RMCG

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Economic and social impacts of recreational hunting and shooting

Final report

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Executive Summary

The Australian economy is $335m and 3,300 jobs larger as a result of the contribution of recreational hunting and sports shooting.

There are 640,000 recreational hunters and shooters in Australia. This includes those who hunt game and pest animals with firearms, bows or knives, and those who participate in target or sports shooting with firearms. It does not include farmers who shoot pest animals on their properties.

Hunters and shooters generate economic activity through the purchase of goods and services while they are on a hunting trip, such as fuel, groceries, ammunition, meals, and accommodation, as well the purchase of equipment such as firearms, bows and ammunition. The gross contribution to GDP, or the economic footprint, from recreational hunting and sport shooting activity in Australia in 2018 was estimated to be $2.4 billion, comprising $0.8 billion directly and $1.6 billion as a result of flow-on economic activity.

The gross contribution does not tell us the benefits of hunting and shooting for the Australian economy, or conversely, the impact on the economy of the (hypothetical) situation where hunting and shooting were prohibited. If hunting and shooting were prohibited, hunters and shooters would redirect their expenditure to other goods and services, and in many cases to similar outdoor activities such as camping, fishing, four-wheel driving and so on. The 'net' contribution to the economy, taking into account the substitution of expenditure to other activities is estimated to be $335m, or 0.02 per cent of Australia's GDP.

The states where the highest amount of economic activity occurred (on and off trip) were New South Wales and Victoria. These states have relatively large populations of hunters and shooters and hunters and shooters from other states to travel there to hunt and shoot.

Hunting and shooting provides an opportunity for participants to engage in physical activity and hunters and shooters are more likely to be active than the general population. It also provides pathways to higher well-being for participants through nature connection, self-efficacy, social networks, physical activity and nutrition; again hunters and shooters have higher levels of well-being than the general population. However, it is not clear whether this is the result of correlation or causation: whether hunting and shooting is responsible for the higher levels of physical activity and well-being, or some other reason.

The data for this study was collected through an online survey, completed by 16,576 hunters and shooters. Survey respondents were self-selecting and biased towards active hunters and shooters. The best estimate of the level of activity in the population is from data collected by the Australian Bureau of Statistics (9% across the entire population and the Victorian Game Management Authority (63% across Victorian game hunters). The level of activity is crucial to the estimates of economic impact and the major source of uncertainty in this study. Further research on this topic should focus on establishing a reliable and unbiased estimate of the activity levels of hunters and shooters.

1 Introduction

1.1 THIS REPORT

Recreational hunting and shooting support a range of businesses and jobs across Australia from the sale of equipment, and trip / event related purchases such as fuel, accommodation, food and drink. In addition, these activities provide health and wellbeing benefits to participants.

It is estimated there are 642,000 recreational hunters and shooters across Australia. This report summarises the results of the research into the economic and social benefits of recreational hunting and shooting. The study was commissioned by the Commonwealth Department of Health and was undertaken by RMCG, EconSearch, JS Consulting and Bartley Consulting.

The objectives of this study were to:

- Estimate the gross economic contribution (i.e. the economic 'footprint') of recreational hunting and sport shooting in Australia
- Estimate the net economic contribution, of recreational hunting and sport shooting in Australia. The net economic contribution is the non-substitutable economic activity of recreational hunting and sport shooting that would be lost to the economy if (hypothetically) recreational hunting and sports shooting ceased in Australia
- Explore the impact of recreational hunting and sport shooting activity on health and wellbeing of hunters and sport shooters.

1.2 SCOPE

This report considers the economic impact of expenditure by recreational hunters and sport shooters and the associated social benefits if:

- The expenditure was associated with recreational hunting (rather than primary production related or professional pest animal control) and sport shooting
- The hunting and sport shooting occurred in Australia
- The hunting and sport shooting occurred between March 2018 and March 2019.

1.3 ACKNOWLEDGEMENTS

RMCG, BDO EconSearch, JS Consulting and Bartley Consulting gratefully acknowledge the assistance provided by:

- Staff from state government authorities for sharing their information, providing feedback and facilitating the distribution of the survey, including the: Victorian Game Management Authority; New South Wales Department of Primary Industries; Tasmanian Department of Primary Industries, Parks, Water and Environment, Game Services; South Australian Department of Environment and Water; and Northern Territory Fisheries, Department of Primary Industries and Resources.
- Sporting Shooters' Association Australia, Field and Game Australia, Australian Deer Association and the Australian Bow Hunters Association, for facilitating the distribution of the survey to their members and providing background information about the nature of hunting and shooting
- State police authorities for providing data
- Survey participants.

2 Research method

2.1 INTRODUCTION

Primary data was collected through a survey to gain a detailed profile of hunters' and shooters' expenditure and supplementary information on health and wellbeing, physical exercise and social interactions of hunters and shooters. This section describes the method used to collect this data.

2.2 SURVEY COMPLETION METHOD

All responses were obtained using an online survey. Online surveys are an efficient way of reaching a large sample and in some cases the data obtained can be more accurate as respondents have more time to consider their responses and provide more honest responses in the absence of an interviewer.

The survey was open to respondents for just over three weeks, from 27 February 2019 to 22 March 2019.

2.3 PROMOTIONAL METHODS

Hunters' and shooters' contact details were not available to the project team; thus the survey was promoted through the following methods:

- Websites or social media accounts of hunting and shooting organisations or state government departments
- E-newsletters sent by hunting and shooting organisations or state government departments
- Print material distributed by hunting organisations.

2.4 NUMBER OF RESPONDENTS

The number of respondents was set with the goal of attaining robust data for each state. A target of 180-400 respondents per state was set prior to survey implementation. The number of responses in each state exceeded the target, ranging from 236 in the Northern Territory to 4.645 in Queensland. Australia-wide, 16,576 respondents provided usable responses to the survey.

The number of respondents by state is shown in Table 2-1.

Table 2-1: Number of responses by state

STATE	NUMBER OF RESPONSES
Australian Capital Territory	290
New South Wales	3,614
Northern Territory	236
Queensland	4,645
South Australia	1,113
Tasmania	528
Victoria	4,112
Western Australia	2,038
Total	16,576

2.5 SURVEY DESIGN

To inform the design of the survey, the project team drew on the knowledge of relevant state authorities, hunting and shooting organisations, and other surveys on hunting conducted recently:

- Economic impact of hunting in Victoria[1]
- Economic impact of recreational hunting in New South Wales[2].

To inform the survey design and questions, seven semi-structured interviews were conducted over the phone to ensure the questions would be appropriate and terms were defined correctly to ensure accurate data collection.

The online survey was then tested by five people from hunting and shooting organisations and state government departments. Feedback was then incorporated into the final survey.

The survey instrument is provided in Appendix A.

[1] RMCG et al, 2014, Economic impact of hunting in Victoria
[2] RMCG et al, 2017, Economic impact of recreational hunting in New South Wales

3 Recreational hunting and shooting in Australia

3.1 INTRODUCTION

Recreational hunting and shooting activities are permitted to varying extents across Australia. The purpose of this section is to provide background on hunting and shooting including the associated licencing requirements, the different types of hunting and shooting and the major hunting and shooting organisations around Australia.

3.2 LICENSING REQUIREMENTS

Hunters and shooters must be licenced in Australia to own and use a firearm. Licensing requirements are stipulated in the *Firearms Act 1996.* To apply for a firearm licence, you must provide a "genuine reason". Recreational hunting and shooting are allowed in all states, while the wording of the genuine reasons vary slightly across states. Those applicable to recreational hunting and shooting are listed in Table 3-1.

Table 3-1: Genuine reasons (relevant to recreational hunting and shooting) for owning a firearm by state/territory[3]

STATE / TERRITORY	GENUINE REASON FOR OWNING A FIREARM
Australian Capital Territory	▪ Sport / target shooting ▪ Recreational hunting / vermin control on rural land
New South Wales	▪ Sport / target shooting ▪ Recreational hunting / vermin control
Northern Territory	▪ Sports shooting ▪ Recreational shooting and hunting
Queensland	▪ Sports or target shooting ▪ Recreational shooting
South Australia	▪ Shooting club ▪ Target shooting ▪ Hunting
Tasmania	▪ Sport or target shooting ▪ Recreational hunting / vermin control
Victoria	▪ Sport / target shooting ▪ Hunting
Western Australia	▪ Recreational hunting or shooting

[3] Sources: various state firearms and weapons legislation

3.3 RECREATIONAL HUNTING

3.3.1 TARGET ANIMAL GROUPS

Animals permitted to be hunted vary between states. In this report, animals permitted for hunting have been classified as: non-native game (e.g. deer), native game (e.g. ducks) and pest animals (e.g. foxes, rabbits, pigs, and so on). Table 3-2 indicates whether these animals can or cannot be hunted in each state or territory.

Declared pest animals can be hunted at any time in every state and territory. Native game animals can be hunted in all states bar the Australian Capital Territory, Queensland and Western Australia, while non-native game animals can be hunted in New South Wales, Northern Territory, Tasmania and Victoria. The hunting of game animals is permitted only in declared open seasons, the dates of which vary from state to state.

Table 3-2: Types of animals permitted for hunting by state[4]

STATE / TERRITORY	NON – NATIVE GAME	NATIVE GAME	DECLARED PEST ANIMALS
Australian Capital Territory	×	×	✓
New South Wales	✓	✓	✓
Northern Territory	✓	✓	✓
Queensland	×	×	✓
South Australia	×	✓	✓
Tasmania	✓	✓	✓
Victoria	✓	✓	✓
Western Australia	×	×	✓

3.3.2 HUNTING METHODS

There are a variety of hunting methods used across Australia. The most common methods include:

- Firearms (rifles and shotguns)
- Bow
- Dogs only.

Firearms can be used for hunting in all states, with the rules and regulations about the types of firearms and ammunition that can used varying between states. Long, recurve and compound bows are permitted in all states except Tasmania. Crossbows are only permitted in Victoria and South Australia for participation in a recognised sport or recreation. Dogs can be used while hunting to retrieve / point / flush game or pest species in all states, however the specific animals that can be hunted vary, for instance dogs can be used to hunt deer in Victoria, but not in NSW. Dogs can be used to stalk animals or retrieve shot birds in all states. Table 3-3 shows which hunting methods are permitted in each.

[4] Source: Sporting Shooters' Association of Australia, 2018

Table 3-3: Hunting methods permitted in each state[5]

METHOD	ACT	NSW[6]	NT	QLD	SA	TAS	VIC[7]	WA
Firearms	✓	✓	✓	✓	✓	✓	✓	✓
Bows	✓	✓	✓	✓	✓	×	✓	✓
Cross bows	×	×	×	✓	×	×	✓	×
Dogs / hounds	✓	✓	✓	✓	✓	✓	✓	✓

3.3.3 HUNTING PERMITS AND LICENCES

AUSTRALIAN CAPITAL TERRITORY

The Australian Capital Territory only permits the hunting of pest animals on private property. Currently there are no game species listed and no pest animal hunting is permitted on public land. Hunting pest animals on private property requires a firearms licence (if using a firearm to hunt) and no hunting permits are required. Hunting with a crossbow is illegal in the ACT.

NEW SOUTH WALES

In New South Wales there are two types of recreational game licences: a General Class Licence and a Restricted Class Licence.

A General Class Licence allows the holder to hunt game animals on private land only. There are five categories of General Class Licence holders:

- Standard (G-Licence)
- Hunting Guide (G-Guide)
- Professional Hunter (G-Professional)
- Commercial Hunter (G-Commercial)
- Visitor's (G-Visitors)

General class professional hunters and commercial hunters are not included in the scope for this study.

A Restricted Class Licence allows the holder to hunt game animals on private land, as well as game and pest animals on public land. There are four categories of Restricted Class Licence holders:

- Standard (R-Licence)
- Hunting guide (R-Guide)
- Commercial Hunter (R-Commercial)
- Visitor's (R-Visitors).

Restricted class commercial hunters are not included in the scope of this study.

Crossbow hunting is illegal in New South Wales.

[5] Source: Sporting Shooters Association of Australia 2018
[6] Department of Primary Industries, 2017
[7] Game Management Authority, 2012

NORTHERN TERRITORY

In the Northern Territory, no permits are required for hunting declared pest animals on private property providing the hunter is licensed under the *Firearms Act 1996* and has the landholder's permission. To hunt on Aboriginal-owned lands, a permit is required from the respective Land Council and endorsement from the Traditional Owner is required (Sporting Shooters Association of Australia 2018).

Game hunting is permitted on some public land during a declared open season. There are two types of permits:

- Pig hunting permit for reserves
- Waterfowl hunting permit.

Pig hunting is limited to two dedicated reserves: Shoal Bay reserve and Harrison Dam reserve. The use of crossbows in both reserves is prohibited. The types of firearms and hunting bows permitted vary in each reserve and whether hunting is taking place during or outside of the waterfowl season (Northern Territory Government 2018).

QUEENSLAND

There are no declared game species in Queensland. Hunting for recreation is limited to pest animals on private property. No permits are required for pest animal hunting, however if using a firearm, the hunter must be licensed as required under the *Firearms Act 1996* (Sporting Shooter's Association of Australia 2018). If using a crossbow for recreational shooting, you must have a *Miscellaneous Licence* for a Category M weapon as per the *Weapons Categories Regulation 1997* (Queensland Police, 2019).

Macropods can be harvested for recreation in Queensland; the hunter must hold a Macropod Harvesting Licence. Only a very small number of these licences are held for recreation purposes. Under the *Nature Conservation (Macropod) Plan 2017,* which commenced in September 2017, commercial and recreational hunters are both licenced under the *Macropod Harvesting Licence (Queensland Government, 2017)*.

SOUTH AUSTRALIA

A hunting permit is generally required for hunting in South Australia. The *Basic Hunting Permit* enables a person to hunt all species of introduced animals. Noting that a landholder does not require a basic hunting permit to hunt introduced animals on their own land. To hunt duck and quail, an Open Season Permit is required. Currently there are Open Season Permits available for those hunting duck or quail species. Any person applying for a Duck Open Season Permit must pass a Waterfowl Identification Test (Sporting Shooters Association of Australia 2018). Written permission from the landholder is required to hunt on private land.

Hunting with crossbows is illegal in South Australia.

TASMANIA

Any person wanting to hunt animals for recreation requires a game licence. Hunting is limited to firearms; bow hunting is not permitted. Game licence holders must also hold a current firearms licence. Separate permits (additional to the game licence) are required for hunting the following game species:

- Deer (Fallow)
- Wild duck
- Short-tailed shearwater (Muttonbird)
- Bennett's and Rufous (Tasmanian pademelon) wallaby
- Brown quail
- Ringneck pheasant.

To hunt ducks, those applying for a permit must pass a Waterfowl Identification Test.

Hunting with hounds / dogs is permitted hunting. However, dogs cannot be used to intentionally catch, kill or injure another animal. They may only be used for flushing out quarry from their bush cover and locate or retrieve shot quarry.

Declared pest animals (rabbits and hares) can be hunted at any time on private land (with the permission of the landholder), state forest and crown land (Department of Primary Industries, Parks, Water and Environment, 2018).

Crossbow hunting in Tasmania is illegal.

VICTORIA

In Victoria, a Game Licence is issued under Section 22A of the *Wildlife Act 1975* and enables the "hunting, taking or destroying of game" (Game Management Authority 2017). To hunt with a firearm you must have a current firearms licence issued under the *Firearms Act 1996.* You do not require a permit for hunting declared pest animals.

There are four main entitlements that can be issued with a Game Licence that are subject to the conditions set out in the Wildlife (Game) Regulations 2012:

- Deer (Stalking)
- Deer (Stalking and Hounds)
- Game birds, not including duck
- Game birds, including duck (Game Management Authority 2017).

A Game Licence can be issued for a single game category, such as deer, or for multiple categories such as deer and game birds not including duck.

If a hunter applied for a *Game birds, including duck* entitlement, they must pass a Waterfowl ID Test before the Licence will be granted. Similarly, if a hunter wants to hunt with hounds, they must pass the Hound Hunting Test.

Game licences have a common expiry date of 31 December and are issued for the following terms:

- Short term (up to 18 months)
- Long term (up to 42 months).

To hunt with crossbows in Victoria, you must have permission under the *Control of Weapons Act 1990.*

3.4 TARGET SHOOTING

Target shooting involves using firearms to shoot targets. The two main types of targets are stationary targets at a set distance and moving targets. These types of targets vary in shape, size and material depending on the shooting discipline. Target shooting is permitted in all states across Australia at licensed shooting clubs. Shooting clubs are often run by various hunting and shooting associations. These associations are further described in Section 3.5.

To participate in recreational shooting with a firearm, a person must be licensed under the *Firearms Act 1996.*

To hold a firearms licence, a person must declare a genuine reason for owning a firearm, there are a number of specific genuine reasons permitted under the firearms legislation for each state. Those that apply to recreational hunting and shooting are described in Section 3.2.

Target shooting with a crossbow is legal in all states, however licences are required in all states except Northern Territory.

3.5 HUNTING AND SHOOTING ORGANISATIONS

There are four main national shooting and hunting bodies across Australia:

- Sporting Shooters Association Australia (SSAA)
- Field and Game Australia (F&G)
- Australia Bow Hunters Association (ABHA)
- Australian Deer Association (ADA)
  - Acknowledging that there are multiple other hunting and shooting organisations throughout Australia.

Sporting Shooters Association Australia

SSAA is a national organisation with branches in every state and territory. They manage more than 18 shooting competitions (also known as disciplines) at local, state, national and international levels. SSAA supports target shooting members and promotes ethical hunting activities of members and sustainable use of wildlife. SSAA works closely with the international and domestic firearms industry and has a representative in the Australian federal parliament. SSAA has more than 440 clubs around the Australia.

Field and Game Australia

Field and Game is a national voluntary member organisation for conservation, hunting and clay target sports. The organisation is focused on: the preservation of wetland habitats, pest animal hunting, hunter-assisted waterfowl research, simulated field clay target shooting and advocacy and engagement with government. There are 69 branches across Australia with most branches located in Victoria (51). Branches hold a range of shooting / hunting events each year.

Australia Bow Hunting Association

The ABHA is a national organisation with branches in each state and territory. Each branch holds and sponsors competitions as well as improving bow hunting policies within their branch. The organisation also has a trading arm *Artemis Productions* which publishes a bowhunting / archery magazine *The Australian Bowhunter.* This is distributed to its members and to the wider public through newsagents. ABHA relies on its clubs for organised bow hunting and archery. There are around 100 affiliated clubs throughout Australia, most of which hold events.

Australian Deer Association

ADA is a national organisation which advocates for wild deer herds and deer hunting. Its primary objective is to raise the status of deer in Australia and encourage appropriate management of free ranging deer populations in Australia. The ADA operates on a membership basis and supports safe, responsible and ethical deer hunting.

4 Demographic profile

4.1 INTRODUCTION

The demographic characteristics of recreational hunters and shooters are described below. These results are based on the 16,576 responses that reported expenditure and demographic data, as described in Section 2.

4.2 AGE

The age profile of recreational hunters and shooters across Australia is provided in Figure 4-1. All age groups were well represented. Hunters and shooters are most likely to be aged between 30 and 74.

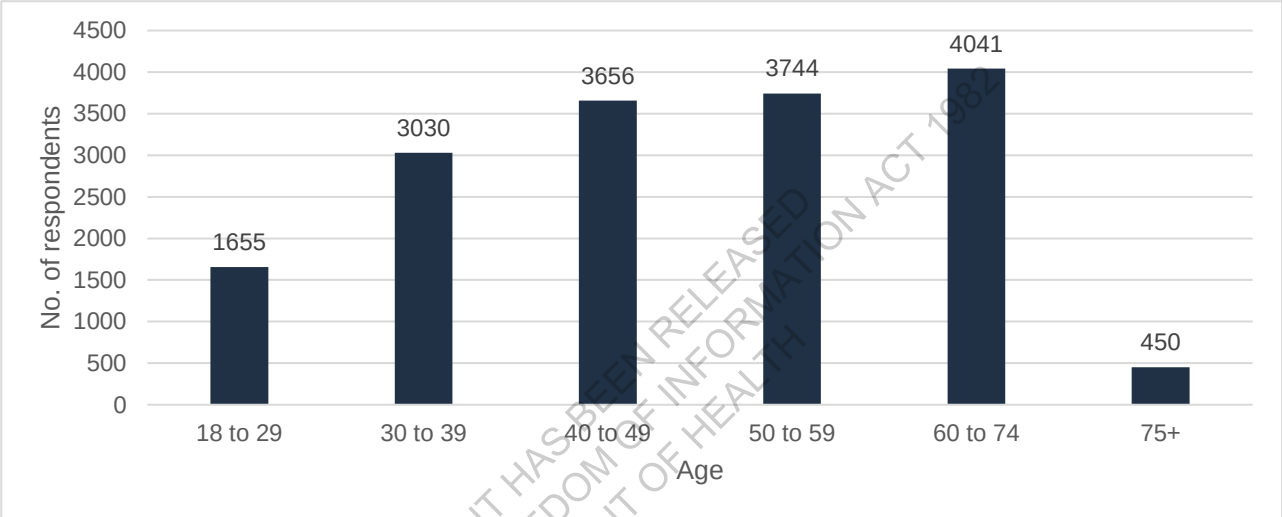

Figure 4-1: Age of respondents across Australia

4.3 GENDER

Hunters are mostly male, as shown in Figure 4-2. Overall 15,858 (96%) of respondents were men, 717 (4%) were women and one person reported “other”.

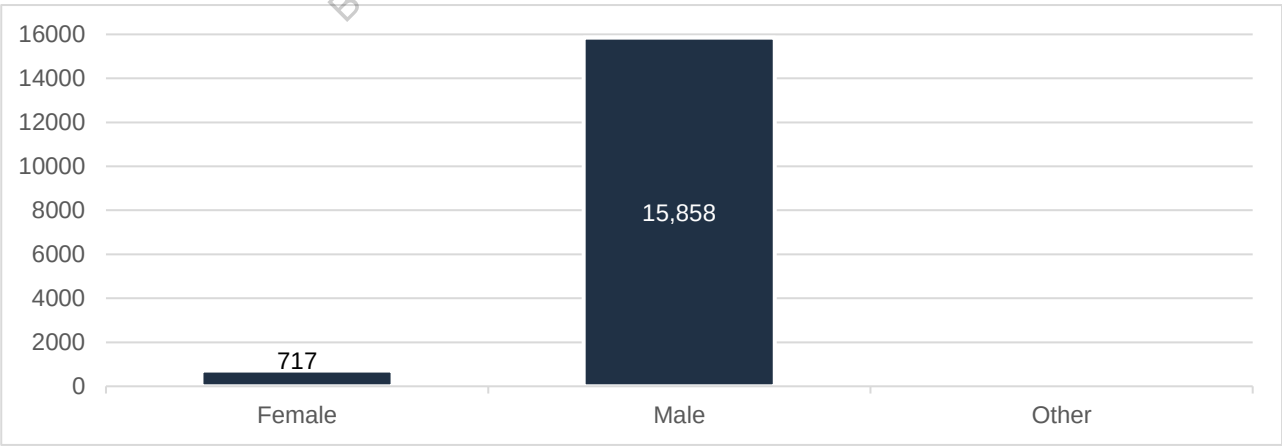

Figure 4-2: Gender of respondents across Australia

4.4 REGIONAL/METRO

Generally speaking, there was an even balance between living in regional and metropolitan areas, as shown in Figure 4-3. However, respondents living in the NT, WA and the ACT were more likely to be from metropolitan areas whereas respondents from Tasmania were more likely to be regional.

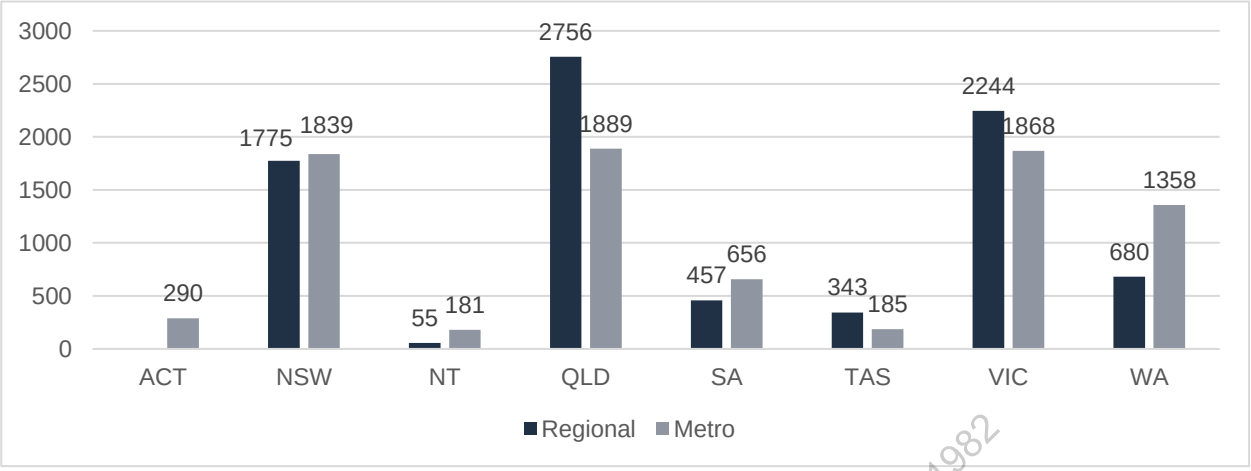

Figure 4-3: Number of respondents in regional or metropolitan areas of each state or territory

5 Hunting and sport shooting expenditure

5.1 INTRODUCTION

The first step in calculating economic contribution was to develop expenditure estimates for the hunting and sport shooting population. Expenditure is a measure of how much hunters and sport shooters spend on hunting and sport shooting trips and on equipment at other times of the year. As some of the goods and services that hunters and sport shooters purchase are imported, or have an imported component, it was necessary to remove this component of the expenditure to determine the local economic contribution.

This section describes how the survey results were used to calculate expenditure for the hunting and sport shooting population.

5.2 ESTIMATION OF EXPENDITURE

The first step in estimating economic impact was to estimate hunting expenditure. To estimate total annual expenditure by state 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 and shooter
3. Extrapolation of expenditure from the survey sample to the population.

These steps are explained more fully below.

5.2.1 STEP 1: DATA ADJUSTMENT

The following adjustments were made to the base data:

- Data cleaning
  - 21,793 survey responses were collected
  - 3,495 responses were removed as they included no, or incomplete, expenditure data
  - 1,723 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
  - 16,576 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 B). 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).

5.2.2 STEP 2: ESTIMATION OF EXPENDITURE BY EACH RESPONDENT

The purpose of this step was to allocate expenditure by State and Territory.

For on-trip expenditure, survey data were collected about respondents' last trip expenditures and where those expenditures occurred. Data were also collected on the total number of hunting and shooting trips taken in each state in the last twelve months and the proportion of these trips that were primarily for hunting or shooting.

Expenditure data from respondents' last trips were extrapolated to all the trips respondents took in Australia in the last twelve months. Expenditures were excluded where they occurred outside Australia and for the proportion of trips not primarily for hunting or shooting.

For off-trip expenditure, survey data were collected about respondents' expenditures and where they occurred.

Expenditure on items used for purposes other than hunting and shooting was adjusted by the proportion of use on hunting or shooting, as indicated by respondents for each item. Expenditures were excluded where they occurred outside Australia.

5.2.3 STEP 3: SCALING EXPENDITURE FROM THE SAMPLE TO THE POPULATION

Population

The population of recreational hunters and shooters comprise the following:

- Firearm licence holders registered in each state who hold licences that state recreational hunting and/or sport shooting as genuine reasons for holding the licence
- Recreational hunters who only hunt without a gun, i.e. with a compound bow or hunt pigs with dogs, and therefore do not have a recreational firearm licence.

Data on numbers of gun licence holders by genuine reason (i.e. recreational hunting and sport shooting) were sought from the police authorities in each state and territory. No current data were provided for Victoria and Western Australia and less recent published estimates were used (RMCG et al. 2014 [Victoria] and Legislative Council of Western Australia 2015). For all states except NSW, the non-gun-using recreational hunting populations were assumed to be 8 per cent of the recreational hunting populations who do use firearms, based on a national survey of recreational hunters in 2012 (Finch et al. 2014). For NSW, more recently published estimates were available (RMCG et al. 2017) and these were used.

The total population of hunters is estimated to be 642,364. The largest populations are in New South Wales (241,608) and Victoria (149,120).

The population estimates for each state and territory used in the study are provided in Table 5-1.

Table 5-1: Recreational hunting and sport shooting population estimates[8]

JURISDICTION	FIREARM HUNTING[9]	SPORT SHOOTING ONLY	FIREARM SUBTOTAL	NON-FIREARM HUNTING ONLY	GRAND TOTAL
ACT	4,945	263	5,208	417	5,625
NSW	191,431	10,177	201,608	40,000	241,608
NT	13,692	600	14,292	1,143	15,435
QLD	77,652	4,128	81,780	6,542	88,322
SA	56,264	2,991	59,255	4,740	63,995
TAS	32,789	1,743	34,532	2,763	37,295
VIC	131,104	6,970	138,074	11,046	149,120
WA	36,015	1,915	37,930	3,034	40,964
Total	543,892	28,787	572,679	69,685	642,364

The 2013 estimates of recreational hunting and sport shooting gun licence holders by age and gender were available for NSW (RMCG et al. 2017) and these data were combined with the 2016 census population estimates in each state (ABS 2017a) to impute the age and gender distribution of the hunting and sport shooting population in each state.

The populations were further split into active (i.e. have undertaken hunting or sport shooting trips in the last twelve months) and non-active (i.e. have not undertaken hunting or sport shooting trips in the last twelve months). This is an important characteristic, as active hunters and shooters expenditure is around eight times higher than non-active.

As the survey sample was not random, self-selection bias was expected to skew the results to over represent avid (active) hunters. A review of the literature identified two suitable studies that established expected participation rates (i.e. went hunting or sport shooting in the last 12 months) from random samples. The first study estimated the participation rate of recreational hunters with Victorian game hunting licences at 63 per cent (Game Victoria 2011). The second study, conducted by the Australian Bureau of Statistics, estimated the participation in shooting sports[10] as part of a multipurpose household survey (ABS 2015). The total number of persons who had actively participated in recreational hunting and shooting in 2013/14 was estimated at 56,600 persons (equivalent of a 9 per cent participation rate of the recreational hunting and shooting population). From these two studies, a weighted average participation rate was calculated (16 per cent), with the 63 per cent estimate applying to the game hunting licenced sub-population (estimated at 85,700 persons) and the 9 per cent estimate applying to the remaining non game hunting licenced sub-population (estimated at 556,600 persons).

The estimate of the proportion of active hunters (63 per cent) reported in Game Victoria's (2011) annual mail survey of hunters was used to estimate the numbers of active and inactive hunters and sport shooters in the population.

[8] Firearm hunting includes firearm hunters who also hunt using non-firearm methods and/or also sport shoot.
[9] Sources: State and Territory firearm registries, RMCG et al. 2014, RMCG et al. 2017, Legislative Council of Western Australia 2015, Finch et al. 2014.
[10] 'Shooting sports' are: hunting (with gun), bird shooting, clay shooting, crossbow shooting, duck shooting, paintball, pistol shooting, rifle shooting, running target shooting, shotgun shooting, skirmish, target shooting and trap shooting.

Scaling-up

Of the 16,576 responses included in the analysis, 99 per cent had gone on at least one hunting or shooting trip in the last twelve months (active). As described earlier, the survey sample was not random, self-selection bias was expected to skew the results to over represent avid (active) hunters. The survey sample of active hunters was sufficient to weight individual responses for each state to match the active population activity, gender and age distributions for that state. Assuming these characteristics are correlated with hunting and shooting 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, 2017b, 2017c). The resulting average weight applied to the sample of active hunters and shooters was 24.

Since only 1 per cent (n=231) of survey responses were from inactive hunters and shooters, individual responses could not be weighted up to the population for each state while maintaining a sufficient sample size. However, the sample size was sufficient to compare the expenditure behaviour of this group to the active group nationally. It was found that around 70 per cent of inactive hunters and shooters make relevant expenditures and that they spend around 42 per cent as much as active hunters and shooters on average (the percentage varies by item). These national factors and the assumption that 84 per cent of the total population are inactive (i.e. 16 per cent assumed to be active – see above) were applied to the estimated population level expenditure on off-trip items by active hunters and shooters to estimate the expenditure by inactive hunters.

5.3 FINAL DEMAND PROFILE

In economic modelling terms, expenditure by hunters and sports shooters 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 and sport shooters pay) to basic prices (i.e. what producers, service providers and other businesses receive) was as follows.

Net taxes (taxes minus subsidies) and marketing and transport margins were reallocated to make the data consistent with accounting conventions used in the multi-region Regional Industry Structure and Employment (RISE) model (see Section 6.1). 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 imports to Australia were not included as part of the 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 state and the results aggregated to form a single final demand profile for Australia by state.

5.4 EXPENDITURE RESULTS

Recreational hunting and sport shooting gross expenditure in 2018 was estimated to be around $1.9 billion in Australia. Table 5-2 shows expenditure disaggregated by where it occurred. The states where the highest amount of expenditure occurred were New South Wales ($650 million) and Victoria ($512 million), the two states combined accounted for 60 per cent of total expenditure. This was due to the relatively large populations of hunters and shooters in these two states and the tendency for hunters and shooters in other states to make expenditures there.

Table 5-2: Gross expenditure results, Australia, 2018 ($m)

LOCATION	ON-TRIP	OFF-TRIP	TOTAL
New South Wales	237	413	650
Victoria	192	320	512
Queensland	106	174	281
South Australia	59	110	169
Western Australia	38	85	124
Tasmania	37	60	97
Northern Territory	31	37	68
Australian Capital Territory	20	11	31
Total (Australia)	721	1,211	1,932

On-trip expenditures accounted for 37 per cent of total expenditures associated with hunting and sports shooting (Table 5-3). Around one-quarter of on-trip expenditure was made on fuel and one-fifth on groceries. The other most significant on-trip expenditure items were ammunition, takeaways and restaurant meals and accommodation. Off-trip expenditures accounted for the remaining 63 per cent of the total, half of which was on firearms, bows, other firearm equipment and ammunition. The other most significant off-trip expenditures were on vehicles/motorbikes/boats (purchased with hunting in mind) and other equipment to support hunting/shooting activities.

Table 5-3: Expenditure by category

CATEGORY	EXPENDITURE ($M)	PROPORTION OF TOTAL (%)
Fuel	173	9%
Groceries (including dog food), drinks and alcohol for self-catering/consumption at your accommodation	127	7%
Ammunition	76	4%
Takeaways and restaurant meals	75	4%
Hunting equipment (e.g. decoys, clothing)	60	3%
Accommodation	86	4%
Fees to landowners	32	2%
Vehicle/motorbike/boat repairs	45	2%
Other items	47	2%
Sub-total (on-trip)	**721**	**37%**
Firearms, bows, other firearm equipment and ammunition	664	34%
Hunting/target shooting club memberships	107	6%
Licenses/permits (e.g. firearm licences, game hunting licences/permits, etc.)	92	5%
Training to support your hunting/target shooting activities (e.g. target practice)	80	4%

CATEGORY	EXPENDITURE ($M)	PROPORTION OF TOTAL (%)
Vehicles/motorbikes/boats (purchased with hunting in mind)	91	5%
Vehicle maintenance	50	3%
Other equipment to support your hunting/target shooting activities (e.g. vehicle equipment/accessories, safety equipment, camping equipment, clothing, knives, binoculars, etc.)	104	5%
Other items	23	1%
Sub-total (off-trip)	1,211	63%
Total (on-trip + off-trip)	1,932	100%

More detailed expenditure results are provided in Appendix B.

6 Gross economic contribution of hunting and sport shooting

6.1 GENERAL APPROACH

This section is concerned with measuring the footprint of recreational hunting and sport shooting on the national 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 and inclusion of multiple regions.

6.2 THE RISE ECONOMIC IMPACT MODEL

The multi-region RISE model of the Australian and state economies, constructed by BDO EconSearch for this study, has the input-output (I-O) model as its core. The model includes one region for each state and territory in Australia and captures the interstate trade effects between them. I-O models are widely used to assess the economic contribution or impact, including employment and gross domestic product, of various economic activities and policies.

To estimate regional economic impacts, 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 a set of assumptions based on average inter-sector11 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 and sport shooters did likewise.

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

6.3 ECONOMIC CONCEPTS USED

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

[11] For a detailed account of the data used to develop the RISE models, see EconSearch 2017.

Gross state product (GSP): GSP is a measure of the contribution of an activity to the state economy. 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)12. Using GSP as a measure of economic impact avoids the problem of double counting that may arise from using the value of expenditure for this purpose. Gross Domestic Product (GDP) is the national equivalent of GSP.

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 this broader economic impact 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 and sport shooters on the trips and in support of their hunting and shooting 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 GSP generated by the supply chain have been reported. GSP can be interpreted along the same lines as the employment example given above.

6.4 NATIONAL AND STATE RESULTS

The results presented below (Table 6-1 and The gross contribution to FTE employment from recreational hunting and sport shooting activity in Australia in 2018 was estimated to be 19,500 FTE in total, comprising 8,800 directly and 10,700 as a result of flow-on economic activity. The total gross contribution to FTE employment (19,500 FTE) is approximately 0.2 per cent of Australia's total FTE employment in 2018 (approximately 12.4 million FTE).

Table 6-2) separate the estimated impacts into two categories: direct and flow-on impacts. The direct impacts are simply those associated with the direct expenditures, for instance, impacts in the retail sector (e.g. groceries, ammunition and fuel), accommodation businesses and manufacturing industry (e.g. hunting equipment and accessories). The flow-on impacts are the effects of all expenditure rounds after the direct expenditure, such as the employment and GSP in the businesses that support and supply the retail, accommodation and manufacturing companies. The flow-on impacts are the estimated multiplier effects.

[12] GDP/GSP can be measured as the sum of household income, 'gross operating surplus and gross mixed income net of payments to owner managers' and 'taxes less subsidies on products and production'.

The results presented below (Table 6-1 and The gross contribution to FTE employment from recreational hunting and sport shooting activity in Australia in 2018 was estimated to be 19,500 FTE in total, comprising 8,800 directly and 10,700 as a result of flow-on economic activity. The total gross contribution to FTE employment (19,500 FTE) is approximately 0.2 per cent of Australia's total FTE employment in 2018 (approximately 12.4 million FTE).

Table 6-2) represent the economic contribution of recreational hunting and sport shooting activity in Australia to the state and national economies. The economic contribution comes from money spent in each state by recreational hunters and sport shooters whilst pursuing their sport. This expenditure can be from both hunting activity in the state and by interstate expenditures. For example, a hunter may live in Queensland, where they purchase some ammunition and undertake some refresher training before going on a hunting trip to NSW where they buy takeaway food, fuel and camping fees. In this example hunting activity in NSW directly stimulated economic activity in both NSW and Queensland. Furthermore, the ammunition purchased in a gun shop in Queensland could have been manufactured in Victoria and flow-on economic activity will show up in Victoria from the purchase in Queensland.

The gross contribution to GDP from recreational hunting and sport shooting activity in Australia in 2018 was estimated to be $2.4 billion in total, comprising $0.8 billion directly and $1.6 billion as a result of flow-on economic activity. The total gross contribution to GDP ($2.4 billion) is approximately 0.1 per cent of Australia's GDP in 2018 ($1,853 billion).

Table 6-1: Estimated gross contribution of national recreational hunting and sports shooting activity to GDP ($m) of Australia and GSP ($m) of each state and territory, 2018[13]

REGION	DIRECT	FLOW-ON (INTRASTATE)	FLOW-ON (INTERSTATE)	FLOW-ON (SUB-TOTAL)	TOTAL
NSW	243	406	197	603	847
VIC	207	304	127	430	638
QLD	115	153	109	262	377
SA	62	86	28	115	177
WA	54	58	66	124	179
TAS	39	45	12	57	97
NT	22	32	8	40	62
ACT	11	12	14	25	37
Australia	757	1,095	561	1,656	2,413

The gross contribution to FTE employment from recreational hunting and sport shooting activity in Australia in 2018 was estimated to be 19,500 FTE in total, comprising 8,800 directly and 10,700 as a result of flow-on economic activity. The total gross contribution to FTE employment (19,500 FTE) is approximately 0.2 per cent of Australia's total FTE employment in 2018 (approximately 12.4 million FTE).

Table 6-2: Estimated gross contribution of national recreational hunting and sports shooting activity to employment (FTE) in Australia and each state and territory, 2018[14]

REGION	DIRECT	FLOW-ON (INTRASTATE)	FLOW-ON (INTERSTATE)	FLOW-ON (SUB-TOTAL)	TOTAL
NSW	2,727	2,648	1,141	3,789	6,516
VIC	2,479	2,284	916	3,200	5,679
QLD	1,359	1,080	495	1,575	2,934
SA	825	646	193	839	1,665
WA	580	352	223	576	1,155
TAS	465	324	67	391	856
NT	294	167	17	183	478
ACT	93	56	72	128	221
Australia	8,822	7,558	3,124	10,681	19,503

[13] Direct effect attributable to expenditures occurring in the state associated with national recreational hunting and sports shooting activity. Flow-on effects occurring in the state due to direct expenditures occurring in the same state. Flow-on effects occurring in the state due to direct expenditures occurring in other states. The sum of intrastate and interstate flow-on effects. The sum of direct and flow-on effects.

[14] See above

6.5 SENSITIVITY ANALYSIS

As this study, and previous studies, used a survey where respondents self-selected we have limited information about the population characteristics. We know that it is likely that the most avid/active hunters and shooters will respond and that the number of trips and expenditures derived from the survey would need to be adjusted. As described in Section 5.2, we used published unbiased estimates of activity, to adjust the survey. This is an important characteristic, as active hunters and shooters annual expenditure is around eight times higher than non-active. Our weighted average estimate is derived and therefore subject to uncertainty. A sensitivity analysis was undertaken to assess the effect variation in the active/inactive assumption on the results of the study, summarised below in Table 6-3).

We show the sensitivity of the results to three scenarios:

- High (63% active). This accords with the proportion of Victorian game hunters who are estimated to be active in a phone survey conducted by the Victorian Game Management Authority
- Low (9% active), in line with the proportion of respondents in a household survey conducted by the Australian Bureau of Statistics who reported they had engaged in hunting in 2015
- Assumed (16% active), assumes that 63% of game hunters are active, while 9% of non-game hunters are active. This is the 'headline' figure used in this study.

As we can see from the results of the sensitivity analysis, the results of the study are quite sensitive to this assumption. For example, the GDP under the assumed scenario is $2.4 billion, while under the high scenario it is $6.0 billion, and under the low scenario it is $1.9 billion.

Table 6-3: Results of the sensitivity analysis, proportion of active hunters and shooters

CASE	% ACTIVE	EXPENDITURE ($M)	TOTAL GDP ($M)	TOTAL FTE
High	63%	4,869	6,002	47,798
Assumed	16%	1,932	2,413	19,503
Low	9%	1,494	1,878	15,289

7 Net economic contribution of hunting and sport shooting

7.1 INTRODUCTION

For some people, hunting/sport shooting is an activity that is unique and provides benefits that cannot readily be achieved by engaging in other activities. For others, hunting/sport shooting is an activity that has similar benefits to others they engage in, which can be substituted for hunting/sport shooting if needed.

The expenditures that drive the gross economic contribution estimates described in Section 6 are, to some degree, substitutable with other forms of discretionary spending by current hunters and sport shooters. In this study we try to gain an understanding of the substitutability of hunting/sport shooting expenditures to determine the expenditures that are not substitutable and can therefore only be attributed to recreational hunting/sport shooting. These non-substitutable expenditures drive the net economic contribution estimates described in this section. The substitutability of hunting and shooting for other activities was examined for this study and an explanation of the findings is provided in Appendix C.

7.2 APPROACH TO EVALUATING NET ECONOMIC CONTRIBUTION

Questions were included in the survey to elicit the substitutability of hunting/sport shooting (as detailed in Appendix C). The University of Canberra estimated overall substitutability scores for each complete survey response from 0 (current hunting/sport shooting activities not substitutable) to 20 (current hunting/sport shooting activities fully substitutable). For the net economic contribution analysis, these substitutability scores were used to estimate a revised expenditure profile for each individual survey response, as follows:

- Score of 0 (hunting not substitutable), all expenditure allocated to average household profile of discretionary spending
- Score of 20 (fully substitutable), expenditure on hunting-specific items allocated to average household profile of discretionary spending, other expenditures unchanged
- Score between 1 and 19, weighted proportionately between 0 and 20, based on score.

Using the substitutability scores, a revised expenditure profile was produced which represents the (hypothetical) scenario where recreational hunting and sport shooting activities by hunters/sport shooters ceased. This hypothetical 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 two scenarios represents the net economic contribution of hunting and sports shooting to Australia.

To estimate the hypothetical expenditure profile, the proportion of trips considered substitutable for similar activities was assumed to still take place, as well as expenditures associated with those trips (excluding expenditures on hunting-specific items). Off-trip expenditures were assumed to scale down in proportion to trip expenditures and hunting-specific items were excluded. The balance of expenditures were assumed to be spent in full by household on other discretionary items based on the average household in their state of residence. An average profile of discretionary expenditure by households was generated for each state using detailed household expenditure profiles from the 2015/16 Household Expenditure Survey (ABS 2017b) and the definition of discretionary household expenditure used by the ABS: everything other than housing, food, fuel and power, medical and health care, and transport.

Since the balance in hunting and shooting related expenditures between the two cases was assumed to be spent on discretional items, an equal amount of expenditure was included in each case. Therefore, the difference in economic contribution between the two cases (the net contribution) was driven entirely by what the expenditures are made on. The case which leads to the greatest recirculation of value within the Australian economy will have the greatest total economic contribution. The key effect that stops value from circulating is expenditure on imports, either directly, or in the supply chains associated with direct expenditures.

Expenditures made on hunting and shooting 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). Off-trip expenditures include relatively more imports and more spent at Australian businesses that sell goods manufactured in other countries (i.e. firearms, ammunition, other related equipment and vehicles). Discretionary household expenditure aligns more closely to the off-trip expenditure profile as a significant amount of spending goes to imports or occurs at Australian businesses selling goods manufactures in other countries (i.e. clothes, footwear, home furnishings and equipment, and recreational equipment).

Following this logic, shifting expenditure from hunting trips to discretionary household expenditure would increase the proportion of expenditure that goes to imports, reducing economic activity in Australia. In the hypothetical case where hunting and shooting ceases, around 90 per cent of expenditure on-trip and off-trip shifts to discretionary household expenditure. In the gross contribution case, an estimated 18 per cent of direct expenditures are made on imports, compared to about 37 per cent in the hypothetical case. This leads to the expected result of a positive net economic contribution from hunting and shooting activity because ceasing it would cause more leakages of expenditure outside of Australia as imports.

7.3 NATIONAL RESULTS

The net contribution to GDP from recreational hunting and sport shooting activity in Australia in 2018 was estimated to be $335 million in total Table 7-1 comprising $80 million directly and $255 million as a result of flow-on economic activity. The total net contribution to GDP ($335 million) is approximately 0.02 per cent of Australia's GDP in 2018 ($1,853 billion). The net contribution estimate is approximately 14 per cent of the gross contribution estimate.

The net contribution to FTE employment from recreational hunting and sport shooting activity in Australia in 2018 was estimated to be approximately 3,300 FTE in total Table 7-1, comprising 2,000 directly and 1,300 as a result of flow-on economic activity. The total net contribution to FTE employment (3,300 FTE) is approximately 0.03 per cent of Australia's total FTE employment in 2018 (approximately 12.4 million FTE). The net contribution estimate is approximately 17 per cent of the gross contribution estimate.

In summary, in the (hypothetical) situation where recreational hunting and sport sporting activity ceased nationally, it is expected that approximately $335 million in contribution to GDP and 3,300 FTE jobs would be lost to the national economy as a result.

Table 7-1: Estimated net contribution of national recreational hunting and sports shooting activity to Australia, 2018

INDICATOR	DIRECT	INDIRECT	TOTAL	% OF NATIONAL
GDP	80	255	335	0.02%
Employment	1,968	1,348	3,316	0.03%

As per the gross contribution study, a sensitivity analysis was undertaken to assess the effect variation in the active/inactive assumption on the results of the study, summarised below in Table 7-2. The impact on net GDP varies from $261 million (low scenario) to $830 million (high scenario).

Table 7-2: Results of the sensitivity analysis (net impacts), proportion of active hunters and shooters

CASE	% ACTIVE	EXPENDITURE ($M)	TOTAL NET GDP ($M)	TOTAL NET FTE
High	63%	4,869	830	7,692
Assumed	16%	1,932	335	3,316
Low	9%	1,494	261	2,665

8 Health and wellbeing

8.1 CONTRIBUTION OF HUNTING/SHOOTING TO HEALTH: PHYSICAL ACTIVITY

8.1.1 INTRODUCTION

Engaging in regular physical activity is critical for maintaining health and wellbeing and is associated with a lower risk of a wide range of physical and mental health conditions through the life span (AIHW 2018). Guidelines have been produced on the level of activity that is sufficient to maintain health and wellbeing, with Australia's Physical Activity and Sedentary Behaviour Guidelines for Adults recommending adults should accumulate a minimum of 150 minutes of moderate physical activity or 75 minutes of vigorous physical activity each week, ideally including five activity sessions (Department of Health 2017). A significant proportion of Australian adults do not engage in sufficient weekly physical activity to provide health and wellbeing benefits. The most recent Australia's Health assessment found that the proportion of Australian adults aged 18 and over who did less than 150 minutes of moderate intensity physical activity or 75 minutes of vigorous physical activity across five or more sessions a week was 44% in 2014-15, while 66% completed the minimum level of physical activity needed to achieve benefits (AIHW 2018).

Hunting and shooting can provide opportunities for physical activity that makes a positive contribution to a person's health and wellbeing. To assess this, the amount of physical activity typically involved in a given period of time spent hunting/shooting was assessed, and the proportion of hunters and shooters who engage in physical activity above the threshold considered sufficient to support positive physical health was assessed using the physical activity measures recommended by AIHW (2003) and used in multiple Australian surveys.

8.1.2 TO WHAT EXTENT ARE HUNTING AND SHOOTING PHYSICAL ACTIVITIES?

Hunting and shooting can be undertaken in a range of ways, some of which involve physical activity while others are relatively sedentary. Therefore, a first step in assessing the likely health and wellbeing benefits of engaging in hunting or shooting was to identify the extent to which hunting activities typically involve moderate or vigorous physical activity.

Survey participants were asked to identify the typical proportion of time they would spend, in a three-hour hunting or shooting session:

- Sitting/travelling in a vehicle (sedentary activity)
- Walking briskly (vigorous activity)
- Walking slowly (moderate activity)
- Standing/squatting (involved some activity, although not at the moderate level)
- Sitting but not in a vehicle (sedentary activity).

On average, in a three-hour period spent hunting or shooting, the hunter/shooter will:

- Travel in a vehicle for 47 minutes (median 36 minutes)
- Walk briskly for 27 minutes (median 18 minutes)
- Walk slowly for 48 minutes (median 36 minutes)
- Stand/squat for 32 minutes (median 27 minutes)
- Sit outside a vehicle for 26 minutes (median 18 minutes).

This suggests that a hunting/shooting trip involving three hours of hunting/shooting time will contribute significantly to the objective of 150 minutes of moderate physical activity each week, constituting between 86 and 116 minutes of this level of activity in the three-hour period dependent on whether the median or mean measure is used[15].

For those who hunt/shoot only a small number of times a year, hunting/shooting will contribute a relatively small amount of their overall physical activity. For those who hunt/shoot regularly, it will contribute a significant amount. Survey participants were asked how many (i) hunting and (ii) sports/target shooting trips they had participated in during the past year. Many reported engaging in both types of trips, and answers were combined to provide an estimate of overall hunting/shooting trips in the past year. Conservatively estimating that a hunting/shooting trip on average involves three hours of activity (many trips involve significantly more than this), Table 8-1 below indicates the proportion of physical activity requirements that will be met by different levels of engagement in hunting/shooting.

Based on this conservative estimate, hunting/shooting alone provides 44% or more of required physical activity for the 23% of hunters/shooters who hunt/shoot most weeks or more frequently. For those who hunt/shoot around once a fortnight – almost one in four hunters/shooters (24%) – between 30% and 40% of physical activity needs are met. For those who hunt/shoot once every month (18%) or once every couple of months (16%), between 7% and 18% of physical activity needs are met.

This suggests that for some hunters and shooters hunting/shooting makes a significant contribution to meeting physical activity guidelines.

Table 8-1: Contribution of hunting/shooting activities to meeting minimum physical activity guidelines, by frequency of hunting/shooting

FREQUENCY OF HUNTING/SHOOTING	% OF PARTICIPANTS	PROPORTION OF ANNUAL 'SUFFICIENT PHYSICAL ACTIVITY' GUIDELINES LIKELY TO BE MET BY HUNTING/ SHOOTING ACTIVITIES
Did not hunt/shoot in the last year	2%	0%
Hunt/shoot 1-2 times a year	7%	2%
Hunt/shoot 3-4 times a year	9%	4% to 5%
Hunt/shoot once every couple of months	16%	7% to 10%
Hunt/shoot every month	18%	13% to 18%
Hunt/shoot every fortnight	24%	29% to 39%
Hunt/shoot most weeks (estimated at 40 weeks)	18%	44% to 60%
Hunt/shoot more than once a week (estimated 65 times a year)	5%	72% to 97%

[15] This is based on counting walking briskly as vigorous activity (each minute of vigorous activity is considered equivalent to two minutes of moderate activity),and considering each minute of standing/squatting as equivalent to 30 seconds of moderate activity).

8.1.3 PROPORTION OF HUNTERS AND SHOOTERS ACHIEVING MINIMUM SUFFICIENT PHYSICAL ACTIVITY LEVEL

In 2014-15, 44% of adult Australians reported engaging in the minimum level of physical activity to support health and wellbeing, including 48% of those aged 18 to 64, and 28% of those aged 65 and over (AIHW 2018). Table 8-2 shows the proportion of hunters and shooters who met sufficient physical activity recommendations of 150 minutes of moderate activity a week (or equivalent) and at least five sessions of activity in an average week. Overall, hunters and shooters are more likely to meet sufficient physical activity requirements than the average Australian adult: 58% met physical activity recommendations, compared to only 44% of Australian adults, including 61% of those aged 18-59 (compared to 48% of those aged 18-64 in the general population), and 53% of those aged 60 and over (compared to 28% of those aged 65 and over in the general population). The proportion with sufficient physical activity is higher for those who hunt/shoot more often, an indicator that hunting/shooting is making a contribution to meeting physical activity guidelines.

The high proportion of older hunters and shooters who meet physical activity guidelines is particularly important: it is common for older adults to have significantly reduced physical activity, and hunting and shooting appear to provide opportunities to maintain physical activity.

Table 8-2: Proportion of hunters/shooters who undertake sufficient physical activity using Australian guidelines

GROUP	HUNTERS/SHOOTERS	GENERAL POPULATION (AIHW 2018)
Female	61%	41%
Male	59%	49%
Aged 18-29	67%	52% (aged 18-24)
Aged 30-39	64%	54% (aged 25-34)
Aged 40-49	60%	47% (aged 35-44)
Aged 50-59	58%	43% (aged 45-54)
Aged 60-74	54%	43% (aged 55-64) 28% (aged 65-74)
Aged 75+	46%	22% (aged 75-84) 16% (aged 85+)
All population	58%	48%

These findings are associations: they do not, for example, identify whether the reason for the high activity levels of older hunters/shooters is because only those who have managed to maintain high activity still engage in this activity, while others stop hunting and shooting activities as they become older. As shown in Table 8-3 even for hunters and shooters that did not hunt or shoot at all in the last year, or very infrequently, their physical activity was higher than the general population. This suggests that hunting and shooting activity is not the only reason for high levels of physical activity found in the hunting and shooting population. That is, this population is likely to be more active than the general population for other reasons. Nevertheless, they show that for many avid hunters and shooters, hunting and shooting provide a means of achieving meaningful levels of physical activity.

Table 8-3: Physical activity by hunting frequency

HUNTING FREQUENCY	SUFFICIENT PHYSICAL ACTIVITY
Did not hunt/shoot in the last year	50%
Hunt/shoot 1-2 times a year	48%
Hunt/shoot 3-4 times a year	54%
Hunt/shoot once every couple of months	57%
Hunt/shoot every month	60%
Hunt/shoot every fortnight	60%
Hunt/shoot most weeks (estimated at 40 weeks)	60%
Hunt/shoot more than once a week (estimated 65 times a year)	66%

8.2 CONTRIBUTION OF HUNTING/SHOOTING TO HEALTH: WELLBEING

A person's 'wellbeing' refers to their overall quality of life. Increasingly, there is recognition of the importance of a person's overall wellbeing to their life outcomes: a person with high subjective wellbeing will typically live longer with fewer health problems and reduced demand on health services, and will be better able to contribute to their community, work and family (e.g. Diener et al. 1998, Diener 2000). 'Subjective wellbeing' here refers to a person's self-evaluation of their wellbeing using standardised validated measures from the field of wellbeing research. These subjective wellbeing measures are now widely used to measure overall quality of life and wellbeing, as important health and wellbeing measures in their own right, and form part of measures of societal progress used by organisations such as the United Nations and the Organisation for Economic Cooperation and Development (OECD) (OCED 2011, Sachs et al. 2018).

Many things can impact a person's wellbeing. Increasingly in recent decades there has been recognition of the important contribution to wellbeing made by (i) physical activity, (ii) outdoor activities in nature areas, and (iii) having strong social networks and connections that are maintained over time. People who self-report higher levels of physical activity are more likely to have high subjective wellbeing and vice versa, and there is also growing evidence of strong associations between higher levels of physical activity and higher subjective wellbeing (Hamer and Stamatakis 2010, Anokye et al. 2012). There is a particularly strong association between high subjective wellbeing and higher physical health in older age, with some speculating that positive subjective wellbeing helps protect health in older age as well as being linked to higher levels of physical activity in older age (Steptoe et al. 2015). Multiple studies, meanwhile, have shown that gentle exercise that occurs in outdoor settings has greater overall benefits for health and wellbeing compared to exercise occurring in an indoor setting such as a gym (Fuegen and Breitenbecher 2018). More broadly, the psychological benefits of spending time in natural settings is now well established, with multiple studies demonstrating health and wellbeing benefits from spending time in natural outdoor places, particularly in relation to taking part in outdoor recreational activities (see for example Nisbet et al. 2011, Wolsko and Lindberg 2013, Capaldi et al. 2014, Ives et al. 2017).

People are more likely to engage in physical activity if they are part of social networks that encourage it, particularly as they age (Sasidharan et al. 2006), and any activity that promotes maintenance or strengthening of social connections is also likely to promote wellbeing as a person's social networks are strong predictors of their physical and mental health and wellbeing (Helliwell 2006). The growing recognition of loneliness as a key contributor to poor health and wellbeing, particularly in older age, has led to increasing focus on how to support activities that can increase social interaction and reduce loneliness at all stages of life, but particularly for older males, amongst whom social isolation is more common than for other groups (Cacioppo et al. 2002, Holmen and Furukawa 2002, Alpass and Neville 2003, Luo et al. 2012).

Hunting and shooting can contribute to physical activity, to nature connection, and to maintaining and growing meaningful social networks that support wellbeing. It has potential to positively contribute to wellbeing, particularly given that many hunters are male, with men being at greater risk of health risks from social isolation compared to women, and older, with older people at greater risk of health problems related to physical inactivity compared to younger people.

To assess the wellbeing of hunters / shooters, survey participants were asked two standard sets of questions on subjective wellbeing:

- Global life satisfaction: Participants were asked to report their satisfaction with their life overall on a scale from 0 (not at all satisfied) to 10 (completely satisfied). This measure is widely used in Australia and internationally and has been well validated (Pavot and Diener 2009).
- Personal Wellbeing Index: Participants were asked their level of satisfaction, from 0 to 10 using the same scale as for Global Life Satisfaction, with (i) their standard of living, (ii) their health, (iii) what they are achieving in life, (iv) their personal relationships, (v) how safe they feel, (vi) feeling part of the community and (vii) their future security. These measures can be either analysed as a single index in which the scores of the seven measures are averaged and transformed into a scale from 0 to 100, or the individual measures can be analysed separately to examine different aspects of wellbeing. The Personal Wellbeing Index is widely used in Australia and internationally and well validated (Cummins et al. 2003).

The average scores of participants were then compared, by age and gender, to results of the 2017 Regional Wellbeing Survey (RWS), which asks people living in different regions across Australia about their wellbeing, including people living in urban and rural/regional areas. Importantly, the RWS asks about wellbeing using the same survey methodology used in this study: an online self-completion questionnaire. This is important for validity of comparison, as there is strong evidence that people report on average lower levels of subjective wellbeing in self-complete paper or online questionnaires, and substantially higher levels of subjective wellbeing when asked about their wellbeing in a phone or face to face interview (Dolan and Kavetsos 2016). Most national reporting of subjective wellbeing uses data collected by phone or face to face, and is therefore not comparable to data collected by the survey conducted for this project. It is important to compare the subjective wellbeing of hunters reported in an online survey to benchmark sources of data that also use a self-complete questionnaire mode. The RWS is a comparable data source that uses the same survey mode (see www.regionalwellbeing.org.au for detailed descriptions and reports on methods used in this survey), and which from 2017 produced estimates of wellbeing for the entire Australian adult population (urban and rural). The comparisons were made between data from the Regional Wellbeing Survey weighted to be representative of the Australian adult population, and data from the hunting survey. As hunters vary from the broader population in terms of average age and gender, data were compared for people of different age groups and genders.

8.2.1 OVERALL WELLBEING – DIFFERENCES BETWEEN HUNTERS/SHOOTERS AND THE GENERAL POPULATION

Overall, hunters and shooters reported significantly higher subjective wellbeing compared to the adult population (as measured by the RWS), for all age groups and both genders, as shown in Figure 8-1. Both male and female hunters/shooters on average reported higher wellbeing than the population average. It was possible this could be due to a difference in the age distribution of hunters/shooters compared to the general population, as wellbeing is known to vary substantially with age. However, the 'wellbeing gap' was largest for younger age groups – younger hunters/shooters report much higher wellbeing than young people in the general population, while older hunters/shooters report slightly higher wellbeing compared to the general population. This suggests that hunting and shooting may potentially have more significant wellbeing benefits for younger people, particularly those aged under 60, although that hypothesis cannot be confirmed with the data from a single point in time collected in this study (a longitudinal study that follows people over time, including their level of engagement with hunting/shooting, would be needed to confirm this hypothesis).

There is a possibility that the high wellbeing scores of hunters/shooters were positively biased due to what is known as the 'priming effect': wellbeing questions were asked towards the end of the survey, and if completing earlier questions on the survey increased feelings of wellbeing, or if respondents felt it was important to report high wellbeing to demonstrate that hunting/shooting is important to their wellbeing, then wellbeing scores overall may be higher than they otherwise would be.

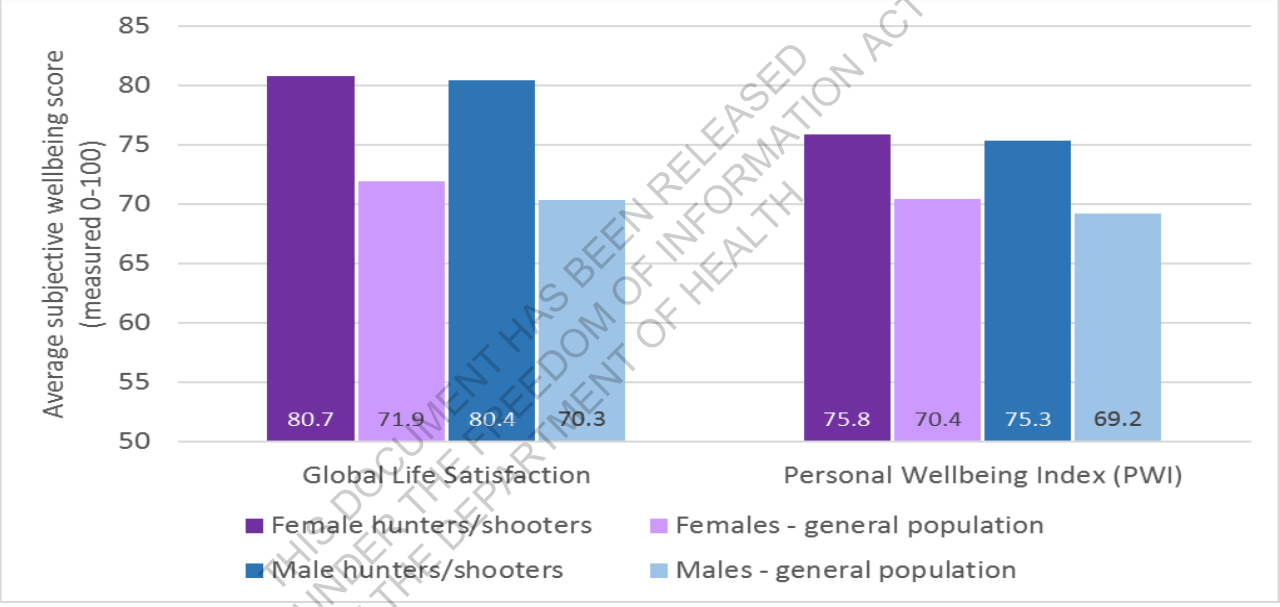

Figure 8-1: Average wellbeing of hunters/shooters compared to general population - by gender

To further test whether hunters consistently demonstrate higher wellbeing than people who do not engage in hunting/shooting, data from the 2018 RWS were analysed. In the 2018 RWS, participants were asked if they engaged in 'recreational hunting' but were not asked if they participated in sports shooting, meaning the comparison here is for hunters only and not shooters who do not also hunt. In the 2018 RWS, there were too few hunters aged 75 and over (25) to enable a valid comparison, so this group has been excluded from reporting in the table below. Data from the RWS are consistent with the data from the hunting survey: for younger age groups in particular, those who engaged in hunting reported significantly higher wellbeing, while for those aged 65-74 wellbeing was not significantly higher amongst hunters compared to non-hunters. RWS findings do suggest that the results of the hunting/shooting survey may have had some priming effects, with overall lower wellbeing scores amongst hunters responding to the RWS compared to those responding to the hunting survey. Despite this, the RWS results are consistent with the hypothesis that engaging in hunting is associated with higher wellbeing for those in younger age groups.

Table 8-4: Average wellbeing of hunters/shooters compared to general population, using 2018 RWS data - by age group

AGE	HUNTERS	NON-HUNTERS
18-29	75	68
30-39	73	71
40-49	73	68
50-59	74	69
60-74	77	77

It is also possible that differences in the wellbeing of hunters/shooters and the general population are due to factors other than their participation in hunting/shooting. For example, it is possible that those with higher wellbeing are better able to participate in desired recreational activities, of which hunting and shooting are examples, rather than hunting and shooting being the cause of higher wellbeing.

To better understand associations between hunting/shooting and wellbeing, the average wellbeing scores of those who went hunting more and less frequently were compared (Table 8-5). There was a clear and strong association between frequency of hunting /shooting and subjective wellbeing, using both of the wellbeing measures, with those who had been on more frequent hunting/shooting trips on average reporting higher wellbeing.

Table 8-5: Average wellbeing of hunters/shooters by frequency of hunting/shooting in the last year

HUNTING FREQUENCY	GLOBAL LIFE SATISFACTION	PERSONAL WELLBEING INDEX (PWI)
Did not hunt/shoot in the last year	75	72
Hunt/shoot 1-2 times a year	78	74
Hunt/shoot 3-4 times a year	79	75
Hunt/shoot once every couple of months	79	74
Hunt/shoot every month	80	75
Hunt/shoot every fortnight	81	76
Hunt/shoot most weeks (estimated at 40 weeks)	82	77
Hunt/shoot more than once a week (estimated 65 times a year)	83	78

8.2.2 WELLBEING PATHWAYS: WHAT ARE THE MECHANISMS BY WHICH HUNTING/SHOOTING ARE LIKELY TO CONTRIBUTE TO WELLBEING?

To better identify whether and how the activity of hunting or shooting may contribute to wellbeing of hunters/shooters, survey participants were asked what aspects of hunting were important to them, to better understand the 'pathways' by which hunting and shooting are most likely to contribute to wellbeing. As shown in Figure 8-2, hunting and shooting was considered to be highly important for spending time outdoors (86%), enjoyment (85% for shooting and 80% for hunting), relaxing/unwinding (83%), learning new skills (83%), feeling a sense of achievement (79% with most also reporting the challenge of sports shooting or hunting was important), spending time in nature (76%), spending time with friends (75%) and spending time with family (69%).

These responses indicate that hunting and shooting can support wellbeing through a number of wellbeing pathways, including:

- **Nature connection:** Spending time outdoors and spending time in nature are very important to over three in four hunters and shooters, and it is likely that the connection to outdoor places and natural places achieved through hunting and shooting contributes positively to wellbeing.
- **Self-efficacy (challenge, skills):** For many hunters and shooters, learning new skills, feeling achievement and experiencing challenge were very important aspects of the hunting or shooting experience. These are indicators that hunting and shooting may contribute to a greater sense of self-efficacy, defined as having confidence that you can achieve the things you wish to and will be successful when attempting specific tasks or actions (Bandura 1982). Self-efficacy is strongly predictive of wellbeing – people who feel more confident in their ability to achieve tasks and meet challenges typically have higher wellbeing and resilience, and the survey results suggest this may be an important mechanism by which hunting and shooting can contribute to wellbeing.
- **Social networks:** Hunting and shooting provide important opportunities to maintain and strengthen social bonding with family and friends, which in turn is an important contributor to wellbeing.
- **Physical activity:** For 65% of hunters and shooters, being physically active when hunting or shooting is a very important aspect of this activity, and this reinforces earlier findings on the high proportion of physical activity hunting and shooting can contribute.
- **Nutrition:** For a smaller proportion of hunters and shooters, this activity may contribute to helping their household achieve some aspects of nutrition, such as protein-dense foods. However, this was a less important component of hunting than others for most survey participants, indicating that this is a less important wellbeing pathways than the others noted above.

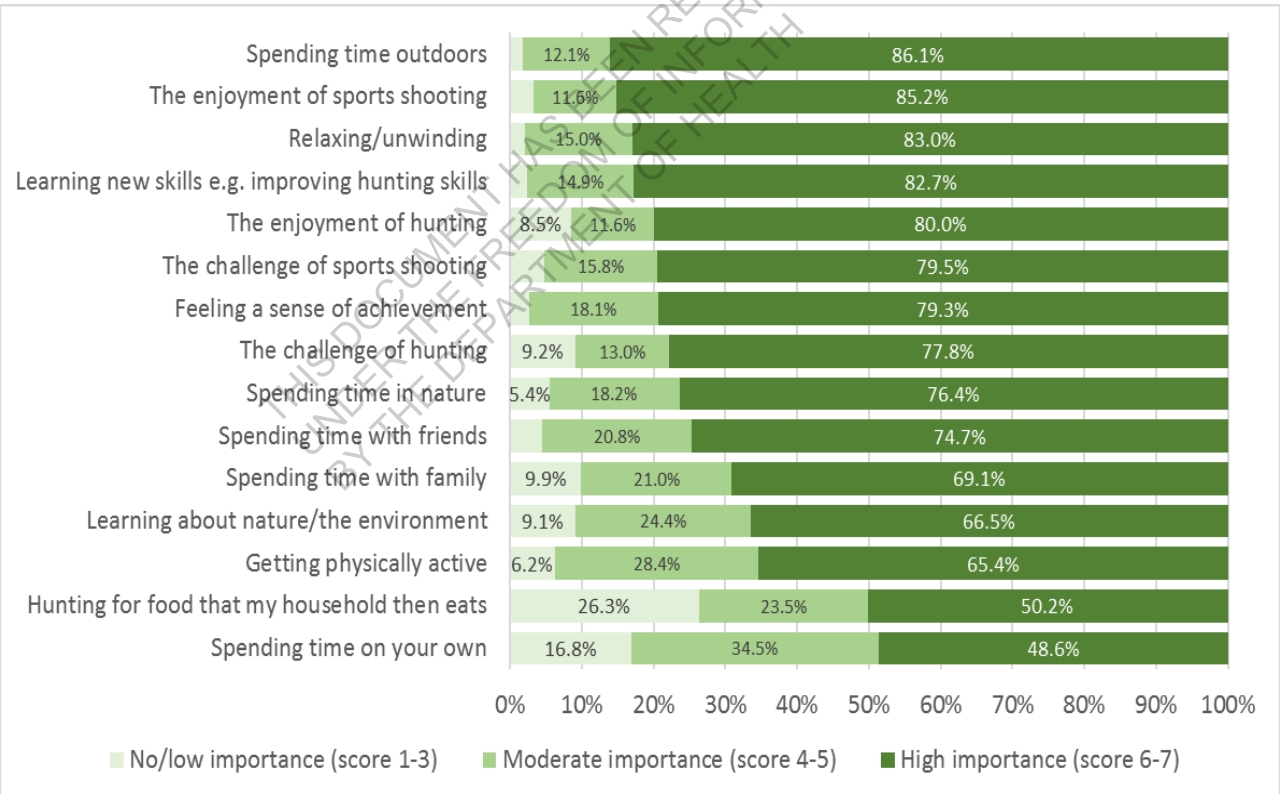

Figure 8-2: 'How important are the following aspects of hunting/shooting to you? - overall ratings of importance

To further analyse this, the individual components of the Personal Wellbeing Index (PWI) were compared. This was done to identify whether hunters and shooters report higher scores for the aspects of wellbeing that hunting/shooting are considered more likely to contribute to. As available evidence suggests hunting may contribute more to what a person is achieving in life (self-efficacy), health (physical activity), personal relationships (social networks) and feeling part of the community (social networks), these were the four specific components of the PWI that were considered to have potential to be higher amongst hunters compared to the general population, due to the contributions of hunting to wellbeing.

As shown in Table 8-6 across men and women the two aspects of wellbeing in which hunters/shooters consistently reported greater satisfaction are (i) satisfaction with what they are achieving in life (self-efficacy) and (ii) personal relationships. This suggests that these are potentially two key pathways by which engaging in hunting and shooting contributes positively to overall wellbeing. There are less consistent differences in other measures, although hunters/shooters usually report better satisfaction with health. All other measures are also higher than the general population with the exception of 'satisfaction with how safe you feel' which is either about the same as the general population or slightly lower.

Table 8-6: Difference between hunters/shooters' satisfaction and RWS respondents (PWI measures)

	STANDARD OF LIVING	HEALTH	WHAT YOU ARE ACHIEVING IN LIFE	PERSONAL RELATIONSHIPS	HOW SAFE YOU FEEL	FEELING PART OF THE COMMUNITY	YOUR FUTURE SECURITY
Female hunters / shooters	79.3	72.6	75.7	83.7	76.8	71.3	70.7
Females - general population	74.0	67.2	68.1	73.9	77.1	66.8	65.5
Difference in average wellbeing score	*5.3*	*5.4*	*7.6*	*9.8*	*-0.3*	*4.6*	*5.2*
Male hunters / shooters	78.4	71.7	76.1	83.4	76.5	71.0	70.0
Males - general population	72.2	67.3	65.2	70.6	76.7	65.7	66.1
Difference in average wellbeing score	*6.1*	*4.3*	*10.8*	*12.8*	*-0.2*	*5.3*	*3.9*

8.3 SUMMARY

Hunting and shooting provides opportunities for physical activity, as well as pathways for greater wellbeing through nature connection, self-efficacy, social networks, physical activity and nutrition. This section has investigated the impact hunting and shooting has on participants' health and wellbeing and physical activity.

The survey results show that hunters/shooters have:

- Higher physical activity than the general population
- Higher levels of well-being than the general population.

However, it is not possible to say from the data whether hunters and shooters have these attributes because they engage in hunting and shooting, or for another reason. That is, whether the observed attributes are a result of correlation or causation.

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Appendix A: Survey instrument

National Recreational Hunting and Sports Shooting Survey 2019

Survey eligibility

* 1. Are you aged 18 or older?

- Yes
- No

National Recreational Hunting and Sports Shooting Survey 2019

Your location

* 2. Where do you live?

- ACT
- NSW – Sydney, Wollongong or Newcastle area
- NSW – elsewhere
- Qld – Brisbane area
- Qld – elsewhere
- SA – Adelaide area
- SA – elsewhere
- Tas – Hobart area
- Tas - elsewhere
- Vic – Melbourne area
- Vic – elsewhere
- WA – Perth area
- WA – elsewhere
- NT – Darwin area
- NT - elsewhere
- Overseas

National Recreational Hunting and Sports Shooting Survey 2019

Your recreational hunting and sport/target shooting methods

* 3. Do you hold a current Australian state or territory firearm licence endorsed for recreational hunting or for sport/target shooting?

- ◯ Yes
- ◯ No

* 4. Which of the following do you use?

- ☐ A firearm for recreational hunting
- ☐ A firearm for sport/target shooting
- ☐ A bow for hunting
- ☐ Dogs to hunt pigs (without firearms)
- ☐ None of the above

National Recreational Hunting and Sports Shooting Survey 2019

Your recreational hunting activity

The following questions are about your recreational hunting trips. Please consider both overnights and day trips. An overnight trip is where you stayed overnight in another location. A day trip is where you travelled more than 50km and were away from home for at least 4 hours.

* 5. Approximately how many recreational hunting trips did you make within Australia in the last year?

- ◯ One a week (50+ trips a year)
- ◯ One a fortnight (25+ trips a year)
- ◯ One a month (12+ trips a year)
- ◯ Once every two months (6 trips a year)
- ◯ Quarterly (3 or 4 trips a year)
- ◯ Less often (one or two a year)
- ◯ None

National Recreational Hunting and Sports Shooting Survey 2019

Your recreational hunting activity

* 6. Approximately how many recreational hunting trips did you make to each of the following locations in the last year?

	One a week (50+ trips a year)	One a fortnight (25+ trips a year)	One a month (12+ trips a year)	Once every two months (6 trips a year)	Quarterly (3 or 4 a year)	Less often (one or two a year)
ACT	○	○	○	○	○	○
NSW	○	○	○	○	○	○
Qld	○	○	○	○	○	○
SA	○	○	○	○	○	○
Tas	○	○	○	○	○	○
Vic	○	○	○	○	○	○
WA	○	○	○	○	○	○
NT	○	○	○	○	○	○

* 7. Where was your most recent recreational hunting trip?

- ○ ACT
- ○ NSW
- ○ Qld
- ○ SA
- ○ Tas
- ○ Vic
- ○ WA
- ○ NT

National Recreational Hunting and Sports Shooting Survey 2019

Your recreational hunting activity

* 8. Thinking about all your recreational hunting trips over the past 12 months, what proportion of trips was recreational hunting the main reason for going on the trip?

- ○ None (0%)
- ○ 1% to 25%
- ○ 26% to 50%
- ○ 51% to 75%
- ○ 76% to 100%

National Recreational Hunting and Sports Shooting Survey 2019

Your sport/target shooting activity

The following questions are about your sport/target shooting trips. Please consider both overnight and day trips. An overnight trip is where you stayed overnight in another location. A day trip is where you travelled more than 50km and were away from home for at least 4 hours.

* 9. Approximately how many sport/target shooting trips did you make in the last year?

- ◯ Around one a week (50+ trips a year)
- ◯ Around one a fortnight (25+ trips a year)
- ◯ Around one a month (12+ trips a year)
- ◯ Around once every two months (6 trips a year)
- ◯ Quarterly (3 or 4 a year)
- ◯ Less often (one or two a year)
- ◯ None

National Recreational Hunting and Sports Shooting Survey 2019

Your sport/target shooting activity

* 10. Approximately how many sport/target shooting trips did you make to each of the following locations in the last year?

	Around one a week (50+ trips a year)	Around one a fortnight (25+ trips a year)	Around one a month (12+ trips a year)	Around once every two months (6 trips a year)	Quarterly (3 or 4 a year)	Less often (one or two a year)
ACT	◯	◯	◯	◯	◯	◯
NSW – Sydney, Wollongong or Newcastle area	◯	◯	◯	◯	◯	◯
NSW – elsewhere	◯	◯	◯	◯	◯	◯
Qld – Brisbane area	◯	◯	◯	◯	◯	◯
Qld – elsewhere	◯	◯	◯	◯	◯	◯
SA – Adelaide area	◯	◯	◯	◯	◯	◯
SA – elsewhere	◯	◯	◯	◯	◯	◯
Tas – Hobart area	◯	◯	◯	◯	◯	◯
Tas - elsewhere	◯	◯	◯	◯	◯	◯
Vic – Melbourne area	◯	◯	◯	◯	◯	◯
Vic – elsewhere	◯	◯	◯	◯	◯	◯
WA – Perth area	◯	◯	◯	◯	◯	◯
WA – elsewhere	◯	◯	◯	◯	◯	◯
NT – Darwin area	◯	◯	◯	◯	◯	◯
NT - elsewhere	◯	◯	◯	◯	◯	◯

* 11. Where was your most recent sport/target shooting trip?

- ACT
- NSW – Sydney, Wollongong or Newcastle area
- NSW – elsewhere
- Qld – Brisbane area
- Qld – elsewhere
- SA – Adelaide area
- SA – elsewhere
- Tas - Hobart
- Tas - elsewhere
- Vic – Melbourne area
- Vic – elsewhere
- WA – Perth area
- WA – elsewhere
- NT – Darwin area
- NT- elsewhere

National Recreational Hunting and Sports Shooting Survey 2019

Your sport/target shooting activity

* 12. Thinking about all your sports/target shooting trips over the past 12 months, what proportion of trips was sports/target shooting the main reason for going on the trip?

- None (0%)
- 1% to 25%
- 26% to 50%
- 51% to 75%
- 76% to 100%

National Recreational Hunting and Sports Shooting Survey 2019

Your spend on recreational hunting or sporting/target shooting trips

In this section we are interested in understanding people's expenditure related to their recreational hunting or sporting/target shooting.

* 13. Please answer the following questions in relation to your most recent trip in the last 12 months, which was …

- A recreational hunting trip
- A sport/target shooting trip
- Neither in the past 12 months

National Recreational Hunting and Sports Shooting Survey 2019

Your spend on recreational hunting or sporting/target shooting trips

* 14. Did you spend any money in relation to your most recent recreational hunting / sport/target shooting trip?

This includes fuel, groceries (including dog food), drinks and alcohol for self-catering/consumption at your accommodation, ammunition, takeaways and restaurant meals, hunting equipment (e.g. decoys, clothing), accommodation fees to landowners, and vehicle/motorbike/boat repairs and any other items you can think of

- ◯ Yes
- ◯ No

National Recreational Hunting and Sports Shooting Survey 2019

Your spend on recreational hunting or sporting/target shooting trips

* 15. On which of the following did you spend money in relation to your most recent trip?

- ☐ Fuel
- ☐ Groceries (including dog food), drinks and alcohol for self-catering/consumption at your accommodation
- ☐ Ammunition
- ☐ Takeaways and restaurant meals
- ☐ Hunting equipment (e.g. decoys, clothing)
- ☐ Accommodation
- ☐ Fees to landowners
- ☐ Vehicle/motorbike/boat repairs
- ☐ Other items

National Recreational Hunting and Sports Shooting Survey 2019

Your spend on recreational hunting or sporting/target shooting

* 16. Approximately how much did you spend on each of the following in relation to your most recent trip?

Please include anything you 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 include that amount. If someone else paid for you, then exclude that amount.

	$1 - $20	$21 - $50	$51 - $100	$101 - $200	$201 - $500	$501 or more
Fuel	○	○	○	○	○	○
Groceries (including dog food), drinks and alcohol for self-catering/consumption at your accommodation	○	○	○	○	○	○
Ammunition	○	○	○	○	○	○
Takeaways and restaurant meals	○	○	○	○	○	○
Hunting equipment (e.g. decoys, clothing)	○	○	○	○	○	○
Accommodation	○	○	○	○	○	○
Fees to landowners	○	○	○	○	○	○
Vehicle/motorbike/boat repairs	○	○	○	○	○	○
Other items	○	○	○	○	○	○

* 17. In what State was the business where you spent most of the money on those items?

If you bought these items at more than one location please select the location where the most money was spent.
For online purchases please record your answer against the location where the vendor is located.

	ACT	NSW	Qld	SA	Tas	Vic	WA	NT	Overseas	Unsure/can't recall
Fuel	○	○	○	○	○	○	○	○	○	○
Groceries (including dog food), drinks and alcohol for self-catering/consumption at your accommodation	○	○	○	○	○	○	○	○	○	○
Ammunition	○	○	○	○	○	○	○	○	○	○
Takeaways and restaurant meals	○	○	○	○	○	○	○	○	○	○
Hunting equipment (e.g. decoys, clothing)	○	○	○	○	○	○	○	○	○	○
Accommodation	○	○	○	○	○	○	○	○	○	○
Fees to landowners	○	○	○	○	○	○	○	○	○	○
Vehicle/motorbike/boat repairs	○	○	○	○	○	○	○	○	○	○
Other items	○	○	○	○	○	○	○	○	○	○

* 18. Where in that State was the expenditure?

	In the capital city of that State (Sydney includes Wollongong and Newcastle)	Elsewhere in the State	Not applicable - overseas	Unsure/can't recall
Fuel	○	○	○	○
Groceries (including dog food), drinks and alcohol for self-catering/consumption at your accommodation	○	○	○	○
Ammunition	○	○	○	○
Takeaways and restaurant meals	○	○	○	○
Hunting equipment (e.g. decoys, clothing)	○	○	○	○
Accommodation	○	○	○	○
Fees to landowners	○	○	○	○
Vehicle/motorbike/boat repairs	○	○	○	○
Other items	○	○	○	○

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Your non-trip expenditure

* 19. In the last 12 months, did you spend any money on your hunting/target shooting activities, apart from on a trip?

Please don't include expenses made during hunting/target shooting trips as these were addressed in the previous section.

- ○ Yes
- ○ No

National Recreational Hunting and Sports Shooting Survey 2019

Your non-trip expenditure

* 20. On which of the following did you spend money?

- [ ] Firearms, bows, other firearm equipment and ammunition
- [ ] Hunting/target shooting club memberships
- [ ] Licenses/permits (e.g. firearm licences, game hunting licences/permits, etc.)
- [ ] Training to support your hunting/target shooting activities (e.g. target practice)
- [ ] Vehicles/motorbikes/boats (purchased with hunting in mind)
- [ ] Vehicle maintenance
- [ ] Other equipment to support your hunting/target shooting activities (e.g. vehicle equipment/accessories, safety equipment, camping equipment, clothing, knives, binoculars, etc.)
- [ ] Other items

ational Recreational Hunting and Sports Shooting Survey 2019

our non-trip expenditure

21. Over the last 12 months, approximately how much did you spend on the following to support your recreational hunting and/or sport/target shooting activities

	$1-$100	$101-$500	$501-$1,000	$1,001 - $2,000	$2,001 - $5,000	$5,001 - $10,000	$10,001 or more	Can't recall
Firearms, bows, other firearm equipment and ammunition	○	○	○	○	○	○	○	○
Hunting/target shooting club memberships	○	○	○	○	○	○	○	○
Licenses/permits (e.g. firearm licences, game hunting licences/permits, etc.)	○	○	○	○	○	○	○	○
Training to support your hunting/target shooting activities (e.g. target practice)	○	○	○	○	○	○	○	○
Vehicles/motorbikes/boats (purchased with hunting in mind)	○	○	○	○	○	○	○	○
Vehicle maintenance	○	○	○	○	○	○	○	○
Other equipment to support your hunting/target shooting activities (e.g. vehicle equipment/accessories, safety equipment, camping equipment, clothing, knives, binoculars, etc.)	○	○	○	○	○	○	○	○
Other items	○	○	○	○	○	○	○	○

22. In what State was the business where you spent most of the money on those items?

	ACT	NSW	Qld	SA	Tas	Vic	WA	NT	Overseas	Unsure/can't recall
Firearms, bows, other firearm equipment and ammunition	○	○	○	○	○	○	○	○	○	○
Hunting/target shooting club memberships	○	○	○	○	○	○	○	○	○	○
Licenses/permits (e.g. firearm licences, game hunting licences/permits, etc.)	○	○	○	○	○	○	○	○	○	○
Training to support your hunting/target shooting activities (e.g. target practice)	○	○	○	○	○	○	○	○	○	○
Vehicles/motorbikes/boats (purchased with hunting in mind)	○	○	○	○	○	○	○	○	○	○
Vehicle maintenance	○	○	○	○	○	○	○	○	○	○
Other equipment to support your hunting/target shooting activities (e.g. vehicle equipment/accessories, safety equipment, camping equipment, clothing, knives, binoculars, etc.)	○	○	○	○	○	○	○	○	○	○
Other items	○	○	○	○	○	○	○	○	○	○

23. Where in that State was the expenditure?

	In the capital city of that State (Sydney includes Wollongong and Newcastle)	Elsewhere in the State	Not applicable - overseas	Unsure/can't recall
Firearms, bows, other firearm equipment and ammunition	○	○	○	○
Hunting/target shooting club memberships	○	○	○	○
Licenses/permits (e.g. firearm licences, game hunting licences/permits, etc.)	○	○	○	○
Training to support your hunting/target shooting activities (e.g. target practice)	○	○	○	○
Vehicles/motorbikes/boats (purchased with hunting in mind)	○	○	○	○
Vehicle maintenance	○	○	○	○
Other equipment to support your hunting/target shooting activities (e.g. vehicle equipment/accessories, safety equipment, camping equipment, clothing, knives, binoculars, etc.)	○	○	○	○
Other items	○	○	○	○

National Recreational Hunting and Sports Shooting Survey 2019

Your non-trip expenditure

* 24. What proportion of your NON TRIP expenditure on the following relates to your recreational hunting or sport/target shooting activities?

	None	1% to 25%	26% to 50%	51% to 75%	76% to 100%
Vehicles/motorbikes/boats (purchased with hunting in mind)	○	○	○	○	○
Vehicle maintenance	○	○	○	○	○
Other equipment to support your hunting/target shooting activities (e.g. vehicle equipment/accessories, safety equipment, camping equipment, clothing, knives, binoculars, etc.)	○	○	○	○	○
Other items	○	○	○	○	○

National Recreational Hunting and Sports Shooting Survey 2019

Social and wellbeing effects of recreational hunting/sports shooting

* 25. Imagine you are given a choice of going hunting/sports shooting or doing another recreational activity over a weekend (weather permitting). Which would you choose?

	I'd choose this activity	I'd find it hard to choose (I like both equally)	I'd go hunting/sports shooting
Fishing	○	○	○
Camping	○	○	○
Bushwalking	○	○	○
Four-wheel driving/dirt biking	○	○	○
Nature watching	○	○	○
Outdoor picnic/BBQ	○	○	○
Clothes shopping	○	○	○
Play favourite computer game	○	○	○
Go to big sports game (e.g. AFL, rugby, other game you follow)	○	○	○
Go to the gym	○	○	○

* 26. How important are the following activities to you?

	1 = Not at all important	2	3	4	5	6	7 = Very important
Going for a walk (other than bushwalking)	○	○	○	○	○	○	○
Bushwalking or hiking	○	○	○	○	○	○	○
Boating, canoeing, kayaking or paddle boarding	○	○	○	○	○	○	○
Jogging or running	○	○	○	○	○	○	○
Cycling on roads or cycle paths	○	○	○	○	○	○	○
Mountain biking	○	○	○	○	○	○	○
Swimming	○	○	○	○	○	○	○
Playing sports with others (e.g., tennis, football)	○	○	○	○	○	○	○
Gone to gym or exercise classes e.g. yoga	○	○	○	○	○	○	○
Camping	○	○	○	○	○	○	○
Horse riding	○	○	○	○	○	○	○
Four wheel driving or dirt biking	○	○	○	○	○	○	○
Rock climbing, abseiling	○	○	○	○	○	○	○
Fishing	○	○	○	○	○	○	○
Kayaking or canoeing	○	○	○	○	○	○	○
Aerial sports (e.g. paragliding, hang-gliding)	○	○	○	○	○	○	○
Snow sports	○	○	○	○	○	○	○
Recreational hunting/sports shooting	○	○	○	○	○	○	○
Other outdoor or sports activities	○	○	○	○	○	○	○

National Recreational Hunting and Sports Shooting Survey 2019

Social and wellbeing effects of recreational hunting/sports shooting

* 27. In the last week, how many times have youwalked continuously, for at least 10 minutes, for recreation, exercise or to get to or from places?

National Recreational Hunting and Sports Shooting Survey 2019

Social and wellbeing effects of recreational hunting/sports shooting

* 28. Over the last week, what was the total time that you spent walking continuously for at least 10 minutes?

Your best guess is fine

National Recreational Hunting and Sports Shooting Survey 2019

Social and wellbeing effects of recreational hunting/sports shooting

* 29. In the last week, how many times did you do any vigorous gardening or heavy work around the yard, which made you breathe harder or puff and pant?

National Recreational Hunting and Sports Shooting Survey 2019

Social and wellbeing effects of recreational hunting/sports shooting

* 30. Over the last week, what was the total time you spent doing vigorous gardening or heavy work around the yard, which made you breathe harder or puff and pant?

Your best guess is fine

National Recreational Hunting and Sports Shooting Survey 2019

Social and wellbeing effects of recreational hunting/sports shooting

* 31. In the last week, excluding household chores, gardening or yard work, how many times did you perform any vigorous physical activity, such as jogging, cycling , aerobics or competitive tennis, which made you breathe harder or puff and pant?

National Recreational Hunting and Sports Shooting Survey 2019

Social and wellbeing effects of recreational hunting/sports shooting

* 32. Over the last week, what was the total time excluding household chores, gardening or yard work, you performed any vigorous physical activity, such as jogging, cycling , aerobics or competitive tennis, which made you breathe harder or puff and pant?

Your best guess is fine

National Recreational Hunting and Sports Shooting Survey 2019

Social and wellbeing effects of recreational hunting/sports shooting

* 33. In the last week, how many times did you perform other more moderate physical activities, such as gentle swimming, golf or tennis, that you have not already mentioned?

National Recreational Hunting and Sports Shooting Survey 2019

Social and wellbeing effects of recreational hunting/sports shooting

* 34. Over the last week, what was the total time you spent doing these other more moderate physical activities?

Your best guess is fine

National Recreational Hunting and Sports Shooting Survey 2019

Social and wellbeing effects of recreational hunting/sports shooting

* 35. In an average three hours spent on recreational hunting or sport shooting, what percentage of the time would you typically spend doing the following?

The total must add to 100%

Sitting/travelling in a vehicle	
Walking briskly	
Walking slowly	
Standing/squatting	
Sitting but not in a vehicle	

National Recreational Hunting and Sports Shooting Survey 2019

Social and wellbeing effects of recreational hunting/sports shooting

* 36. Thinking about your own life and personal circumstances, how satisfied are you with the following?

	0 = Completely dissatisfied	1	2	3	4	5	6	7	8	9	10 = Completely satisfied
Your life as a whole	○	○	○	○	○	○	○	○	○	○	○
Your standard of living	○	○	○	○	○	○	○	○	○	○	○
Your health	○	○	○	○	○	○	○	○	○	○	○
What you are currently achieving in life	○	○	○	○	○	○	○	○	○	○	○
Your personal relationships	○	○	○	○	○	○	○	○	○	○	○
How safe you feel	○	○	○	○	○	○	○	○	○	○	○
Feeling part of your community	○	○	○	○	○	○	○	○	○	○	○
Your future security	○	○	○	○	○	○	○	○	○	○	○

National Recreational Hunting and Sports Shooting Survey 2019

Social and wellbeing effects of recreational hunting/sports shooting

* 37. How important to you are the following things about recreational hunting/sport shooting?

	1 = Not at all important	2	3	4	5	6	7
Relaxing/unwinding	○	○	○	○	○	○	○
Spending time outdoors	○	○	○	○	○	○	○
Spending time in nature	○	○	○	○	○	○	○
Spending time on your own	○	○	○	○	○	○	○
Spending time with family	○	○	○	○	○	○	○
Spending time with friends	○	○	○	○	○	○	○
The enjoyment of hunting	○	○	○	○	○	○	○
The challenge of hunting	○	○	○	○	○	○	○
Hunting for food that my household then eats	○	○	○	○	○	○	○
Learning about nature/the environment	○	○	○	○	○	○	○
Learning new skills e.g. improving hunting/sport shooting skills	○	○	○	○	○	○	○
Feeling a sense of achievement	○	○	○	○	○	○	○
Getting physically active	○	○	○	○	○	○	○
The challenge of sport shooting	○	○	○	○	○	○	○
The enjoyment of sport shooting	○	○	○	○	○	○	○

National Recreational Hunting and Sports Shooting Survey 2019

Demographics

Finally a few questions to help us check we have surveyed a good cross section of recreational hunters/sports shooters

* 38. Are you ...?

- ○ Male
- ○ Female
- ○ Other

39. Are you aged ...?

- ◯ 18 to 29
- ◯ 30 to 39
- ◯ 40 to 49
- ◯ 50 to 59
- ◯ 60 to 74
- ◯ 75+

* 40. How did you hear about this survey?

- ◯ Received an email invitation
- ◯ It was advertised on a club's website
- ◯ Read about it in a club newsletter
- ◯ Told about it by friends
- ◯ Saw it advertised on Facebook
- ◯ Other
- ◯ Can't recall

Appendix B: Detailed expenditure estimates

Table B-1: Hunting and sports shooting total expenditure profile by state ($m)

CATEGORY	NSW	VIC	QLD	SA	WA	TAS	NT	ACT
Fuel	61	44	24	14	10	8	7	4
Groceries (including dog food), drinks and alcohol for self-catering/consumption at your accommodation.	42	35	16	11	7	7	5	3
Ammunition	22	22	12	6	5	3	3	2
Takeaways and restaurant meals	24	21	10	6	4	4	3	2
Hunting equipment (e.g. decoys, clothing).	18	17	13	4	2	3	2	1
Accommodation	27	22	12	8	5	5	4	3
Fees to landowners	12	5	6	2	2	3	2	1
Vehicle/motorbike/boat repairs.	15	13	6	3	3	2	2	2
Other items	16	12	6	4	2	2	3	2
Sub-total (on-trip)	237	192	106	59	38	37	31	20
Firearms, bows, other firearm equipment and ammunition.	229	169	100	62	49	33	18	5
Hunting/target shooting club memberships.	35	28	14	12	8	6	3	1
Licenses/permits (e.g. firearm licences, game hunting licences/permits, etc.).	31	25	12	9	6	6	2	1
Training to support your hunting/target shooting activities (e.g. target practice).	26	23	11	7	7	3	3	1
Vehicles/motorbikes/boats (purchased with hunting in mind).	33	26	11	6	5	4	4	1
Vehicle maintenance	18	14	7	4	3	2	2	1
Other equipment to support your hunting/target shooting activities (e.g. vehicle equipment/accessories, safety equipment, camping equipment, clothing, knives, binoculars, etc.).	36	29	15	9	6	6	3	1
Other items	7	6	3	2	2	1	1	0
Sub-total (off-trip)	413	320	174	110	85	60	37	11
Total (on-trip + off-trip)	1,301	1,024	561	339	247	195	135	61

Appendix C: Substitutability of hunting for other activities

Substitutability of hunting for other activities

For some people, hunting is an activity that is unique and provides benefits that cannot readily achieve by engaging in other activities. For others, hunting is an activity that has similar benefits to others they engage in, which can be substituted for hunting if needed.

Understanding the substitutability of hunting is important for a number of reasons. In particular, the extent to which hunting and other activities are substitutable influences whether a change in hunting will trigger a drop in expenditure, or a switch in expenditure. While some expenditure on hunting is specific to the activity of hunting or shooting (e.g. expenditure on ammunition), other expenditure is not specific to hunting/shooting (e.g. spending on accommodation, food, restaurants). For example, a person for whom bushwalking and hunting are reasonably substitutable may, if hunting is not possible, still spend the same amount on accommodation and food and go camping instead. One for whom these are not substitutable might not spend anything on accommodation and food if the hunting activity is no longer available.

Substitutability is a difficult concept to measure. In the absence of being able to track change in behaviour of people when one recreational activity is unavailable, it is only possible to measure substitutability by examining people's stated preferences regarding activities. This has important limitations: in particular, a person's stated preferences can differ to their actual behaviour if the situation they are being asked to state preferences for occurs. Thus the data collected on stated preferences in relation to substituting activities can be considered a broad guide to substitutability only.

Substitutability can be analysed by examining *current behaviour*, by identifying the extent to which on current hunting trips hunting is combined with other activities, and whether hunting is typically the main purpose of trips or is secondary to other activities. This provides insight into substitutability through identifying the extent to which hunting is the primary driver of expenditure on trips, however it does not provide a strong measure of substitutability.

Substitutability can also be examined by asking participants to state their preferences for hunting versus other activities. This was asked in two different ways in the survey. First, all hunters were asked to rate how important each of a list of 19 activities were to them, one of which was recreational hunting/sports shooting. The activities listed focused on those most directly substitutable with hunting in terms of involving outdoors activities, often in nature areas, with some element of physical challenge, and answers provide insight into which activities are considered as important as hunting or shooting.

Second, survey participants were asked if, given a choice between hunting/sports shooting and any of 10 other activities on a weekend, they would choose hunting/shooting or the other activity, or would find it hard to choose between them. This again provides an indication of the relative importance of hunting/shooting compared to other activities, and was given a score of 0 if hunting/shooting was preferred for all 10 activities, a score of 1 for every activity considered equally preferred to hunting/shooting, and a score of 2 for each activity preferred to hunting/shooting, giving a score from 0 to 20.

The two scores were compared for consistency, to identify variability between them, and the average of the two used as the overall substitutability score.

The sections below examine substitutability of hunting and shooting for other activities using these different measures.

1.1 Evaluating substitutability: Is hunting/shooting usually the primary or the secondary purpose of trips?

If hunting or shooting are usually the secondary rather than primary purpose of trips, this indicates a high level of substitutability of other activities with hunting and shooting. This was examined by asking about hunting and shooting trips undertaken in the last year. Survey participants were asked for what proportion of their hunting/shooting trips in the last year recreational hunting or sports/target shooting was the primary purpose of the trip. This identified whether people are usually undertaking hunting and/or sports/target shooting as a 'side activity' on a trip they would have taken irrespective of the hunting activity, or whether hunting was the primary activity. Where hunting or sports/target shooting is the primary activity, it is much more likely that all trip related expenditure is dependent on the hunting or sports/target shooting activity. If hunting or sports/target shooting is not the main activity, it is likely expenditure on accommodation, travel etc would occur irrespective of whether hunting/shooting was part of the trip. To analyse this, the proportion of all trips for which hunting and/or sports shooting was and wasn't the main purpose of the trip was calculated.

Responses to these questions show that hunting/shooting is usually the primary purpose of trips in which these activities occur. Of all hunters/shooters:

- 1.6% reported that hunting or shooting was not the main purpose of any of their hunting/shooting trips in the last year
- 5.7% reported hunting/shooting was the primary purpose of 1% to 25% of trips
- 5.8% reported hunting/shooting was the primary purpose of 26% to 50% of trips
- 11.2% reported hunting/shooting was the primary purpose of 51% to 75% of trips
- 75.7% reported hunting/shooting was the primary purpose of 76% to 100% of trips.

This was similar across both hunting and sports/target shooting trips. This indicates that the majority of hunting and shooting trips would not still have occurred in the absence of the hunting/shooting activity, with the majority of expenditure attributable to the activity of hunting/shooting.

When examined by number of trips undertaken (Figure C-1 and Figure C-2), the dominance of hunting/shooting as the primary purpose of trips is apparent, with those who went hunting/shooting more often in the last year most likely to report that hunting was the main purpose of the trip, while those who only went on one or two hunting trips were more likely to report hunting/shooting being the main purpose of less than half their hunting/shooting trips.

This indicates that it is important to understand not only the proportion of hunters for whom hunting was the primary purpose of most trips, but the proportion of hunting trips in the last year. To estimate the proportion of hunting/shooting trips for which hunting/shooting was the primary activity, the number of trips reported by each hunter was calculated based on the mid-point of the categories asked about (if a person reported they went hunting 1-2 times they were estimated to have gone on 1.5 hunting trips, if they reported 3-4 trips, they were estimated to have hunted 3.5 times, and so on). In total this identified that the 17,047 hunters who reported hunting once or more in the last twelve months went on approximately 132,800 hunting trips in total, while the 17,006 who reported going on a sports/target shooting trip once or more in the last year went on a total of approximately 168,800 shooting trips. When calculated as a proportion of *hunting/shooting trips* rather than *hunters/shooters*, hunting or shooting was the primary purpose of 82.6% of all hunting or shooting trips (higher than the 75.7% of hunters/shooters due to the high proportion of those who hunt more frequently for whom hunting/shooting was the primary purpose), including 79.7% of all hunting trips and 85.0% of all sports/target shooting trips (Figure 3).

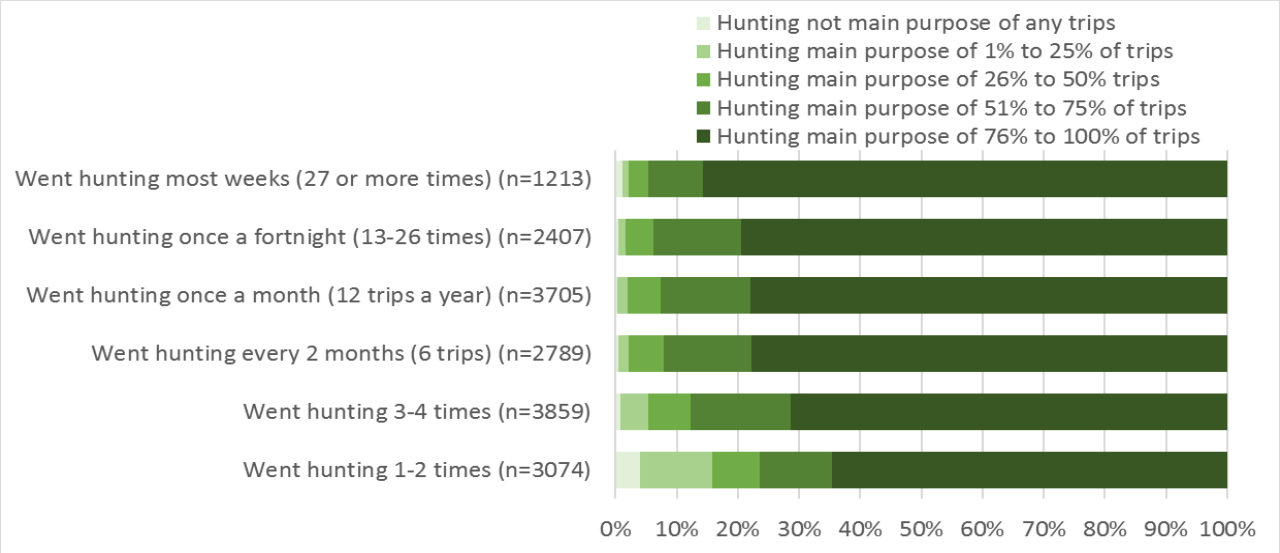

Figure C-1: Proportion of hunting trips in the last year for which the primary purpose of the trip was hunting, by hunting avidity

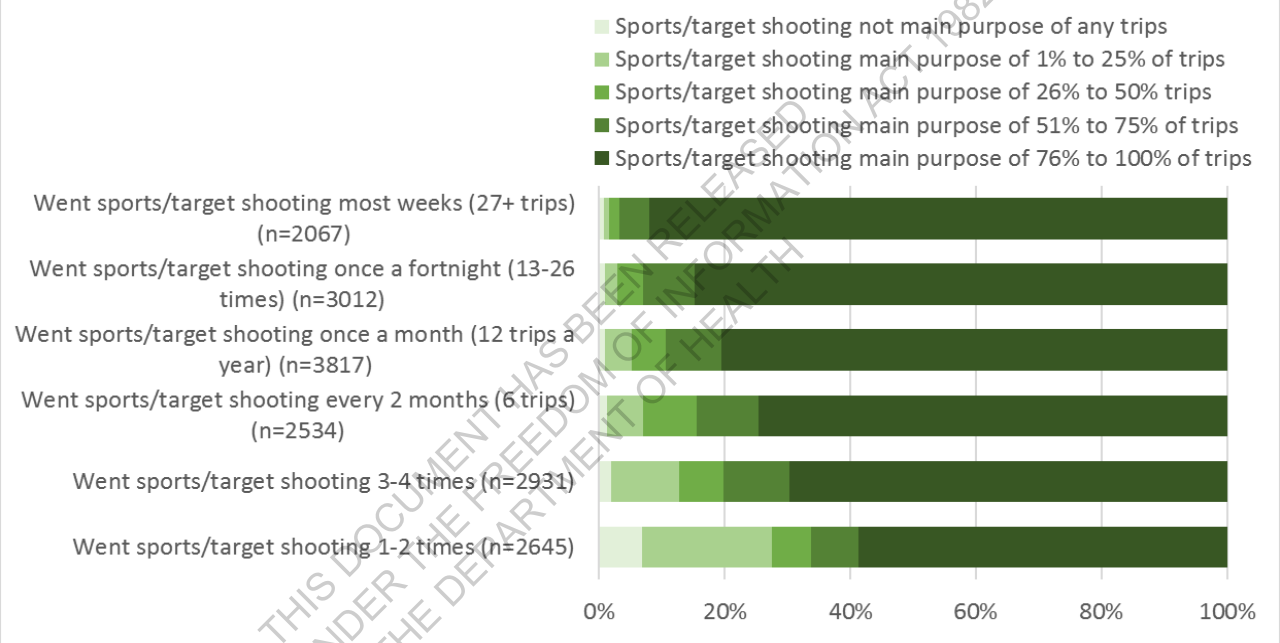

Figure C-2: Proportion of shooting trips in the last year for which the primary purpose of the trip was shooting, by shooting avidity

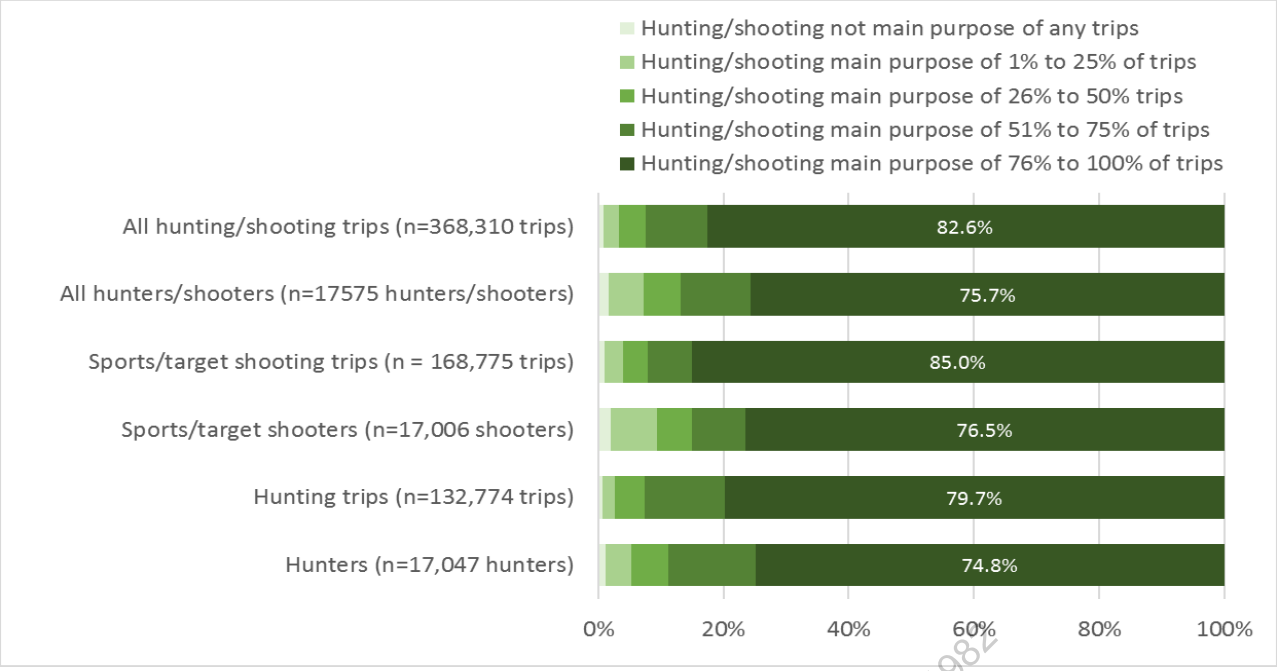

Figure C-3: Proportion of hunting/shooting trips in the last year for which the primary purpose of the trip was shooting, by (i) number of hunters and (ii) number of hunting trips

The data were further examined to identify whether substitutability varied for hunters/shooters depending on their gender and age. While the number of hunting and shooting trips declined with age (Table C-1 and Table C-2), and women on average went hunting or shooting slightly fewer times than men in the last year, there was relatively little difference in the proportion of people who reported hunting/shooting was the primary purpose of trips in which these activities occurred (Table C-3 and Table C-4). Women were slightly less likely than men to have hunting as the primary activity undertaken on a hunting trip, and slightly more likely to report sports/target shooting was the primary purpose of shooting trips than men. Those aged 60 and over were less likely to report that hunting was the primary purpose of the trips in which they hunted than those who were younger, whereas for sports/target shooting, younger people – those aged under 40 – were slightly less likely to report that shooting was the primary purpose of the trip.

Table C-1: Number of *hunting* trips in the last year, by gender and age group

AGE	<5 TRIPS	5-12 TRIPS	>12 TRIPS
Female	46.2%	31.3%	22.5%
Male	43.0%	37.0%	20.0%
Age 18-29	29.8%	35.8%	34.4%
Age 30-39	34.7%	40.7%	24.6%
Age 40-49	41.4%	38.5%	20.1%
Aged 50-59	46.6%	36.3%	17.1%
Age 60-74	51.7%	33.9%	14.4%
Aged 75+	64.9%	26.7%	8.4%

Table C-2: Number of *shooting* trips in the last year, by gender and age group

AGE	<5 TRIPS	5-12 TRIPS	>12 TRIPS
Female	39.7%	30.9%	29.3%
Male	42.4%	32.3%	25.4%
Age 18-29	44.5%	33.4%	22.1%
Age 30-39	45.8%	34.4%	19.8%
Age 40-49	44.1%	33.1%	22.9%
Aged 50-59	39.7%	33.7%	26.7%
Age 60-74	39.8%	29.1%	31.2%
Aged 75+	40.0%	23.7%	36.2%

Table C-3: Proportion of *hunting* trips for which the primary purpose was hunting/shooting, by gender and age group

AGE	<51%	51% TO 75%	76% TO 100%
Female	16.3%	12.4%	71.3%
Male	10.0%	13.5%	76.5%
Age 18-29	8.4%	14.8%	76.8%
Age 30-39	7.8%	15.0%	77.2%
Age 40-49	9.0%	13.2%	77.9%
Aged 50-59	10.1%	11.6%	78.4%
Age 60-74	13.5%	13.7%	72.8%
Aged 75+	20.0%	14.1%	65.9%

Table C-4: Proportion of *shooting* trips for which the primary purpose was hunting/shooting, by gender and age group

AGE	<51%	51% TO 75%	76% TO 100%
Female	11.3%	4.9%	83.8%
Male	14.5%	8.3%	77.2%
Age 18-29	18.0%	9.9%	72.1%
Age 30-39	17.0%	8.3%	74.7%
Age 40-49	14.9%	7.2%	77.9%
Aged 50-59	12.2%	8.3%	79.5%
Age 60-74	12.5%	8.4%	79.1%
Aged 75+	15.3%	7.2%	77.4%

Overall, existing behaviour of hunters and shooters indicates that the large majority of hunting and shooting trips are principally undertaken for the purpose of hunting and shooting, and not primarily for other purposes (e.g. camping, travelling). This in an indicator of potentially low substitutability as hunting and shooting are not typically undertaken as part of a trip involving multiple equally important activities, but instead are usually undertaken in a trip designed specifically around the activity of hunting or shooting.

1.2 Evaluating substitutability: Relative importance of hunting/shooting and other activities

Survey participants were asked to rate how important each of a list of 19 activities involving outdoor, nature-based, physical activity were to them, one of which was recreational hunting/sports shooting. The activities listed focused on those most directly substitutable with hunting in terms of involving outdoors activities, often in nature areas, with some element of physical challenge, and included walking, bushwalking, boating/canoeing, cycling, mountain biking, swimming, playing sports with others, going to the gym, camping, horse rising, four wheel driving, rock climbing, aerial sports, snow sports, and other outdoor/sports activities. By comparing the mean importance score given to different activities, it was possible to identify the ranking of hunting compared to other activities: activities ranked higher or equal to hunting are more likely to be substitutable in terms of providing important benefits to a person, and those ranked less important are less likely to be substitutable.

Unsurprisingly, hunters and shooters were most likely to rank hunting/shooting as an important activity out of the 19 activities asked about (Figure C-4), with 92.1% reporting hunting/shooting was an important activity to them. The other activities most commonly nominated as being very important were camping (45.5%), fishing (39.3%), and four wheel driving or dirt biking (26.7%). Less than 20% of survey participants nominated each of the other activities asked about as being very important to them. This indicates that activities that often occur in the same trips as hunting/shooting, such as camping and fishing, are those most 'substitutable' for hunting and shooting in terms of providing benefits that result in people considered them important recreational activities.

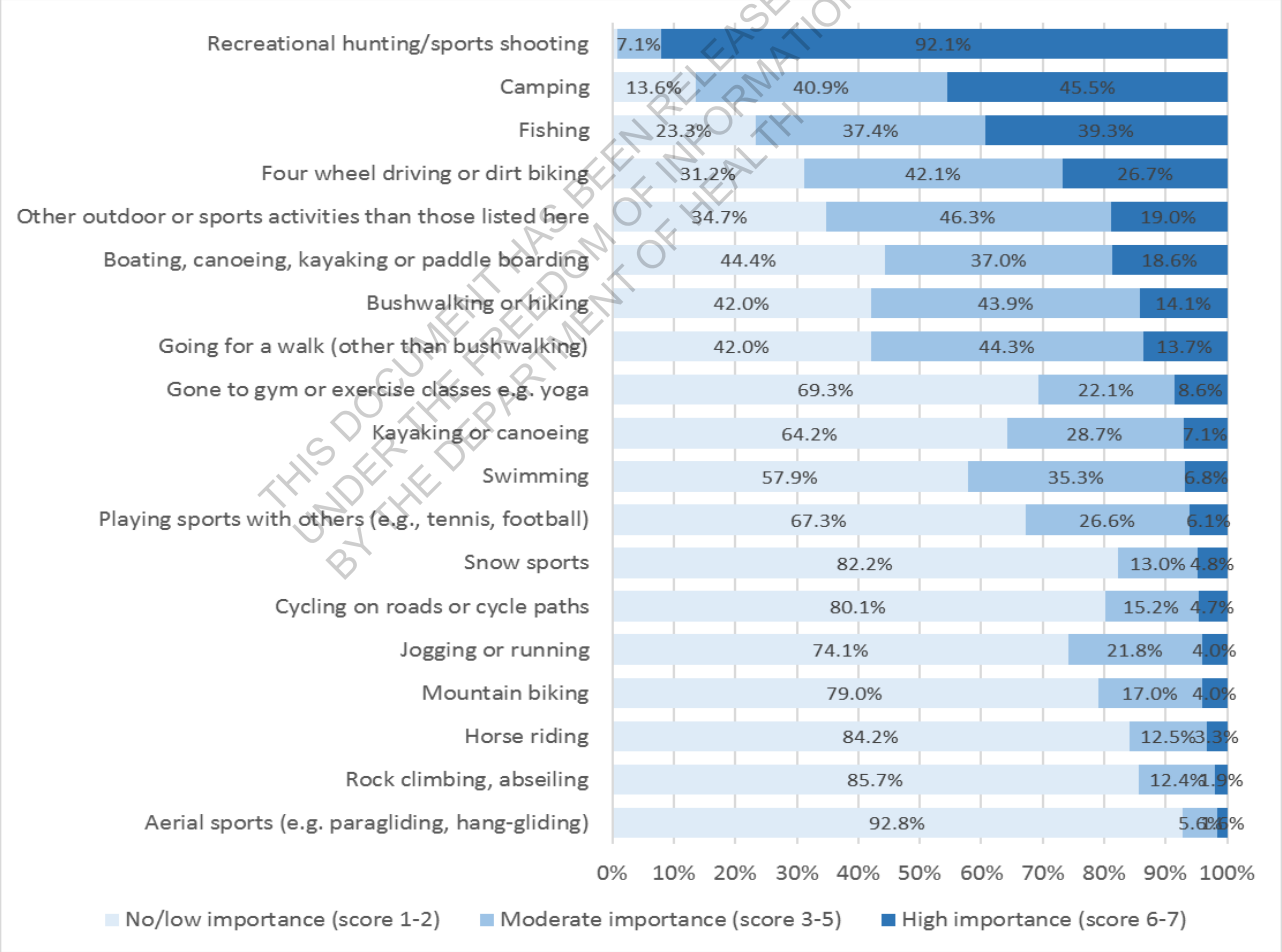

Figure C-4: 'How important is this activity to you' – rating of importance of 19 recreational activities

To better understand the proportion of hunters/shooters who had at least one other recreational activity they considered to be as important to them as hunting or shooting, each person was assigned a score based on the relative ranking of hunting to other activities, calculated as a score in which a person was given 2 points for each activity ranked more important than hunting, 1 point for each activities ranked equally important to hunting, and a score of 0 for all activities ranked as less important than hunting. In general, activities were rarely ranked more important than hunting: even for camping, the activity most commonly reported to be more important than hunting, only 2.8% ranked it as more important than hunting. Given this, Figure C-5 combines scores of those who reported other activities being equally and more important than hunting. As shown in Figure C-5, there were only three activities that more than one in five hunters/shooters considered equally or more important than hunting/shooting: camping, fishing, and four-wheel driving or dirt biking.

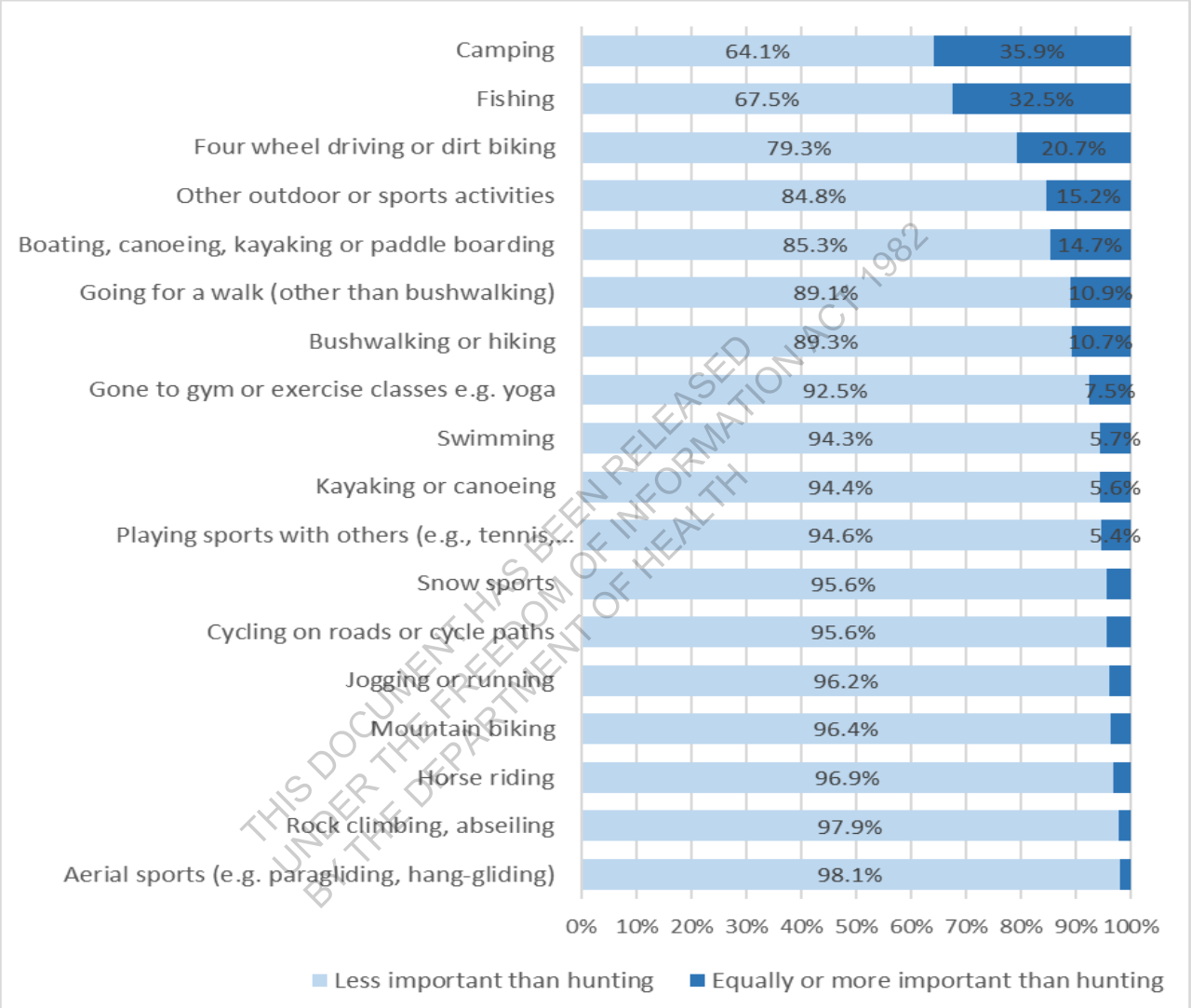

Figure C-5: How important is this activity to you' – relative importance of 18 recreational activities compared to hunting/shooting

Summing the relative importance scores across all activities gave a score from 0 (hunting not at all substitutable for other activities in terms of importance) to a maximum of 20 indicating that multiple activities were considered as or more important than hunting (technically, scores could reach as high as 36, but were capped at 20 to avoid outliers from the very small numbers of people with a score higher than this). Overall, as shown in Figure C-6, 62.5% of hunters/shooters reported at least once activity being equally important to or more important than hunting/shooting, with most of these identifying only one or two activities that were equally/more important. For 37.5%, none of the other 18 activities asked about were equally important or more important than hunting or shooting, indicating lower substitutability of other activities for hunting/shooting.

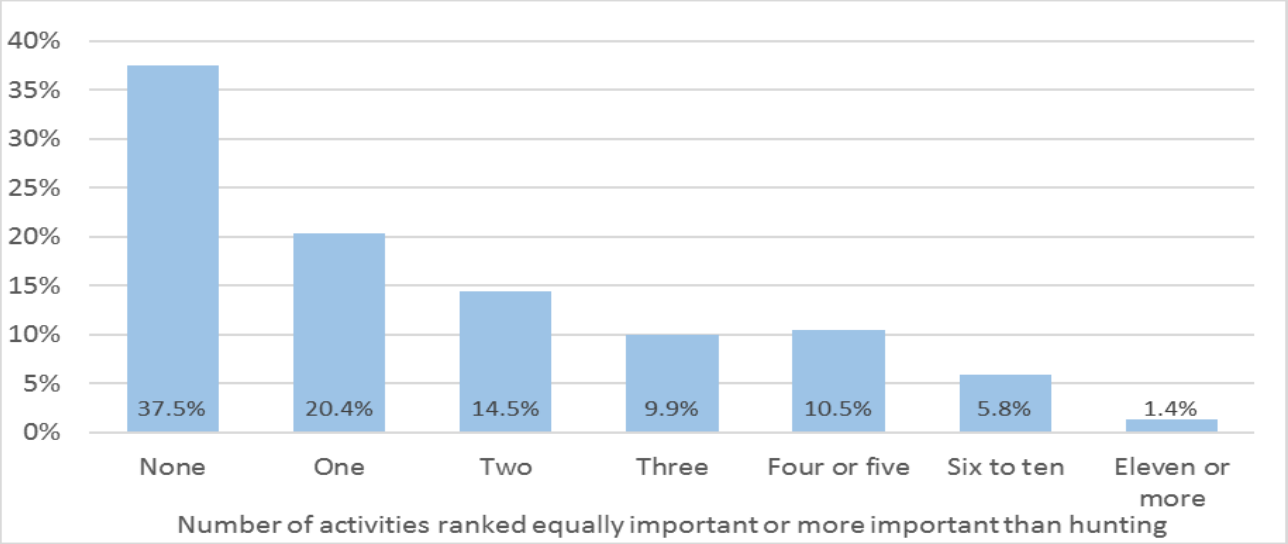

Figure C-6: 'How important is this activity to you': number of activities considered equally/more important than hunting

Relative importance of hunting versus other activities was similar for male and female hunters/shooters, but changed with age (Figure C-7). Younger hunters were more likely than older hunters to identify other activities as being equally or more important to hunting/shooting: only 30.8% of those aged 18 to 29 ranked hunting/shooting as more important to them than all other activities asked about, compared to 48.9% of those aged 75 or older. This suggests that the relative importance of hunting as an activity may be changing, with a wider range of activities considered substitutable by younger hunters/shooters compared to older generations.

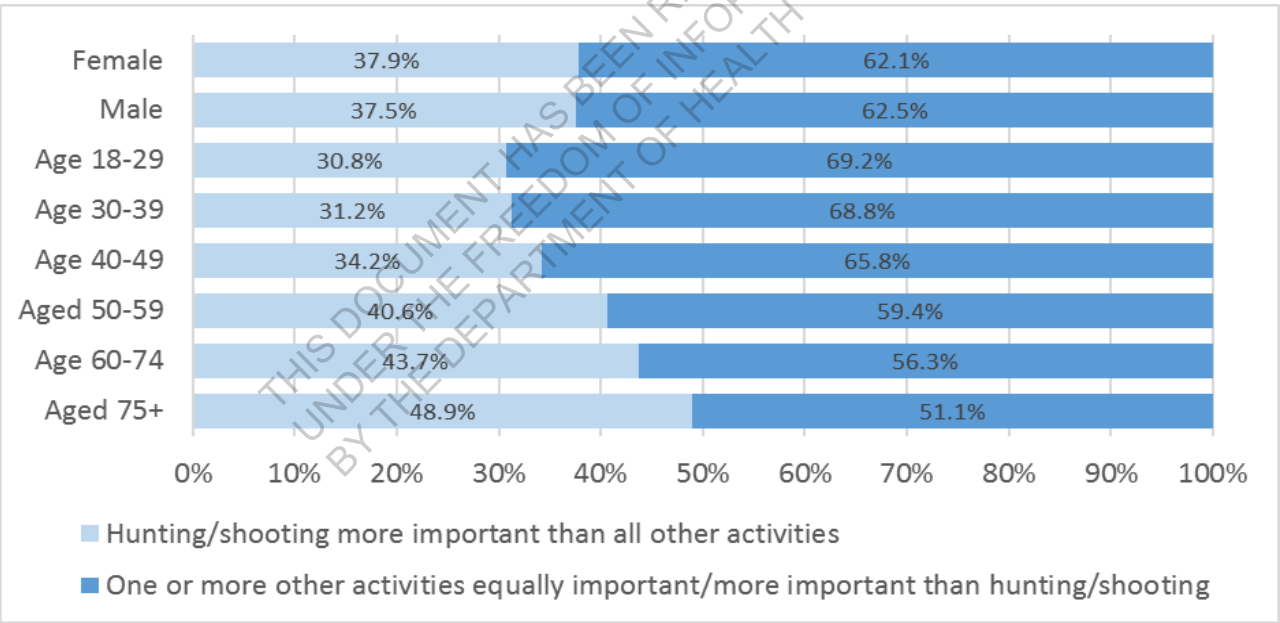

Figure C-7: 'How important is this activity to you': Number of activities considered equally/more important than hunting, by gender and age group

1.3 Evaluating substitutability: Choosing between hunting/shooting and other activities

Another way of evaluating substitutability is to ask a person if, given a choice of doing one or another activity, they would choose one or the other, or would find it hard to choose as they like both equally. This was asked for 10 activities, with survey participants asked if they would choose to go hunting/shooting versus camping, fishing, four-wheel driving/dirt biking, picnic/BBQ, bushwalking, nature watching, a big sports match, the gym, playing their favourite computer game, or clothes shopping.

Similar to the importance ranking, the activities most substitutable for hunting were camping, fishing and four-wheel driving/dirt biking, with the proportion who stated they would find it hard to choose between hunting and these activities or that they would choose the non-hunting/shooting activity being 52.6% for camping, 49.7% for fishing, 36.8% for four-wheel driving/dirt biking, and 36.8% for outdoor picnics/BBQs. This suggests that when asked to directly evaluate which they would choose, some of the non-hunting/shooting activities are considered relatively substitutable with hunting, more so than was evident when survey participants ranked the importance of each activity.

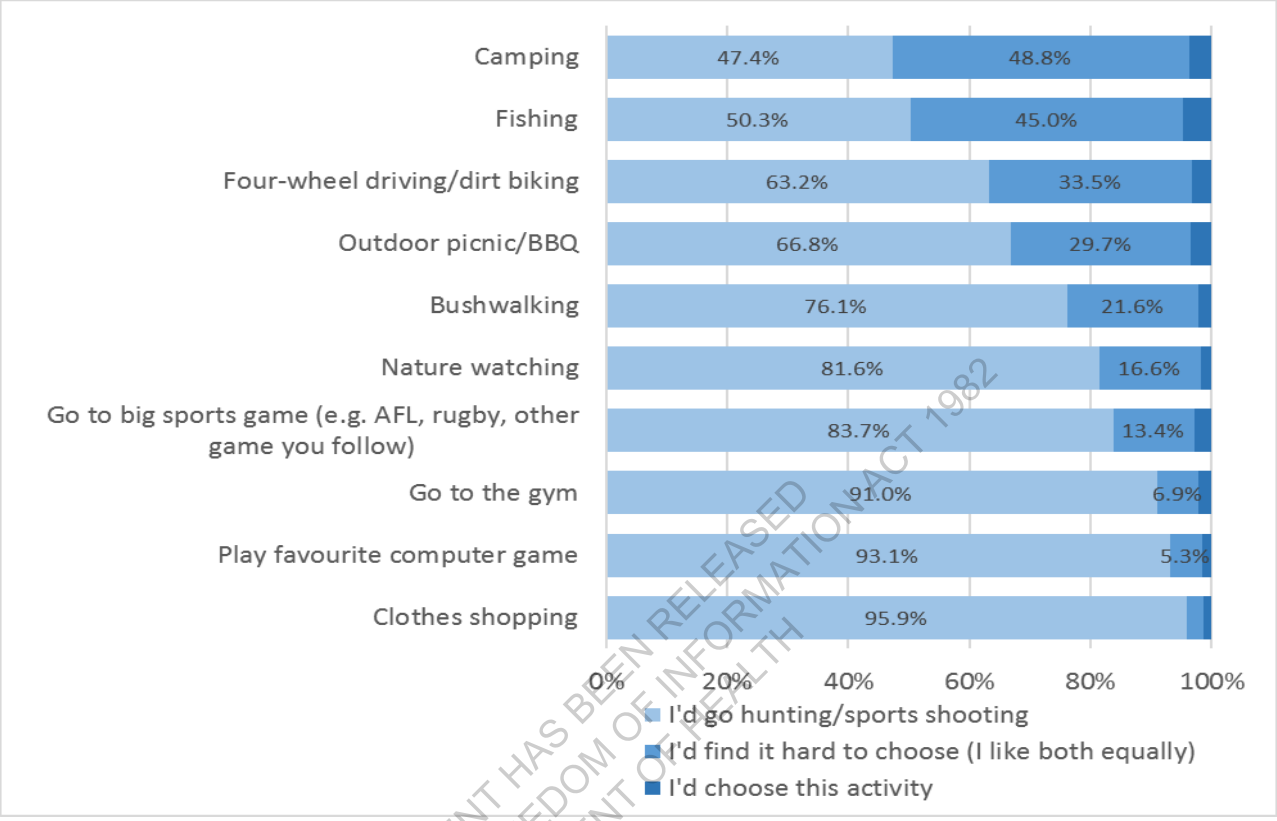

Figure C-8: Imagine you are given a choice of going hunting/sports shooting or doing another recreational activity over a weekend (weather permitting). Which would you choose?

When examined overall, only 21.9% of hunters/shooters indicated that they would always choose hunting/shooting in preference to all 10 activities asked about, while 45.0% indicated they there were one or two other activities they would find it hard to choose between or would prefer, and 33.1% identified three or more other activities. This was similar across male and female survey participants, and across most age groups (Figure C-9), with the exception of those aged 75 or older, who were more likely to preference hunting. This indicates that while older hunters/shooters are more likely to identify hunting as a highly important activity than younger hunters/shooters, when presented with a choice they often have other activities they enjoy doing, even if they aren't overall ranked as being as important as hunting/shooting.

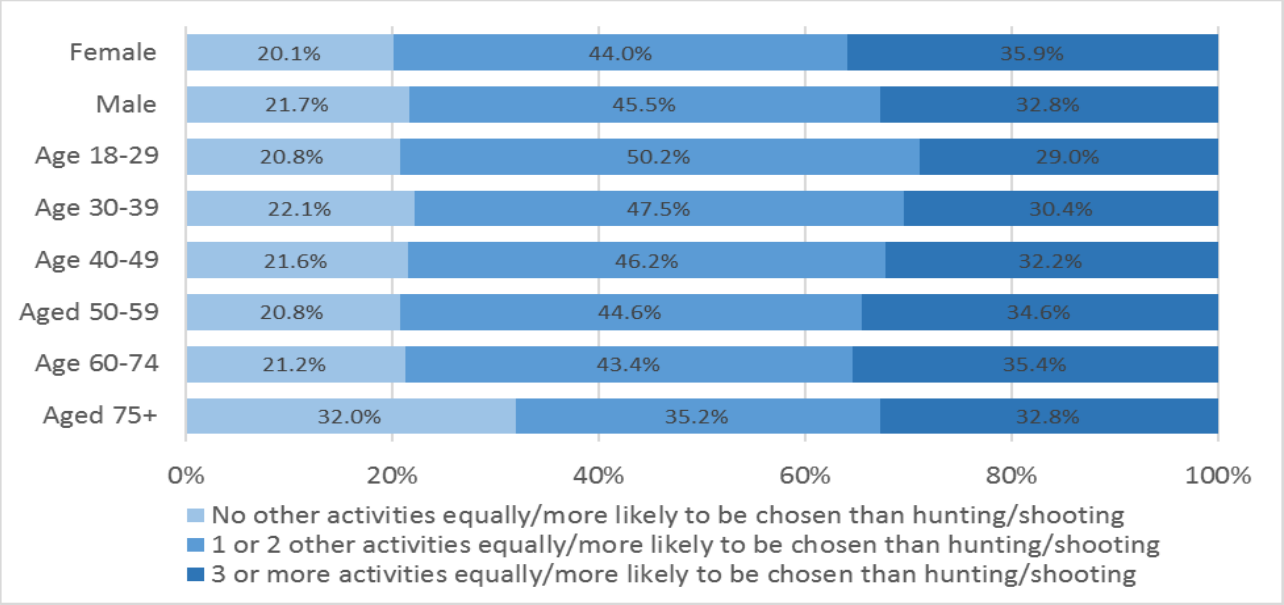

Figure C-9: Preference for going hunting/shooting versus 10 other activities if asked to choose on a weekend

1.4 Overall substitutability of hunting/shooting and other activities

Both the importance of hunting and the choice made between hunting and other activities when given options for a weekend are important measures of substitutability. Each gives somewhat different insight: 'importance' measures provide insight into how important hunting is to a person's recreational identity even if it isn't always chosen, while actual choice behaviour indicates relative ease and importance of hunting compared to other activities presented as options.

Overall likely substitutability of hunting for other activities in general was calculated as the average of the following two scores:

- Relative importance of hunting versus 19 other activities, score from 0 (no other activity ranked equally important or more important than hunting) to 20 (many other activities ranked equally/more important)
- Choice of hunting versus 10 other activities for a weekend (score of 0 = hunting always chosen in preference to other 10 activity, while score of 20 would indicates all 10 activities were chosen in preference to hunting; if hunting and all other activities were considered hard to choose between the score would be 10).

This gave an overall substitutability score from 0 to 20, which was used to estimate likely proportion of non-hunting specific expenditure that was reliant on hunting versus that which would likely still occur in the absence of hunting/shooting forming one of the mix of activities undertaken on a trip.

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