substitutability with a correlation of -0.361
- This suggests that hunters with lower expenditure are less likely to be willing to substitute other activities for recreational hunting.

## Appendix 4: Economic contribution results tables

This appendix contains all of the tables that show the economic contribution by Regional Partnership area, LGA and animal groups.

### ECONOMIC CONTRIBUTION BY REGIONAL PARTNERSHIP AREA

The following tables show the breakdown by Regional Partnership area, game animals and each individual animal group.

**Table A4-1: Economic contribution of deer hunting by Regional Partnership, 2019**

	EXPENDITURE		GROSS REGIONAL PRODUCT (\$M)			EMPLOYMENT (FTE)		
Region	(\$m)	Share	Direct	Flow-on	Total	Direct	Flow-on	Total
Barwon	6.0	3%	2.3	1.8	4.2	27	15	42
Central Highlands	2.7	1%	1.0	0.7	1.7	11	6	17
Gippsland	49.0	25%	18.1	12.1	30.2	192	101	293
Goulburn	16.9	9%	6.2	3.3	9.5	64	27	91
Great South Coast	1.2	1%	0.4	0.3	0.7	5	2	7
LoddonCampaspe	8.4	4%	3.2	2.6	5.8	38	21	59
Mallee	1.9	1%	0.7	0.5	1.2	8	4	12
Ovens Murray	45.0	23%	12.7	10.0	22.7	180	80	261
Wimmera Southern Mallee	3.8	2%	1.5	1.0	2.5	17	8	26
Greater Melbourne	63.9	32%	24.0	27.3	51.3	268	215	482
Inter-regional trade <sup>a</sup>	0.1	0%	20.2	50.7	70.9	102	370	472
<b>Total Victoria</b>	<b>\$198.9</b>	<b>100%</b>	<b>\$90.3</b>	<b>\$110.2</b>	<b>\$200.5</b>	<b>912</b>	<b>849</b>	<b>1,761</b>

**Table A4-2: Economic contribution of duck hunting by Regional Partnership, 2019**

	EXPENDITURE		GROSS REGIONAL PRODUCT (\$M)			EMPLOYMENT (FTE)		
Region	(\$m)	Share	Direct	Flow-on	Total	Direct	Flow-on	Total
Barwon	5.2	8%	1.9	1.5	3.4	22	12	35
Central Highlands	3.3	5%	1.2	0.8	1.9	12	7	19
Gippsland	7.1	11%	2.7	2.0	4.7	32	17	48
Goulburn	4.4	7%	1.7	1.0	2.7	20	8	28
Great South Coast	1.8	3%	0.7	0.4	1.1	8	4	11
LoddonCampaspe	6.4	10%	2.2	1.7	4.0	25	14	39
Mallee	4.5	7%	1.6	1.1	2.7	17	9	26
Ovens Murray	4.5	7%	1.4	1.1	2.5	19	9	28
Wimmera Southern Mallee	3.5	5%	1.3	0.8	2.1	14	7	21
Greater Melbourne	22.7	36%	8.8	10.4	19.2	102	82	184
Inter-regional trade	0.0	0%	4.9	15.3	20.3	36	112	148
<b>Total Victoria</b>	<b>\$63.6</b>	<b>100%</b>	<b>\$28.5</b>	<b>\$36.2</b>	<b>\$64.7</b>	<b>308</b>	<b>280</b>	<b>587</b>



**Table A4-3: Economic contribution of quail hunting by Regional Partnership, 2019**

	EXPENDITURE		GROSS REGIONAL PRODUCT (\$M)			EMPLOYMENT (FTE)		
Region	(\$m)	Share	Direct	Flow-on	Total	Direct	Flow-on	Total
Barwon	0.9	4%	0.4	0.3	0.6	4	2	6
Central Highlands	0.4	2%	0.2	0.1	0.3	2	1	3
Gippsland	1.8	9%	0.6	0.5	1.1	8	4	12
Goulburn	2.5	12%	1.0	0.6	1.6	13	5	18
Great South Coast	0.3	1%	0.1	0.1	0.2	2	1	3
LoddonCampaspe	1.7	8%	0.6	0.5	1.1	7	4	11
Mallee	2.4	11%	0.9	0.7	1.6	11	6	17
Ovens Murray	0.6	3%	0.2	0.1	0.3	2	1	3
Wimmera Southern Mallee	2.2	10%	0.9	0.6	1.5	12	5	18
Greater Melbourne	8.3	39%	3.1	3.6	6.7	35	28	64
Inter-regional trade	0.0	0%	1.6	5.1	6.8	10	37	47
<b>Total Victoria</b>	<b>\$21.0</b>	<b>100%</b>	<b>\$9.5</b>	<b>\$12.3</b>	<b>\$21.9</b>	<b>106</b>	<b>96</b>	<b>202</b>

**Table A4-4: Economic contribution of pest animal hunting by Victorian game licence holders by Regional Partnership, 2019**

	EXPENDITURE		GROSS REGIONAL PRODUCT (\$M)			EMPLOYMENT (FTE)		
Region	(\$m)	Share	Direct	Flow-on	Total	Direct	Flow-on	Total
Barwon	5.8	9%	2.2	1.5	3.8	23	13	36
Central Highlands	3.4	5%	1.2	0.8	2.0	13	7	20
Gippsland	10.2	15%	4.7	2.4	7.1	39	20	59
Goulburn	7.4	11%	2.7	1.4	4.1	26	11	37
Great South Coast	1.8	3%	0.7	0.4	1.0	6	3	9
LoddonCampaspe	7.1	10%	2.7	2.1	4.9	32	17	49
Mallee	5.2	8%	2.0	1.4	3.4	22	11	33
Ovens Murray	9.5	14%	2.5	2.0	4.4	35	16	51
Wimmera Southern Mallee	5.0	7%	2.0	1.2	3.2	22	10	32
Greater Melbourne	12.3	18%	4.6	5.0	9.6	50	39	89
Inter-regional trade <sup>a</sup>	0.0	0%	6.2	19.4	25.6	30	140	171
<b>Total Victoria</b>	<b>\$67.8</b>	<b>100%</b>	<b>\$31.5</b>	<b>\$37.5</b>	<b>\$69.0</b>	<b>300</b>	<b>288</b>	<b>588</b>

**Table A4-5: Economic contribution of game animal hunting only by Regional Partnership, 2019**

	EXPENDITURE		GROSS REGIONAL PRODUCT (\$M)			EMPLOYMENT (FTE)		
Region	(\$m)	Share	Direct	Flow-on	Total	Direct	Flow-on	Total
Barwon	12.2	4%	4.6	3.6	8.2	53	30	83
Central Highlands	6.5	2%	2.3	1.6	3.9	25	13	38
Gippsland	57.9	20%	21.4	14.6	36.0	232	122	354
Goulburn	23.8	8%	8.9	5.0	13.9	96	40	137
Great South Coast	3.3	1%	1.3	0.8	2.1	14	7	21
LoddonCampaspe	16.5	6%	6.1	4.8	10.9	70	39	109
Mallee	8.8	3%	3.2	2.2	5.4	36	19	55
Ovens Murray	50.1	18%	14.2	11.2	25.5	201	90	292
Wimmera Southern Mallee	9.5	3%	3.6	2.4	6.1	44	20	65
Greater Melbourne	94.8	33%	35.9	41.3	77.3	406	325	731
Inter-regional trade <sup>a</sup>	0.1	0%	26.7	71.2	97.9	148	519	666
<b>Victoria</b>	<b>\$283.5</b>	<b>100%</b>	<b>\$128.3</b>	<b>\$158.8</b>	<b>\$287.1</b>	<b>1,326</b>	<b>1,225</b>	<b>2,550</b>

## ECONOMIC CONTRIBUTION BY LGA

The following tables show the breakdown by LGA, game animals and by animal group.

**Table A4-6: Economic contribution of deer hunting by LGA and Greater Melbourne, 2019**

Region	EXPENDITURE		GROSS REGIONAL PRODUCT (\$M)			EMPLOYMENT (FTE)		
	(\$m)	Share	Direct	Flow-on	Total	Direct	Flow-on	Total
Greater Melbourne	63.9	32%	20.9	27.3	48.2	268	215	482
Mansfield	17.9	9%	6.5	2.8	9.3	72	23	95
East Gippsland	13.7	7%	5.2	3.0	8.2	55	25	80
Wellington	12.5	6%	3.4	2.2	5.7	48	18	66
Latrobe	13.3	7%	4.8	3.3	8.1	49	28	77
Greater Geelong	4.7	2%	1.7	1.4	3.1	22	12	34
Horsham	3.6	2%	1.2	1.0	2.2	16	8	24
Greater Bendigo	4.3	2%	1.5	1.3	2.8	20	11	30
Wodonga	9.1	5%	3.3	2.0	5.2	34	16	50
Greater Shepparton	4.2	2%	1.3	0.6	1.9	16	5	21
Wangaratta	7.5	4%	2.1	1.8	3.9	29	16	45
Murrindindi	6.6	3%	1.1	0.9	2.0	20	8	28
Baw Baw	7.8	4%	2.3	1.8	4.1	33	16	49
Towong	5.6	3%	1.5	0.8	2.3	27	6	33
Mitchell	3.3	2%	1.2	0.3	1.4	12	3	15
Gannawarra	0.3	0%	0.1	0.1	0.1	2	0	2
Campaspe	1.1	1%	0.4	0.3	0.8	7	3	10
Ballarat	2.0	1%	0.6	0.5	1.1	8	5	12
Alpine	3.5	2%	1.3	0.5	1.8	16	4	19
Macedon Ranges	2.9	1%	0.8	0.5	1.3	11	5	16
Swan Hill	0.9	0%	0.3	0.2	0.5	4	2	6
Other	10.2	5%	29.0	57.6	86.6	143	422	566
<b>Total Victoria</b>	<b>\$198.9</b>	<b>100%</b>	<b>\$90.3</b>	<b>\$110.2</b>	<b>\$200.5</b>	<b>912</b>	<b>849</b>	<b>1,761</b>

**Table A4-7: Economic contribution of duck hunting by LGA and Greater Melbourne, 2019**

Region	EXPENDITURE		GROSS REGIONAL PRODUCT (\$M)			EMPLOYMENT (FTE)		
	(\$m)	Share	Direct	Flow-on	Total	Direct	Flow-on	Total
Greater Melbourne	22.7	36%	8.0	10.4	18.5	102	82	184
Mansfield	1.1	2%	0.4	0.2	0.6	5	2	6
East Gippsland	1.0	2%	0.4	0.3	0.7	5	2	8
Wellington	3.1	5%	1.0	0.6	1.6	14	5	19
Latrobe	2.3	4%	0.9	0.6	1.5	9	5	15
Greater Geelong	4.3	7%	1.4	1.2	2.6	18	10	28
Horsham	2.4	4%	0.8	0.6	1.4	10	5	15
Greater Bendigo	3.0	5%	0.9	0.8	1.8	12	7	19
Wodonga	1.3	2%	0.5	0.3	0.8	5	2	7
Greater Shepparton	2.2	3%	0.7	0.3	1.0	9	3	11
Wangaratta	1.4	2%	0.4	0.4	0.8	6	3	9
Murrindindi	0.2	0%	0.1	0.1	0.1	2	0	2
Baw Baw	0.4	1%	0.1	0.1	0.2	2	1	3
Towong	0.1	0%	0.0	0.0	0.1	1	0	1
Mitchell	1.2	2%	0.5	0.1	0.6	6	1	7
Gannawarra	2.9	4%	0.8	0.4	1.2	11	3	15
Campaspe	1.8	3%	0.5	0.4	0.9	7	3	10
Ballarat	2.3	4%	0.7	0.6	1.2	8	5	13
Alpine	0.1	0%	0.0	0.0	0.0	0	0	0
Macedon Ranges	0.6	1%	0.2	0.1	0.3	2	1	3
Swan Hill	0.7	1%	0.2	0.2	0.4	3	2	4
Other	8.4	13%	10.1	18.4	28.5	70	136	206
<b>Total Victoria</b>	<b>\$63.6</b>	<b>100%</b>	<b>\$28.5</b>	<b>\$36.2</b>	<b>\$64.7</b>	<b>308</b>	<b>280</b>	<b>587</b>

**Table A4-8: Economic contribution of quail hunting by LGA and Greater Melbourne, 2019**

	EXPENDITURE		GROSS REGIONAL PRODUCT (\$M)			EMPLOYMENT (FTE)		
Region	(\$m)	Share	Direct	Flow-on	Total	Direct	Flow-on	Total
Greater Melbourne	8.3	39%	2.8	3.6	6.4	35	28	64
Mansfield	0.1	0%	0.0	0.0	0.0	0	0	0
East Gippsland	0.5	2%	0.2	0.1	0.3	3	1	4
Wellington	0.5	2%	0.2	0.1	0.3	2	1	3
Latrobe	0.5	2%	0.2	0.1	0.3	2	1	3
Greater Geelong	0.8	4%	0.3	0.2	0.5	3	2	5
Horsham	2.0	10%	0.7	0.6	1.3	11	5	16
Greater Bendigo	0.5	3%	0.2	0.2	0.3	2	1	3
Wodonga	0.3	2%	0.1	0.1	0.1	1	0	1
Greater Shepparton	1.6	8%	0.5	0.2	0.7	6	2	8
Wangaratta	0.1	1%	0.0	0.0	0.1	1	0	1
Murrindindi	0.4	2%	0.2	0.1	0.4	5	1	6
Baw Baw	0.0	0%	0.0	0.0	0.0	0	0	0
Towong	0.0	0%	0.0	0.0	0.0	0	0	0
Mitchell	0.3	1%	0.1	0.0	0.2	2	0	2
Gannawarra	0.2	1%	0.1	0.0	0.1	1	0	1
Campaspe	0.8	4%	0.2	0.2	0.4	3	1	4
Ballarat	0.3	1%	0.1	0.1	0.1	1	1	2
Alpine	0.0	0%	0.0	0.0	0.0	0	0	0
Macedon Ranges	0.2	1%	0.1	0.1	0.2	1	1	2
Swan Hill	1.7	8%	0.5	0.5	1.0	8	4	12
Other	1.8	8%	3.1	6.0	9.0	18	44	62
<b>Total Victoria</b>	<b>\$21.0</b>	<b>100%</b>	<b>\$9.5</b>	<b>\$12.3</b>	<b>\$21.9</b>	<b>106</b>	<b>96</b>	<b>202</b>

**Table A4-9: Economic contribution of pest animal hunting by Victorian game licence holders, by LGA and Greater Melbourne, 2019**

	EXPENDITURE		GROSS REGIONAL PRODUCT (\$M)			EMPLOYMENT (FTE)		
Region	(\$m)	Share	Direct	Flow-on	Total	Direct	Flow-on	Total
Greater Melbourne	12.3	18%	3.8	5.0	8.8	50	39	89
Mansfield	4.5	7%	1.6	0.7	2.3	17	6	23
East Gippsland	3.9	6%	1.4	0.8	2.2	14	7	21
Wellington	2.2	3%	0.6	0.4	1.0	9	3	12
Latrobe	2.2	3%	0.8	0.5	1.3	8	4	12
Greater Geelong	5.1	8%	1.5	1.3	2.8	21	11	31
Horsham	4.1	6%	1.3	1.1	2.4	18	9	27
Greater Bendigo	4.2	6%	1.3	1.1	2.4	17	9	26
Wodonga	1.2	2%	0.5	0.2	0.7	4	2	5
Greater Shepparton	2.8	4%	0.7	0.3	1.1	9	3	13
Wangaratta	0.8	1%	0.2	0.2	0.4	3	2	5
Murrindindi	2.4	4%	0.4	0.3	0.7	7	3	10
Baw Baw	1.0	1%	0.3	0.2	0.5	4	2	6
Towong	1.0	1%	0.2	0.1	0.3	4	1	5
Mitchell	1.4	2%	0.5	0.1	0.6	5	1	6
Gannawarra	2.0	3%	0.5	0.3	0.8	8	2	11
Campaspe	1.5	2%	0.5	0.4	1.0	9	4	12
Ballarat	0.6	1%	0.2	0.2	0.3	2	1	4
Alpine	1.0	1%	0.0	0.0	0.0	0	0	0
Macedon Ranges	0.8	1%	0.2	0.2	0.4	4	2	5
Swan Hill	0.9	1%	0.3	0.2	0.5	4	2	6
Other	11.8	17%	14.5	23.8	38.3	83	176	259
<b>Total Victoria</b>	<b>\$67.8</b>	<b>100%</b>	<b>\$31.5</b>	<b>\$37.5</b>	<b>\$69.0</b>	<b>300</b>	<b>288</b>	<b>588</b>

**Table A4-10: Economic contribution of game hunting by LGA**

	EXPENDITURE		GROSS REGIONAL PRODUCT (\$M)			EMPLOYMENT (FTE)		
Region	(\$m)	Share	Direct	Flow-on	Total	Direct	Flow-on	Total
Greater Melbourne	94.8	33%	31.7	41.3	73.0	406	325	731
Mansfield	19.1	7%	6.9	3.0	9.9	77	25	102
East Gippsland	15.2	5%	5.8	3.4	9.2	63	28	91
Wellington	16.1	6%	4.5	3.0	7.5	65	23	88
Latrobe	16.1	6%	5.8	4.1	9.9	60	35	95
Greater Geelong	9.8	3%	3.3	2.8	6.2	44	24	67
Horsham	8.0	3%	2.6	2.3	4.9	37	19	56
Greater Bendigo	7.8	3%	2.6	2.3	4.9	34	19	52
Wodonga	10.7	4%	3.8	2.3	6.2	40	19	59
Greater Shepparton	8.0	3%	2.5	1.1	3.6	31	10	41
Wangaratta	9.0	3%	2.6	2.2	4.8	36	20	56
Murrindindi	7.3	3%	1.4	1.1	2.5	27	9	36
Baw Baw	8.3	3%	2.4	1.9	4.4	35	17	52
Towong	5.8	2%	1.6	0.8	2.4	28	6	34
Mitchell	4.8	2%	1.8	0.4	2.2	20	4	24
Gannawarra	3.4	1%	0.9	0.5	1.4	14	4	18
Campaspe	3.7	1%	1.2	0.9	2.0	17	7	24
Ballarat	4.5	2%	1.3	1.2	2.5	17	10	27
Alpine	3.6	1%	1.4	0.5	1.9	16	4	20
Macedon Ranges	3.7	1%	1.0	0.7	1.7	15	6	21
Swan Hill	3.4	1%	1.0	0.9	1.9	14	8	22
Other	20.4	7%	42.1	82.0	124.1	231	603	834
<b>Victoria</b>	<b>\$283.5</b>	<b>100%</b>	<b>\$128.3</b>	<b>\$158.8</b>	<b>\$287.1</b>	<b>1,326</b>	<b>1,225</b>	<b>2,550</b>



# Appendix 5: Results - change between survey years 2013 and 2019

## CHANGE IN EXPENDITURE BY REGIONAL PARTNERSHIP AREA

**Table A5-1: Expenditure (\$M) by Victorian game licence holders by Regional Partnership, by animal group, 2013 and 2019**

2013 (CURRENT DOLLARS)						2019 (CURRENT DOLLARS)					
Region	Deer	Duck	Quail	Pest Animals	Total	Region	Deer	Duck	Quail	Pest Animals	Total
Central Highlands	3.4	2.4	0.7	8.5	15.0	Barwon	6.0	5.2	0.9	5.8	18.0
Central Hume	14.4	2.5	0.7	11.8	29.5	Central Highlands	2.7	3.3	0.4	3.4	9.9
G21	2.2	11.0	2.8	3.2	19.3	Gippsland	49.0	7.1	1.8	10.2	68.0
Gippsland	31.3	18.5	4.2	31.4	85.4	Goulburn	16.9	4.4	2.5	7.4	31.3
Goulburn Valley	3.3	6.3	2.0	8.6	20.3	Great South Coast	1.2	1.8	0.3	1.8	5.1
Great South Coast	2.4	1.3	0.5	2.3	6.5	LoddonCampaspe	8.4	6.4	1.7	7.1	23.5
LoddonMallee North	1.7	8.5	1.3	18.0	29.4	Mallee	1.9	4.5	2.4	5.2	14.0
LoddonMallee South	1.8	13.1	2.1	14.4	31.4	Ovens Murray	45.0	4.5	0.6	9.5	59.6
Lower Hume	13.5	1.0	0.2	10.8	25.4	Wimmera Southern Mallee	3.8	3.5	2.2	5.0	14.5
Greater Melbourne	73.8	43.2	34.1	36.1	187.2	Greater Melbourne	63.9	22.7	8.3	12.3	107.1
Unincorporated Vic	0.0	0.0	0.0	0.0	0.0	<b>Total Victoria<sup>a</sup></b>	<b>\$198.9</b>	<b>\$63.6</b>	<b>\$21.0</b>	<b>\$67.8</b>	<b>\$351.3</b>
Upper Hume	6.6	1.4	0.3	4.8	13.1	<sup>a</sup> includes expenditures in Unincorporated Victoria					
Wimmera Southern Mallee	0.9	2.4	0.7	1.9	5.9						
<b>Total (Victoria)</b>	<b>\$155.4</b>	<b>\$111.7</b>	<b>\$49.6</b>	<b>\$151.8</b>	<b>\$468.5</b>						

## CHANGE IN ECONOMIC CONTRIBUTION BY REGIONAL PARTNERSHIP AREA

Table A5-2: Gross economic contribution by Victorian game licence holders by Regional Partnership, by animal group, 2013 (current dollars)

ECONOMIC CONTRIBUTION BY REGIONAL PARTNERSHIP, ALL ANIMAL GROUPS (\$M), 2013 (CURRENT DOLLARS)								
	Expenditure		Gross Regional Product (\$m)			Employment (FTE)		
Region	(\$m)	Share	Direct	Flow-on	Total	Direct	Flow-on	Total
Greater Melbourne	187.2	40%	76.9	104.9	181.8	622	636	1,258
Gippsland	85.4	18%	31.4	16.1	47.5	267	122	389
LoddonMallee South	31.4	7%	11.2	7.1	18.3	92	53	145
Central Hume	29.5	6%	10.9	5.6	16.5	106	50	156
LoddonMallee North	29.4	6%	11.3	5.2	16.6	105	46	151
Lower Hume	25.4	5%	9.2	3.9	13.1	89	31	120
Goulburn Valley	20.3	4%	7.5	4.0	11.4	81	34	115
G21	19.3	4%	7.1	5.2	12.3	67	39	106
Central Highlands	15.0	3%	5.2	3.4	8.6	48	27	75
Upper Hume	13.1	3%	4.6	2.1	6.7	42	17	59
Great South Coast	6.5	1%	2.5	1.1	3.6	25	9	35
Wimmera Southern Mallee	5.9	1%	2.2	0.9	3.1	21	8	28
Inter-regional trade	-		18.9	134.8	153.8	32	810	842
<b>Total Victoria</b>	<b>\$468.5</b>	<b>100%</b>	<b>\$198.9</b>	<b>\$294.5</b>	<b>\$493.4</b>	<b>1,598</b>	<b>1,882</b>	<b>3,480</b>

**Table A5-3: Gross economic contribution by Victorian game licence holders by Regional Partnership, by animal group, 2019 (current dollars)**

ECONOMIC CONTRIBUTION BY REGIONAL PARTNERSHIP, ALL ANIMAL GROUPS (\$M), 2019								
	Expenditure		Gross Regional Product (\$m)			Employment (FTE)		
Region	(\$m)	Share	Direct	Flow-on	Total	Direct	Flow-on	Total
Barwon	18.0	5%	6.9	5.1	12.0	77	43	119
Central Highlands	9.9	3%	3.5	2.4	5.9	38	20	59
Gippsland	68.0	19%	26.1	17.0	43.1	271	142	413
Goulburn	31.3	9%	11.6	6.4	17.9	122	51	174
Great South Coast	5.1	1%	1.9	1.2	3.1	21	10	30
LoddonCampaspe	23.5	7%	8.8	6.9	15.7	102	57	159
Mallee	14.0	4%	5.2	3.6	8.8	59	30	88
Ovens Murray	59.6	17%	16.7	13.2	29.9	237	106	343
Wimmera Southern Mallee	14.5	4%	5.6	3.7	9.3	66	31	97
Greater Melbourne	107.1	31%	40.5	46.3	86.8	456	364	820
Inter-regional trade <sup>a</sup>	0.1	0%	33.0	90.5	123.5	178	659	837
<b>Total Victoria</b>	<b>\$351.3</b>	<b>100%</b>	<b>\$159.8</b>	<b>\$196.3</b>	<b>\$356.1</b>	<b>1,626</b>	<b>1,513</b>	<b>3,138</b>

## CHANGE IN EXPENDITURE BY LGA

EXPENDITURE BY LGA, BY ANIMAL GROUP (\$M), 2013 (CURRENT DOLLARS)						EXPENDITURE BY LGA 2019					
LGA	Deer	Duck	Quail	Pest Animals	Total	LGA	Deer	Duck	Quail	Pest Animals	Total
Greater Melbourne	73.8	43.2	34.1	36.1	187.2	Greater Melbourne	63.9	22.7	8.3	12.3	107.1
Wellington	10.1	8.4	0.7	9.9	29.0	Mansfield	17.9	1.1	0.1	4.5	23.7
Latrobe	7.4	5.4	2.5	5.5	20.8	East Gippsland	13.7	1.0	0.5	3.9	19.1
Baw Baw	5.8	1.6	0.1	11.3	18.9	Wellington	12.5	3.1	0.5	2.2	18.3
Greater Bendigo	1.1	9.4	1.8	6.3	18.6	Latrobe	13.3	2.3	0.5	2.2	18.3
Mansfield	8.4	0.4	0.1	7.4	16.4	Greater Geelong	4.7	4.3	0.8	5.1	14.9
Greater Shepparton	2.7	5.1	1.8	6.1	15.7	Horsham	3.6	2.4	2.0	4.1	12.1
Greater Geelong	1.8	8.6	2.4	2.4	15.2	Greater Bendigo	4.3	3.0	0.5	4.2	12.1
Mitchell	9.1	0.7	0.2	4.0	14.0	Wodonga	9.1	1.3	0.3	1.2	11.9
East Gippsland	5.8	2.7	0.6	3.2	12.2	Greater Shepparton	4.2	2.2	1.6	2.8	10.8
Gannawarra	0.9	3.7	0.2	6.9	11.6	Wangaratta	7.5	1.4	0.1	0.8	9.9
Murrindindi	4.4	0.3	0.0	6.8	11.5	Murrindindi	6.6	0.2	0.4	2.4	9.7
Wodonga	4.3	1.3	0.3	3.5	9.4	Baw Baw	7.8	0.4	0.0	1.0	9.3
Macedon Ranges	0.6	0.2	0.1	6.9	7.7	Towong	5.6	0.1	0.0	1.0	6.7
Campaspe	0.2	1.6	0.4	4.5	6.6	Mitchell	3.3	1.2	0.3	1.4	6.2
Wangaratta	2.6	1.8	0.5	1.5	6.4	Gannawarra	0.3	2.9	0.2	2.0	5.3
Golden Plains	0.0	0.4	0.1	5.5	6.1	Campaspe	1.1	1.8	0.8	1.5	5.2
Mildura	0.3	0.6	0.2	4.5	5.6	Ballarat	2.0	2.3	0.3	0.6	5.1
Ballarat	3.1	1.4	0.4	0.4	5.2	Alpine	3.5	0.1	0.0	1.0	4.6
Alpine	2.6	0.2	0.0	1.5	4.3	Macedon Ranges	2.9	0.6	0.2	0.8	4.5
Loddon	0.0	3.1	0.1	0.6	3.8	Swan Hill	0.9	0.7	1.7	0.9	4.3
Other <sup>a</sup>	10.6	11.7	3.2	17.1	42.5	Other <sup>a</sup>	10.2	8.4	1.8	11.8	32.2
<b>Total Victoria</b>	<b>\$155.4</b>	<b>\$111.7</b>	<b>\$49.6</b>	<b>\$151.8</b>	<b>\$468.5</b>	<b>Total Victoria</b>	<b>\$198.9</b>	<b>\$63.6</b>	<b>\$21.0</b>	<b>\$67.8</b>	<b>\$351.3</b>

## CHANGE IN ECONOMIC CONTRIBUTION BY LGA

ECONOMIC CONTRIBUTION BY LGA, ALL ANIMAL GROUPS (\$M), 2013 (CURRENT DOLLARS)								
	Expenditure		Gross Regional Product (\$m)			Employment (FTE)		
Region	(\$m)	Share	Direct	Flow-on	Total	Direct	Flow-on	Total
Greater Melbourne	187.2	40%	76.9	104.9	181.8	622	636	1,258
Wellington	29.0	6%	10.8	3.7	14.5	75	26	101
Latrobe	20.8	4%	7.3	3.6	10.9	56	24	80
Baw Baw	18.9	4%	7.0	4.3	11.3	72	34	106
Greater Bendigo	18.6	4%	6.3	4.2	10.5	57	33	90
Mansfield	16.4	3%	6.1	2.3	8.5	65	21	87
Greater Shepparton	15.7	3%	5.7	3.6	9.3	64	31	95
Greater Geelong	15.2	3%	5.5	4.0	9.5	54	30	83
Mitchell	14.0	3%	4.5	2.0	6.5	42	16	58
East Gippsland	12.2	3%	4.5	2.0	6.5	42	18	60
Gannawarra	11.6	2%	4.6	1.8	6.3	56	17	73
Murrindindi	11.5	2%	4.8	1.7	6.5	46	14	59
Wodonga	9.4	2%	3.3	1.8	5.1	29	14	43
Macedon Ranges	7.7	2%	2.9	2.0	5.0	19	13	33
Campaspe	6.6	1%	2.4	1.1	3.4	22	9	30
Wangaratta	6.4	1%	2.1	1.2	3.3	21	11	32
Golden Plains	6.1	1%	2.1	0.7	2.8	18	5	23
Mildura	5.6	1%	2.2	0.6	2.8	10	5	15
Ballarat	5.2	1%	1.7	1.3	3.0	17	10	27
Alpine	4.3	1%	1.6	0.6	2.2	14	5	19
Other <sup>a</sup>	46.3	10%	36.6	147.0	183.6	196	911	1,108
<b>Total Victoria</b>	<b>\$468.5</b>	<b>100%</b>	<b>\$198.9</b>	<b>\$294.5</b>	<b>\$493.4</b>	<b>1,598</b>	<b>1,882</b>	<b>3,480</b>

## CHANGE IN ECONOMIC CONTRIBUTION – VICTORIA

ECONOMIC CONTRIBUTION BY ANIMAL GROUP, VICTORIA, 2013 (CURRENT DOLLARS)								
	Expenditure		Gross State Product (\$m)			Employment (FTE)		
Animal group	(\$m)	Share	Direct	Flow-on	Total	Direct	Flow-on	Total
Deer	155.4	33%	64.3	95.3	159.6	531	608	1,140
Duck	111.7	24%	47.8	71.7	119.5	399	458	857
Quail	49.6	11%	20.5	31.5	52.0	184	201	385
<b>Game Hunting Sub-total</b>	<b>316.6</b>	<b>68%</b>	<b>132.6</b>	<b>198.6</b>	<b>331.1</b>	<b>1,115</b>	<b>1,268</b>	<b>2,382</b>
Pest Animals	151.8	32%	66.3	95.9	162.2	483	614	1,097
<b>Total</b>	<b>\$468.5</b>	<b>100%</b>	<b>\$198.9</b>	<b>\$294.5</b>	<b>\$493.4</b>	<b>1,598</b>	<b>1,882</b>	<b>3,480</b>

ECONOMIC CONTRIBUTION BY ANIMAL GROUP, VICTORIA, 2019								
	Expenditure		Gross Regional Product (\$m)			Employment (FTE)		
Animal group	(\$m)	Share	Direct	Flow-on	Total	Direct	Flow-on	Total
Deer	198.9	57%	90.3	110.2	200.5	912	849	1,761
Duck	63.6	18%	28.5	36.2	64.7	308	280	587
Quail	21.0	6%	9.5	12.3	21.9	106	96	202
<b>Game Hunting Sub-total</b>	<b>283.5</b>	<b>81%</b>	<b>128.3</b>	<b>158.8</b>	<b>287.1</b>	<b>1,326</b>	<b>1,225</b>	<b>2,550</b>
Pest Animals	67.8	19%	31.5	37.5	69.0	300	288	588
<b>Total</b>	<b>\$351.3</b>	<b>100%</b>	<b>\$159.8</b>	<b>\$196.3</b>	<b>\$356.1</b>	<b>1,626</b>	<b>1,513</b>	<b>3,138</b>

# Appendix 6: Gross economic contribution method

## EXPENDITURE

### INTRODUCTION

The first step in calculating economic contribution was to develop expenditure estimates for the recreational hunting population with game hunting licences in Victoria. Expenditure is a measure of how much hunters spend on recreational hunting trips and on equipment, training, etc., to support their hunting at other times of the year.

Estimation of expenditure required some data checking/adjustment, estimating the trip and non-trip expenditures by each sampled hunter and scaling that expenditure from the survey sample to the population.

These aggregated expenditure data were then converted from purchasers' prices to basic prices by reallocating net taxes, retail and transport margins and removing imports.

The closing adjustment to the aggregate expenditure data was allocating them to the relevant input-output sectors (78 intermediate sectors, other value added or imports) in which the expenditure occurred, compiling a final demand profile ready for input into the economic contribution estimation models.

### ESTIMATION OF EXPENDITURE

To estimate total annual expenditure by animal group and by location from the survey, the following data processing steps were undertaken:

1. Data adjustment
2. Estimation of on-trip and off-trip expenditure by each sampled hunter
3. Scaling the expenditure from the survey sample to the population.

These steps are explained more fully below:

#### Step 1 – data adjustment

- Data cleaning
  - 1,677 survey responses were collected that included complete expenditure data
  - Six responses were removed because they included no demographic data and, therefore, couldn't be reweighted to match population demographics. Imputation of these variables was explored but not carried out as, while there were differences on average, no reliable basis for imputing demographic variables for individual responses was identified. Further, the remaining sample size was sufficient
  - 1,671 responses remained after cleaning and were used to make expenditure estimates
- Data ranges converted to data values. There were a number of instances where the responses were given as ranges, where a value was required for the analysis (Appendix 1). In most cases mid-point values were used to represent the data range. In the case where a range was specified as a value or higher (i.e. '\$501 or higher'), a conservative assumption was made by using the lower bound (i.e. \$501 in the example).

## Step 2 – estimation of on-and-off trip expenditure by each sampled hunter

The purpose of this step was to allocate expenditure by animal group by location.

For on-trip expenditure, survey data were collected about respondents' last trip expenditures, what animal group was mainly hunted on that trip and when that trip occurred. Data were also collected on the total number of recreational hunting trips they took in Victoria in the last 12 months and the breakdown of those trips by main animal hunted. Expenditure data, from respondents' last trips, were extrapolated to all the trips respondents took, by animal group, in the last 12 months. Expenditures were excluded where they occurred outside Victoria.

For off-trip expenditure, survey data were collected about respondents' expenditures and where they occurred. Expenditure on items used for purposes other than recreational hunting was adjusted by the proportion of use on hunting as indicated by respondents for each item. Respondents' off-trip expenditure was distributed evenly across the animal groups they were endorsed to hunt. Off-trip expenditure was apportioned to game animals only, as it was assumed that equipment purchases were for the purpose of recreational game hunting, with pest hunting being an opportunistic activity that capitalised on the existing equipment. Expenditures were excluded where they occurred outside Victoria.

## Step 3 – scaling the expenditure from the survey sample to the population

### *Population characteristics*

Information regarding the characteristics of the recreational game hunting population was drawn from an anonymised extract of the Victorian game licence database provided by the Game Management Authority for this project. The data were analysed to estimate the number of game licence holders in each licence category for each age group as enumerated in the survey (see S2 of the survey questionnaire, Appendix 1). The game-hunting population was further split into active (i.e. have hunted in the last 12 months) and non-active hunters (i.e. have not hunted in the last 12 months). This is an important characteristic, as active hunters' expenditure is higher than non-active. The estimates of the proportion of active hunters for each animal group provided by Game Management Authority from the 2019 recreational hunting season survey of game hunters were<sup>16</sup> used to estimate the numbers of active and inactive hunters in the population. Table A6-1 provides a comparison of the survey sample to the Victorian game hunter population.

**Table A6-1: Comparison of survey sample to the population**

CHARACTERISTIC	SURVEY SAMPLE (N=1,671)	POPULATION (N=53,716)
Proportion male	97%	97%
Proportion female	3%	3%
Proportion under 35 years old	22%	26%
Proportion between 35 and 55 years old	48%	40%
Proportion over 55 years old	30%	34%
Proportion active (Deer) <sup>a</sup>	75%	44%
Proportion active (Duck) <sup>a</sup>	39%	26%
Proportion active (Quail) <sup>a</sup>	18%	7%
Proportion club members	62%	29%

*Note: a licenced to hunt this animal group*

<sup>16</sup> Hunting surveys are undertaken yearly by the Game Management Authority.



## Scaling up

Of the 1,671 responses included in the analysis, 95 per cent had gone on at least one recreational hunting trip in the last twelve months (active). As described earlier, the survey sample was not random, therefore self-selection bias was expected to skew the results to over represent hunters who take more trips. The survey sample of active and inactive hunters was sufficient to weight individual responses for each animal group to match the population level of activity, gender and age distributions for that animal group. Assuming these characteristics are correlated with recreational hunting behaviour, this provides a better estimate of population level activity than simply weighting each response by the ratio of population size to sample size. The generalised regression method, described by Bethlehem and Keller (1987), was used to weight responses. Weighting was carried out using the GREGWT package in R, initially developed by the ABS to weight household surveys (ABS 2000), that has since been applied by the ABS to other industry and household surveys (ABS 2016, 2017a, b). The resulting average weight applied to the sample of active hunters was 32.1.

## GEOGRAPHY USED FOR THE ANALYSIS

The unit of geography used for the regional economic analysis was LGA. A composite region for Greater Melbourne was used that covered the metropolitan LGAs as detailed in Table A6-2.

**Table A6-2: Greater Melbourne region defined by LGA**

GREATER MELBOURNE REGION – LOCAL GOVERNMENT AREAS			
Banyule	Glen Eira	Maroondah	Port Phillip
Bayside	Greater Dandenong	Greater Melbourne	Stonnington
Boroondara	Hobsons Bay	Melton	Whitehorse
Brimbank	Hume	Monash	Whittlesea
Cardinia	Kingston	Moonee Valley	Wyndham
Casey	Knox	Moreland	Yarra
Darebin	Manningham	Mornington Peninsula	Yarra Ranges
Frankston	Maribyrnong	Nillumbik	

We estimated economic contribution for the metropolitan region, as well as the 20 non-metropolitan LGAs (out of the total of 48) that had the highest hunting expenditure from the survey.

Overall, these 20 LGAs and Greater Melbourne region accounted for 91 per cent of the total expenditure by Victorian game hunting licence holders in this survey.

**Table A6-3: High expenditure LGAs<sup>17</sup> selected for the economic contribution analysis**

LOCAL GOVERNMENT AREAS			
Alpine	Greater Bendigo	Mansfield	Wangaratta
Ballarat	Greater Geelong	Greater Melbourne	Wellington
Baw Baw	Greater Shepparton	Mitchell	Wodonga
Campaspe	Horsham	Murrindindi	
East Gippsland	Latrobe	Swan Hill	
Gannawarra	Macedon Ranges	Towong	

## FINAL DEMAND PROFILE

In economic modelling terms, expenditure by hunters is referred to as final demand. When the expenditure is disaggregated by industry sector (retail, restaurants, accommodation, etc.) and converted from 'purchasers' prices', into 'basic prices' it is referred to as a final demand profile.

The conversion of expenditure estimates from purchasers (i.e. what hunters pay) to basic prices (i.e. what producers, service providers and other businesses receive) was as follows.

Net taxes (taxes minus subsidies) and retail and transport margins were reallocated to make the data consistent with accounting conventions used in the Regional Industry Structure and Employment (RISE) model (see Section 0). Purchasers to basic price ratios were derived from ABS data (ABS 2013, Table 9). This process ensured that margins, such as retail and transport margins, were allocated to the appropriate sectors, taxes were properly identified and that regional imports were not included as part of the regional economic contribution estimation process.

The final adjustment to the base data was allocation of expenditure data in basic prices to the relevant input-output sectors (78 intermediate sectors, other value added or imports) in which the expenditure occurred, thus compiling a profile of sales to final demand. This process was undertaken for each animal group (deer (stalking and hound), duck, quail (stubble quail and non-indigenous game birds) and pest animals) and the results aggregated to form a single final demand profile by LGA.

## GROSS ECONOMIC CONTRIBUTION

### INTRODUCTION

The gross economic contribution measures the footprint of recreational hunting in the regional and state economies.

The estimates of economic contribution presented in this report are generated by an extension of the conventional input-output method known as the RISE model (Regional Industry Structure and Employment) developed by BDO EconSearch. These extensions have included the addition of population and unemployment "sectors", as well as capacity to analyse productivity and price change effects.

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<sup>17</sup> Includes Greater Melbourne region.

The magnitude of various expenditures and where they occur is fed into the RISE model by the final demand profile. Also needed is information on how the sectors receiving this expenditure share their expenditures among the various sectors from whom they buy, and so on, for the further expenditure rounds. The RISE model provides industry multipliers (in terms of employment and, gross regional product (GRP)), which are applied directly to expenditure estimates to formulate economic contribution estimates.

## THE RISE ECONOMIC MODEL

The RISE model of the state and regional economies, constructed by BDO EconSearch for this study, has the input-output (I-O) model as its core. I-O models are widely used to assess economic contribution, including employment and gross regional product, of various economic activities.

To estimate regional economic contribution, the RISE model requires information on the magnitude of various expenditures and where they occur, in this case, gathered from the survey. Also needed is information on how the sectors receiving this expenditure share their expenditures among the various sectors from whom they buy, and so on, for the further expenditure rounds.

Survey data were used to determine the direct expenditures only. For expenditure in subsequent rounds (expenditure by businesses and households that received money from hunters) a set of assumptions based on average inter-sector<sup>18</sup> expenditure were used. For example, if households in the regional economy spent 13 per cent of their income on food on average, it was assumed that, for instance, those working in accommodation establishments that serve hunters did likewise.

The RISE model provides industry multipliers (in terms of employment, gross regional product (GRP) and household income), which are applied directly to expenditure estimates to formulate economic contribution estimates. This approach makes simplifying assumptions about the operation of the economy but has the benefit of being relatively simple and transparent.

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<sup>18</sup> For a detailed account of the data used to develop the RISE models, see BDO EconSearch 2020.

# Appendix 7: Net economic contribution method

## INTRODUCTION

Without hunting, hunting expenditure would be reallocated among different economic activities. It is assumed that without hunting, money currently spent on hunting expenditure would be spent on other things, being either:

1. Other outdoor activities such as camping, fishing, target shooting
2. General discretionary household expenditure.

Expenditures made on recreational hunting trips include only a small amount of imports as much occurs at businesses in Australia selling Australian services (i.e. restaurants, accommodation, and vehicle repairs). The same is true of spending on other outdoor activities. In contrast, general discretionary household expenditure (e.g. clothes, footwear, home furnishings etc) includes a significant amount of spending that goes to imports.

Shifting expenditure from recreational hunting to discretionary household expenditure would increase the proportion of expenditure that goes to imports. For example, in the gross contribution case, an estimated 13 per cent of direct expenditures are made on imports, compared to about 39 per cent in the low substitutability case. This causes a reduction in economic activity in Victoria.

Questions were included in the survey to elicit the substitutability of recreational hunting and substitutability scores for each complete survey response were estimated. Using the substitutability scores, an expenditure profile was modelled where recreational hunting activities are replaced by other outdoor activities or general discretionary expenditure.

The 'without hunting' expenditure scenario was analysed with the same input-output model that was used for the gross economic contribution scenario. The difference between the results of the 'with hunting' and 'without hunting' scenarios represents the net economic contribution.

## ESTIMATING SUBSTITUTABILITY

Survey questions were used to model the substitutability of recreational hunting. Two methods were identified for estimating whether game licence holders would switch their hunting expenditure to other outdoor activities, or to general household discretionary expenditure. Each method is described below.

### Low substitutability

A proportion of trips for each hunter was considered substitutable based on a general substitutability score calculated as the average of an importance score and a choice modelling score. Regarding importance, more trips were considered substitutable if the hunter rated more alternative recreational activities as equally or more important than recreational hunting. Additional weighting was applied if activities were identified as more important. An average of 1.1 out of 14 activities were identified as equally important as recreational hunting and an additional 0.4 as more important. Regarding choice modelling, more trips were considered substitutable if the hunter identified more activities that they would prefer to do than recreational hunting (on a nice weekend at the same cost) or that they would have trouble choosing between compared to hunting. Additional weighting was applied for activities preferred over recreational hunting.

The lower bound is likely to be unrealistically low for many hunters, but accurate for some. As there is a known difference between a person's statements about their preferences or intended behaviour and actual choices, documented in multiple studies, it is likely that while recreational hunting is a preferred activity, other activities can provide some benefits that substitute for part of the benefits achieved from hunting, even if they do not provide the same level of benefit. Thus, the assumption of the lower bound that a preference for recreational hunting over another activity means the other activity has little to no benefit or value may be unrealistic. The reality is that the non-preferred activity would in many cases have some level of substitutability with hunting, despite not providing the same level or type of benefits as hunting.

### **High substitutability**

All trips for a hunter were considered substitutable if they rated at least one other outdoor activity equally or more important than recreational hunting, or if they would have trouble choosing between hunting and that activity on a nice weekend at the same cost. Under this assumption, recreational hunting is considered substitutable for another outdoor activity for 90 per cent of recreational hunters, these hunters account for 81 per cent of trips.

The upper bound makes the assumption that having any other activity a person likes to do as much as recreational hunting indicates an ability to substitute that activity for hunting. In practice, this may be unrealistic: it is likely that recreational hunting and other activities provide differing benefits that do not increase in a linear manner. In other words, adding more of another activity to compensate for a lack of hunting will not necessarily add the same level of benefits as that activity had previously – someone who already camps five times a year, and adds another five camping trips instead of five recreational hunting trips, may not experience as much benefit from the second five camping trips as the first five. Thus, the upper bound assumption may be unrealistically high for many hunters, but accurate for some, depending on how substitutable the other activities are for recreational hunting.

## **EXPENDITURE PROFILE WITHOUT HUNTING**

An expenditure profile was modelled where game licence holders do not undertake hunting. The proportion of trips considered substitutable for similar activities was assumed to still take place, as well as expenditure associated with those trips (excluding expenditure on recreational hunting-specific items). Off-trip expenditure was assumed to be in proportion to trip expenditure.

The balance of expenditure, including expenditure on hunting-specific items, was assumed to be spent in on other discretionary items based on the average household in Victoria. This was based on the ABS definition of discretionary household expenditure: everything other than housing, food, fuel and power, medical and health care, and transport. Data used was detailed household expenditure profiles from the 2015/16 Household Expenditure Survey (ABS 2017c).

It is estimated that in the low substitutability scenario, of the \$351 million of recreational hunting expenditure, \$16 million of the expenditure would be reallocated to substitute outdoor activities, such as camping, fishing, bushwalking and \$335 million would be reallocated to general discretionary expenditure.

In the high substitutability scenario, \$229 million of the expenditure would be reallocated to substitute outdoor activities, such as camping, fishing, bushwalking and \$123 million would be reallocated to general discretionary household expenditure (Table A7-1). There is no net change in total expenditure by households (\$351M) under either assumption.

**Table A7-1: Estimated change in expenditure as a result of a cessation of recreational hunting, Victoria, 2019**

INDICATOR	HUNTING	SUBSTITUTE OUTDOOR ACTIVITIES	GENERAL HOUSEHOLD DISCRETIONARY EXPENDITURE
Low substitutability	-\$351	\$16	\$335
High substitutability	-\$351	\$229	\$123

## CALCULATION OF THE NET CONTRIBUTION

The 'without hunting' expenditure scenario was analysed with the same input-output model that was used for the gross economic contribution scenario. The difference between the results of the 'with hunting' and 'without hunting' scenarios represents the net economic contribution.



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2.0	Draft report	24/04/2020	M. Ludeman H. Bailey J. McRobert W. Henderson M. Magnusson	J. McRobert	M. Sandford	J. McRobert	C. Goldsworthy A. Cole
3.0	Draft report (complete)	08/05/2020	M. Ludeman H. Bailey J. McRobert W. Henderson A. Magnusson M. Magnusson	J. McRobert	J. Belz	J. McRobert	C. Goldsworthy A. Cole
4.0	Final report	03/06/2020	M. Ludeman H. Bailey J. McRobert W. Henderson	J. McRobert	J. Belz	J. McRobert	C. Goldsworthy A. Cole
4.1	Final report	12/06/2020	W. Henderson	-	-	-	A. Cole
4.2	Final report (minor edits)	25/6/2020	W. Henderson	-	-	-	A. Cole