



Department of
Primary Industries

The New South Wales Hunter Education Handbook



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The NSW Hunter Education Handbook

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More information

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Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (June 2014). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of the Department of Primary Industries or the user's independent adviser.

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Department of
Primary Industries



ABOUT THIS HANDBOOK

The purpose of this handbook is to provide hunters in NSW with an excellent source of knowledge and information to assist them to hunt legally and responsibly. It was compiled by experts in the field of hunting.

To assist in the process of continual learning, NSW Department of Primary Industries (DPI) has published this Hunter Education Handbook.

The handbook can be used by:

- Hunter LEAP Providers and Trainers that are accredited by DPI to provide 'adequate training' for a NSW Restricted Game Hunting Licence (R-Licence);
- hunters who:
 - want to apply for an R-Licence.
 - want to further their knowledge of other hunting methods.
 - are hunting for the first time.
- individuals, clubs and organisations as a learning guide for the reinforcement of hunting knowledge and ethical practices.

THE GAME AND FERAL ANIMAL CONTROL ACT 2002

The *Game and Feral Animal Control Act 2002* (the Act) and its Regulation 2012 are administered by the NSW DPI Game Licensing Unit.

Objectives

The objects of the Act are:

1. to provide for the effective management of introduced species of game animals; and
2. to promote responsible and orderly hunting of those game animals on public and private land, and of certain feral animals on public land.

Game and Pest Management Advisory Board

The Game and Pest Management Advisory Board reports to the Minister for Primary Industries and has the following functions:

1. to represent the interests of licensed game hunters in matters arising under the Act,
2. to provide advice on request to the Minister or the Regulatory Authority on game and feral animal control,
3. to provide advice on request to the Minister on priorities for expenditure on research from the Game and Pest Management Trust Fund,
4. to provide advice to the Minister or the Regulatory Authority on educational courses relating to game hunting.

WHAT IS ADEQUATE TRAINING?

Under the *Game and Feral Animal Control Act 2002* and its Regulation 2012, the Regulatory Authority can only grant an R-Licence to applicants who:

1. have completed adequate training for the licence, and

2. are a member of a hunting club or organisation that has been approved by DPI (an Approved Hunting Organisation, known as an AHO).

The Regulation sets out the requirements for adequate training. The training must cover:

- relevant provisions of the Act, the Regulation and the Hunters' Code of Practice.
- principles for the safe use of firearms, bows and other hunting equipment.
- ethics of hunting, including laws relating to trespass.
- animal welfare issues relating to hunting.
- such other matters as considered appropriate.

The Regulatory Authority's functions under the Act are delegated to the DPI Game Licensing Unit.

The DPI R-Licence Accreditation Course is based on the Hunter Education Handbook and addresses each of these requirements.

AHOs may also apply to DPI for approval of their own course of training that covers the mandatory topics.

WHAT IS HUNTER LEAP?

Hunter LEAP is an education package that is available to hunting organisations and hunting industry businesses for the benefit of their members and customers. It makes hunter education accessible and flexible and provides hunters with opportunities to continually increase their knowledge and update their skills.

R-Licence training is only one part of Hunter LEAP. The education options under Hunter LEAP are:

- the R-Licence Accreditation Course.
- firearms and hunting safety training.
- short courses and workshops on a variety of hunting topics.

Talk to your Hunter LEAP Provider or Trainer for more information on other Hunter LEAP training.

About the R-Licence Accreditation Course

The DPI R-Licence Accreditation Course is an open-book, multiple-choice test where the answers can be found by reading the Hunter Education Handbook. You need to score 100% to be accredited.

Only accredited Hunter LEAP Trainers nominated by an accredited Hunter LEAP Provider can administer the DPI R-Licence Accreditation Course.

The NSW Hunter Education Handbook is divided into two sections and you need to pass both sections to complete the open-book test and qualify for an R-Licence.

Section 1: Training responsible game hunters

This section contains the following study units known as 'CASE'.

- 1.1 Code of Practice & law
- 1.2 Animal welfare
- 1.3 Safe hunting practices

1.4 Ethics and conservation

Section 2: R-Licence categories

This section contains the following study units known as 'categories'. You must complete at least one category to qualify for a NSW R-Licence.

2.1 Hunting with **Firearms**

A Rifles

B Shotguns

2.2 Hunting with **Blackpowder Firearms**

2.3 Hunting with **Bows**

2.4 Hunting with **Dogs**

About the units

Each unit of study has the following structure and sections:

- Table of contents
- Glossary of terms
- Learning objectives
- Introduction
- Hunting information
- Practice exercises
- A list of reference books for further reading and learning
- Self-assessment

PREPARING FOR THE R-LICENCE ACCREDITATION COURSE

The R-Licence testing requirements ensure that applicants understand their responsibilities and relevant laws relating to game hunting practices in NSW. Membership with an Approved Hunting Organisation (AHO) ensures you have a peer support network.

AHOs are hunting organisations who apply to the Regulatory Authority for 'approved' status; they must have a constitution and disciplinary procedures in place to qualify for approval.

If you are new to hunting, it is highly recommended that you attend an accredited hunting course, in addition to completing the training requirements for an R-Licence.

Further information about AHOs and accredited training is available at www.dpi.nsw.gov.au/hunting or by phoning the Game Licensing Unit on 02 6391 3750.

Your responsibilities

- **If you have trouble reading and understanding the information in this book, you are required to advise your Hunter LEAP Trainer before attempting the test.**
- It is your responsibility to become a member of an AHO so you qualify for an R-Licence.
- You should read the compulsory units of study contained in this handbook and make sure you understand the information you learn. You can refer to the contents of this handbook at any time during the assessment to help you respond to the questions.

What happens after the test?

If you have successfully completed the accreditation requirements and are already a member of an AHO then you are ready to submit your licence application to the DPI Game Licensing Unit. With your Hunter LEAP Trainer, fill out and submit **Form A1 Application for a NSW Restricted Game Hunting Licence** and an **R-Licence Accreditation Form**.

If you already hold a NSW General Game Hunting Licence (G-Licence), fill in and submit **Form C Application for a NSW Restricted Game Hunting Licence (Upgrade or add categories)** and an **R-Licence Accreditation Form**.

Your licence will be processed in 20 working days.

Before you can book to hunt on public land you will first need to pass two additional online education courses on outdoor navigation and knowledge of Written Permission conditions. Successfully passing the training modules allows you to apply for Written Permission through the online hunt booking system.

Where can I hunt?

The R-Licence allows you to hunt, with permission, on both private and declared public land in NSW. The R-Licence incorporates the G-Licence conditions and you do not need to apply for both.

What can I hunt?

Non-indigenous game animals (licence required to hunt on public or private land)

Birds

Bobwhite Quail (*Colinus virginianus*)
 California Quail (*Lophortyx callipepla californicus*)
 Guinea Fowl (*Numida meleagris*)
 Partridge (*Alectoris alectoris chukar*)
 Peafowl (*Pavo cristatus*)
 Pheasant (*Phasianus phasianus colchicus*)
 Spotted Dove (*Streptopelia chinensis*)
 Turkey (*Meleagris gallopavo*)

Other animals

Deer (family *cervidae*)

Note: seasonal hunting conditions apply to certain deer species.

Native game birds (licence required to hunt on private land)

Note: Native Game Birds can only be hunted on private lands that are covered by a Native Game Bird Management (Owner/occupier) Licence.

Ducks

Australian Shelduck or Mountain Duck (*Tadorna tadornoides*)
 Australian Wood Duck or Maned Duck (*Chenonetta jubata*)
 Black Duck or Pacific Black Duck (*Anas superciliosa*)
 Blue-winged Shoveler or Australasian Shoveler (*Anas rhynchotis*)
 Chestnut Teal (*Anas castanea*)

Ducks (continued)

Grass Whistling Duck or Plumed Whistling Duck (*Dendrocygna eytoni*)

Grey Teal (*Anas gracilis*)

Hardhead Duck or White-eyed Duck (*Aythya australis*)

Pink-eared Duck (*Malacorhynchus membranaceus*)

Water Whistling Duck, Wandering Whistling Duck or Whistling or Wandering Tree Duck (*Dendrocygna arcuata*)

Quail

Brown Quail (*Coturnix ypsilophora*)

Stubble Quail (*Coturnix pectoralis*)

Pigeons

Common Bronzewing Pigeon (*Phaps chalcoptera*)

Crested Pigeon (*Ocyphaps lophotes*)

Non-indigenous animals (licence required to hunt on public land only)

Cat (*Felis catus*)

Dog (other than dingo) (*Canis familiaris*)

Goat (*Capra hircus*)

Fox (*Vulpes vulpes*)

Hare (*Lepus capensis*)

Rabbit (*Oryctolagus cuniculus*)

Pig (*Sus scrofa*)

Common Starling (*Sturnus vulgaris*)

Common or Indian Myna (*Acridotheres tristis*)

Feral Pigeon (*Columba livia*)

R-Licence types

- Standard
- Hunting guide
- Commercial
- Professional
- Visitor (where the visitor is hunting with the holder of an R-Licence).

R-Licence categories

You can apply for one or more of the following categories. If you pass the category, it will be listed on your licence which is your authorisation to use that method of hunting on public land. However, you cannot use the firearm categories unless you also hold a NSW Firearms Licence, issued by the NSW Police Force.

- Firearms (rifles and shotguns)
- Blackpowder firearms
- Bows
- Dogs.

SECTION ONE: CASE

UNIT 1.1 CODE OF PRACTICE AND LAW

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Glossary of terms

Webpage – the information located at an internet address that can be viewed using a browser program on your computer, such as Explorer, Firefox or Chrome.

Parliamentary Counsel – a Government body supervising the electronic storage and maintenance of all NSW legislation on a website available to the general public.

Act – an Act of the NSW Parliament containing the enforceable law of NSW.

Regulation – an administrative rule containing the details necessary to enforce the intent of an Act.

Learning objectives

On completion of this unit you will:

- be able to be tested for a NSW Restricted Game Hunting Licence with your nominated hunting method/s.
- know the NSW Code of Practice for game hunting.
- know how to access up to date NSW Government legislation online using a computer.
- know how to obtain detailed information from any Act or Regulation relevant to hunting in NSW.
- understand the penalty for trespass with a firearm in NSW.
- understand that NSW law in relation to cruelty to animals directs that no animal be allowed to suffer unnecessary pain.
- understand the general blanket protections extended to native fauna in NSW.
- understand the requirements of the *Firearms Act 1996*.
- understand the requirements of the *Game and Feral Animal Control Act 2002*.

Introduction

It is a condition of issue for a NSW Game Hunting Licence that the licence holder be aware of and obey all NSW legislation that relates to hunting, animal welfare and the use of firearms. This unit of study will assist you to abide by this licence condition.

New South Wales Code of Practice for hunting

The Code of Practice for hunting is legally binding in NSW under the *Game and Feral Animal Control Act 2002* and *Regulation 2012*. NSW licensed game hunters must obey this Code as a condition of their licence.

1. AWARENESS of relevant legislation

It is the responsibility of the holder of a NSW Game Hunting Licence to be aware of and comply with all relevant legislation relating to hunting, animal welfare and the use of firearms.

2. SAFE handling of firearms

Where firearms are used, the rules for safe handling set out in the *NSW Firearms Safety Awareness Handbook* published by or under the authority of the Commissioner of Police must be complied with at all times.

3. PERMISSION required to enter land

A NSW Game Hunting Licence does not authorise the holder of a licence to hunt on any land. The holder of a game hunting licence must not hunt on any land without the express authority of the occupier of the land.

4. TARGET IDENTIFICATION and safety

A game animal must not be fired at unless it can be clearly seen and identified and the shot taken poses no discernible risk of injury to any person or significant damage to any property.

5. OBLIGATION to avoid suffering

An animal being hunted must not be inflicted with unnecessary pain. To achieve the aim of delivering a humane death to a hunted animal:

- it must be targeted so that humane kill is likely
- it must be shot within the reasonably accepted killing range of the firearm and ammunition or bow and arrow being used, and
- the firearm and ammunition, bow and arrow or other thing used must be such as can be reasonably expected to humanely kill an animal of the target species.

6. Lactating female with dependent young

If a lactating female is killed, every reasonable effort must be made to locate and kill any dependent young.

7. Wounded animals

If an animal is wounded, the hunter must take all reasonable steps to locate it so that it can be killed quickly and humanely.

8. Use of dogs

Dogs and other animals may be used to assist hunters, but only if:

- their use is not in contravention with the *Prevention of Cruelty to Animals Act 1979* and,
- their use is with the permission of the occupier of the land concerned.

How to find information on hunting law

If you own or have access to a computer

Enter the website address www.legislation.nsw.gov.au or search the web for 'NSW legislation'.

This will take you to the home page of the NSW Parliamentary Counsel's Office.

If you do not have a computer

You cannot access print copies of legislation unless you print from the legislation website. You can either contact a printing company to download the file and print it for you, or seek assistance to access the internet.

It's important to remember that obtaining information online is very easy once you know how. Getting started is the difficult part. All you need to do is to ask for help to find the Parliamentary Counsel's home page address listed above.

Why not:

- ask a friend with a computer to help you.
- ask a member of the local hunting club to help you.
- visit a local community technology centre for assistance to access the NSW government website.
- seek help at your local library. In NSW, all local libraries have free online computer facilities.
- pay to use an internet café computer. Ask the staff for help.

Using the Parliamentary Counsel's website

All NSW law, including Acts and Regulations, can be found on this website.

If you know the name of the legislation you are looking for, simply click 'browse' and locate the page from an alphabetical list. You do not need to know the name of the Act or Regulation that you are looking for though; the site has advanced searching and browsing facilities.

Searching for legislation



The screenshot shows the homepage of the NSW legislation website. At the top left is the New South Wales Government logo and the text 'New South Wales Government NSW legislation'. Below this is a blue navigation bar with the following links: Search, Browse, Notification-Gazette, As Made, Bills, Tables, and Links. The 'Search' link is circled in red. Below the navigation bar, the page title is 'NSW legislation'. The main content area contains the following text: 'This is the official NSW Government website for online publication of legislation and is provided and maintained by the [Parliamentary Counsel's Office](#). The website contains:'. A bulleted list follows, detailing the types of legislation available, such as Acts, regulations, and historical versions. At the bottom, there is a link to 'About' and a note about 'Government Gazette' arrangements from 1 January 2014.

Once you have opened the front page of the website click on <Search> to open the search form.

You need to enter your keywords to start the search engine.

Make sure the 'Acts in Force' and 'Regs in Force' boxes are ticked.

In this example we have entered the words *game animal* in the 'exact phrase' field and clicked on <Search>.

New South Wales Government
NSW legislation

Search Browse Notification-Gazette As Made Bills Tables Links

Search In Force and Repealed

This search is for Acts, Regulations etc and EPIs as consolidated and in force or as repealed.

What do you want to search?

Search Acts Regs etc EPIs **Repealed** Acts Regs etc EPIs

Standard Search

exact phrase

all of the words

any of the words

without the words

search in Text Title

limit search to year and/or to

Search

A number of regulations and acts appear that use that phrase – including the *Game and Feral Animal Control Act 2002*, which is the Act we want.

New South Wales Government
NSW legislation

Search Browse Notification-Gazette As Made Bills Tables Links

Search > Search In Force and Repealed Results

Search In Force and Repealed Results

Document Types="Acts, Regs", Exact Phrase="game animal", Search In="Text"

Pages: 1

Displaying records 1 to 6 of 6

Food Regulation 2010

Game and Feral Animal Control Act 2002 No 64

Game and Feral Animal Control Further Amendment Act 2012 No 104

Game and Feral Animal Control Regulation 2012

Local Land Services Act 2013 No 51

National Parks and Wildlife Act 1974 No 80

Pages: 1

Click on its title and the next page will appear showing you the contents of this Act.

New South Wales Government
NSW legislation

www.legislation.nsw.gov.au

Search Browse Notification-Gazette As Made Bills Tables Links

Contents (2002 - 64)

Game and Feral Animal Control Act 2002 No 64

Status information

Long title

Part 1 Preliminary

1 Name of Act
2 Commencement
3 Objects
4 Definitions
5 Game animals for the purposes of this Act
6 Application of other legislation
6A Exemptions from certain offences under National Parks and Wildlife legislation
6B Orders and notices under other legislation

Part 2 Game and Pest Management Advisory Board

Whole title | Regulations | Historical versions | Historical notes | Search title | PDF

Results: Document Types="Acts, Regs", Exact Phrase="game animal", Search In="Text" match 0 of 10 records
Result titles | Result hits
Previous hit | Next hit

Game and Feral Animal Control Act 2002 No 64

Current version for 1 January 2014 to date (accessed 5 March 2014 at 14:48)
Status information

Status information

Currency of version
Current version for 1 January 2014 to date (accessed 5 March 2014 at 14:48).
Legislation on this site is usually updated within 3 working days after a change to the legislation.

Provisions in force

From the navigation list on the left-hand side, click on 'Part 1: Preliminary, 5: Game animals for the purpose of this Act'.

The definition of which game animals can be legally hunted under this Act now appears.

New South Wales Government
NSW legislation

www.legislation.nsw.gov.au

Search Browse Notification-Gazette As Made Bills Tables Links

Contents (2002 - 64)

Game and Feral Animal Control Act 2002 No 64

Status information

Long title

Part 1 Preliminary

1 Name of Act
2 Commencement
3 Objects
4 Definitions
5 Game animals for the purposes of this Act
6 Application of other legislation
6A Exemptions from certain offences under National Parks and Wildlife legislation
6B Orders and notices under other legislation

Part 2 Game and Pest Management Advisory Board

Whole title Regulations Historical versions Historical notes Search title PDF

Results: Document Types="Acts, Regs", Exact Phrase="game animal", Search In="Text"
Result titles | Result hits

Game and Feral Animal Control Act 2002 No 64

Current version for 1 January 2014 to date (accessed 3 March 2014 at 14:55)
Part 1 Section 5

5 Game animals for the purposes of this Act

(1) For the purposes of this Act, a *game animal* is any animal specified in Schedule 3 that is living in the wild.

(2) The Minister may, by order published on the NSW legislation website, amend Schedule 3:

(a) by adding the name or description of any animal (other than an animal of a species that was native to Australia before European settlement), or

(b) by omitting or amending any such name or description.

(3) Despite any other provision of this section, a game animal does not include any animal that is or is part of a threatened species, population or ecological community within the meaning of the *Threatened Species Conservation Act 1995*.

Top of page

Use the scroll bar to look at all the contents on this page.

You can navigate to any section of the Act using the navigation menu on the left-hand side.

Looking up penalties

Go back to the <Search> page.

New South Wales Government
NSW legislation

www.legislation.nsw.gov.au

Search Browse Notification-Gazette As Made Bills Tables Links

Search In Force and Repealed

This search is for Acts, Regulations etc and EPs as consolidated and in force or as repealed.

What do you want to search?

In Force
 Acts Regs etc EPs

Repealed
 Acts Regs etc EPs

Standard Search

exact phrase

all of the words trespassing firearm

any of the words

without the words

search in Text Title

limit search to year and/or No

Search

OR

Advanced Search

Search

This time enter the words *trespassing firearm* in the 'all of the words' section.

If you had put your keywords into the 'any of the words' field, you would find a long list of Acts that contain these words. By using 'all of the words', you have limited your search to ensure that you find the words when they appear in the same context.

In the above example, using the 'all of the words' field, you will only find one Act that contains both these words in the correct context: the *Crimes Act 1900*.

As this is a large Act, there are options to quickly locate the information on trespassing with firearms in the Act. On the right-hand side of the search result, click <Hits list>.

New South Wales Government
NSW legislation

www.legislation.nsw.gov.au

Search Browse Notification-Gazette As Made Bills Tables Links

Search > Search In Force and Repealed Results

Search In Force and Repealed Results

Document Types="Acts, Regs", Search In="Text", All Words="trespassing firearm"

Subscribe to this feed

Pages: 1

Displaying records 1 to 1 of 1

Crimes Act 1900 No 40

Pages: 1

Search in these titles

Search title Hits list | Home title

A new page is displayed showing the specific section of the Crimes Act we are interested in.

New South Wales Government
NSW legislation
www.legislation.nsw.gov.au

Search Browse Notification-Gazette As Made Bills Tables Links

Search > Search Results > Hits List

Document Types="Acts, Regs", Search In="Text", All Words="trespassing firearm" [Subscribe to this feed](#)

Pages: 1

Displaying records 1 to 1 of 1

Crimes Act 1900 No 40
Part 3A, Division 2, 93H Trespassing with or dangerous use of firearm or spear gun

Pages: 1

Click the new link that has appeared 'Part 3A, Division 2, 93H Trespassing with or dangerous use of firearm or spear gun'.

A new page is displayed containing the exact detailed information that we want.

New South Wales Government
NSW legislation
www.legislation.nsw.gov.au

Search Browse Notification-Gazette As Made Bills Tables Links

Contents (1900 - 40)

Crimes Act 1900 No 40

Status information

Long title

Part 1 Preliminary and interpretation

1 Name of Act
2 (Repealed)
3 Application of certain provisions of Act
3A, 3B (Repealed)
4 Definitions
4A Recklessness
4B Dishonesty
5, 6 (Repealed)
7 'Possession' when

Whole title Regulations Historical versions Historical notes
Search title PDF

Results: Document Types="Acts, Regs", Search In="Text", All Words="trespassing firearm" match 1 of 1 records
Result titles | Result hits 5 hits in page:

Crimes Act 1900 No 40

Current version for 31 January 2014 to date (accessed 5 March 2014 at 15:27)
Part 3A > Division 2 > Section 93H << page >>

93H Trespassing with or dangerous use of firearm or spear gun

(1) A person who, possessing a firearm, imitation firearm, spear gun or imitation spear gun, enters any building or land (other than a road), unless the person:

(a) is the owner or occupier of the building or land or has the permission of the owner or occupier, or

(b) does so with a reasonable excuse...

We've now found that the penalties for trespassing with a firearm are severe.

Another important Act to read is the Firearms Act 1996.

Go back to the search screen and type *firearms act* in the search field, then hit the search button. From the list of options, select *Firearms Act 1996*. This is the legislation that sets firearms licensing and training provisions.

New South Wales Government
NSW legislation
www.legislation.nsw.gov.au

Search Browse Notification-Gazette As Made Bills Tables Links

Contents (1996 - 46) Expand Collapse

Firearms Act 1996 No 46

Status information

Long title

Part 1 Preliminary

1 Name of Act
2 Commencement
3 Principles and objects of Act
4 Definitions
4A Meaning of 'possession' of a firearm—proof of possession
4B Meaning of 'close associate' of firearms dealer
4C Meaning of 'prohibited pistol'
4D Special provisions relating to imitation firearms
5 Amendment of Schedule 1 list of prohibited firearms
6 Application of Act
6AA Application of Commonwealth National Vocational Education and Training Regulator Act 2011
6A Exemption for certain firearms manufactured before 1900

Whole title Regulations Historical versions Historical notes Search title PDF

Firearms Act 1996 No 46

Current version for 6 January 2015 to date (accessed 15 April 2015 at 10:51)
Part 1 > Section 3

3 Principles and objects of Act

(1) The underlying principles of this Act are:

(a) to confirm firearms possession and use as being a privilege that is conditional on the overriding need to ensure public safety, and

(b) to improve public safety:

(i) by imposing strict controls on the possession and use of firearms, and

(ii) by promoting the safe and responsible storage and use of firearms, and

(c) to facilitate a national approach to the control of firearms.

Important hunting legislation

In addition to the *Game and Feral Animal Control Act 2002* and the *Crimes Act 1900*, hunters who use firearms must also be familiar with the *Firearms Act 1996*, which sets out the rules for firearms licensing as well as ownership and use. These are the six most important Acts that all hunters need to be aware of are:

- the *Game and Feral Animal Control Act 2002*
- the *Crimes Act 1900* in relation to trespass
- the *Firearms Act 1996*
- the *National Parks and Wildlife Act 1974*
- the *Prevention of Cruelty to Animals Act 1979*
- the *Companion Animals Act 1998*

In **summary**, to comply with these Acts you must:

- only hunt on property that you own or have written permission to hunt on.
- only use firearms safely, with appropriate licences and approved storage facilities.
- only hunt prescribed game in accordance with the Act and Hunters' Code of Practice.
- never inflict unnecessary pain and suffering on animals when hunting.

References for further reading and learning

Commons Management Regulation 2006

Crimes Act 1900

Crown Lands Act 1989

Firearms Act 1996

Firearms Regulation 2006

Forestry Act 2012

Forestry Regulation 2012

Game and Feral Animal Control Act 2002

Game and Feral Animal Control Regulation 2012

National Parks and Wildlife Act 1974

National Parks and Wildlife Regulation 2009

Prevention of Cruelty to Animals Act 1979

Prevention of Cruelty to Animals Regulation 2012

Weapons Prohibition Act 1998

Companion Animals Act 1998

Example assessment questions

QUESTION	ANSWER
Up to date information on all the laws and regulations relevant to hunting in NSW is available on the Parliamentary Counsel's web page www.legislation.nsw.gov.au .	True or False?
List four serious breaches of NSW law in relation to hunting.	1.
	2.
	3.
	4.
It is a licence condition that a NSW Game Hunting Licence holder must be aware of and obey all NSW legislation that relates to hunting, animal welfare and the use of firearms.	True or False?
List four Acts of the NSW Parliament that regulate hunting.	1.
	2.
	3.
	4.

Self-assessment checklist

Questions	True	False
1. The NSW Code of Practice for hunting is not legally binding.		
2. You will find all the current NSW legislation, including Acts and Regulations, on the NSW Parliamentary Counsel website.		
3. It's a condition of issue for NSW Game Hunting Licences that the licence holder be aware of all NSW legislation that relates to hunting, animal welfare and the use of firearms.		
4. No animal when being hunted may be inflicted with unnecessary pain.		
5. You do not need a NSW game hunting licence to hunt deer on private property in NSW.		
6. The maximum penalty for discharging a firearm while trespassing is 10 years imprisonment.		
7. You must only hunt on property which you own or for which you have written permission to hunt on.		
8. You are only permitted to hunt prescribed game in accordance with the Hunters' Code of Practice.		
9. The <i>Crimes Act 1900</i> is relevant to hunting through laws associated with trespass.		
10. Never inflict unnecessary pain and suffering on game and feral animals.		

SECTION ONE: CASE

UNIT 1.2 ANIMAL WELFARE

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The unsuccessful shot.....	17
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Glossary of terms

Cardinal – primary, chief or important.

Kill zone – a zone of tissue on which projectile impact will produce a humane death.

Longevity – length of time an animal lives.

Moribund – dying.

Mortal – death causing.

Spoor – animal’s trail or scat.

Learning objectives

On completion of this unit you will:

- be able to be tested for a NSW Restricted Game Hunting Licence with your nominated hunting method/s.
- know where to shoot an animal to ensure a humane kill.
- know when it is appropriate to aim for the head kill zone and when it is appropriate to use the chest kill zone.
- know what to do if a shot goes wrong.
- understand your obligations under the *Prevention of Cruelty to Animals Act 1979*.

Introduction

Humans utilise animals in a variety of ways. At times, and with reasonable cause, we kill both domestic and wild animals.

The question with hunting is not if we *should* hunt, but rather, what are the welfare principles we need to apply to the way we hunt?

This unit of study will assist you to hunt animals without inflicting unreasonable or unnecessary pain and suffering on them.

Shot placement

There are only two acceptable points of aim when hunting animals with firearms: the **head kill zone** and the **chest kill zone**. People often reduce these zones to the brain and the chest, but in fact, the kill zones are larger than simply the actual, physical size of either the brain or of the chest. The head kill zone includes the spinal cord in the upper neck and the chest kill zone includes the lungs and greater vessels leading to the heart such as the vena cava and aorta.

Single projectiles from rifles or shotguns kill by several means. They physically damage bone and soft tissue, disrupt blood vessels causing serious blood loss and impart energy into the animal with a tremendous concussive blow.

In both the head kill zone and the chest kill zone, projectiles produce all three of these effects.

Multiple projectiles from shotguns have both a concussive impact and the additional advantage of several impact sites in the killing zones on the targeted animal. Shot size and pattern are selected to ensure that there are a number of fatal hits.

The concussive impact of a projectile strike to the head kill zone normally renders the animal instantaneously unconscious while at the same time producing fatal bone and tissue damage and severe bleeding. There is no pain and suffering with this very humane death.

With a projectile strike to the chest kill zone an animal may collapse unconscious on the spot but is more likely to retain consciousness for a very short period of time. Death is more commonly due to severe blood loss than to the concussive impact. It is not uncommon for a chest-shot animal to run for a few seconds before collapsing unconscious from the bleeding from the heart or other major vessels within the chest. Death is very quick, making this a humane way to kill an animal.

Definition of kill zones

Head kill zone

- **Side on:** the point of aim is the base of the ear.
- **Front on:** the point of aim varies with the angle of the head. If the animal is looking down the barrel, the point of aim is just above the centre of the nostrils. If the animal is looking at the ground, the point of aim is the intersection of two lines drawn from each eye to the opposite ear.

Chest kill zone

- **Side on:** the point of aim is just behind the shoulder at the middle of the chest. The kill zone includes the spinal column, the lungs, the great vessels to the heart and the heart itself.
- **Front on:** the point of aim is the base of the neck between the legs.
- **Quartering:** the point of aim is a diagonal line to transect heart and shoulder. The projectile should pass through the base of the heart to lodge in the far shoulder.

Scenario 1

You are shooting from a vehicle in a feral animal control operation by spotlight at night. You have a heavy barrelled rifle with a very light trigger and a high power telescopic sight. Your vehicle is equipped with a bench rest style rifle rest. The animals are holding still in the spotlight at close distances and you are shooting with the vehicle stationary and the engine turned off. The rifle is tuned to your hand loaded ammunition and the projectiles are hitting spot-on point of aim.

Recommended kill zone: Head

Scenario 2

You are hunting on foot in the Great Dividing Range during the day. It is hot and you are breathing heavily under the weight of your daypack. You have a sporting rifle with a 4x telescopic sight, a safe trigger pressure and factory load ammunition. You come across animals that are 120 m off and you cannot stalk any closer without them taking flight. You take the shot using an improvised bush rest.

Recommended kill zone: Chest

Scenario 3

Question: Where would you target each of these feral pigs?



Answer: The pig on the left would need to be shot in the chest kill zone. The projectile should enter low on the right rib cage, cross the chest through both lungs and heart and lodge in the left foreleg. The pig on the right may be shot in either the head or chest kill zone. The shot in the chest kill zone first needs to pass through the right shoulder and then on into the chest.

Remember, you are shooting from a position above both pigs and that the pig on the left is quartering away from you and the pig on the right is quartering towards you.

Photo: J Dunn

Principle of kill zones

The chest kill zone is preferred to a head shot in most hunting situations. The humane kill target area is much larger, more animals are taken with this aim and the likelihood of an animal escaping wounded is minimised.

The danger with the head kill zone is that a small deflection in aim may result in an animal being wounded in the face or jaw and escape to die a slow and painful death from starvation, thirst or infection. Head kill zone shots must only be attempted when you are sure of the shot, as in Scenario 1. Head kill zone shots are the preferred shot for professional shooters such as commercial kangaroo harvesters who use specialised equipment.

The successful shot

The successful shot is one single shot that drops your animal instantaneously on, or within a few seconds of projectile impact. Death is swift and the struggle is minimal. You will achieve this when:

- you stalk as close to the animal as possible without disturbing it.
- you use a firearm/ammunition combination with adequate killing power.

- you use an appropriate rifle sight (usually telescopic).
- you use a firearm shooting true to point of aim.
- you allow for the shot distance.
- you take a firm, secure rest for your shot.
- you have mastered breathing and trigger control.
- you do not flinch on discharge of the firearm.
- you target the chest kill zone.

The unsuccessful shot

What to do

From time-to-time things may go wrong. A round of ammunition may be defective or the animal may move just on the instant of firing. You may unintentionally pull the shot.

Scenario 1

Your animal collapsed on being shot and is conscious.

A prompt second shot to the head kill zone is necessary. This must be done immediately. You must minimise further stress to the animal. Remember that when you are close to an animal, your projectile will strike low to the crosswires of your telescopic rifle sight.

Scenario 2

Your animal is mortally wounded but is able to run a short distance.

On taking the shot, your sight picture was good – you may even have seen the projectile impact and you know that the animal is mortally wounded. Without taking a second hasty shot, quietly follow the animal to its point of collapse. Animals in such a condition usually drop dead on the run. A second shot to the head kill zone may or may not be required when you reach the animal.

Scenario 3

Your animal is wounded and able to run a long distance. Immediately follow up the initial shot with as many more shots to the chest as are necessary to kill the animal.

If the animal escapes out of rifle range, take the time to mark two spots approximately 3 m apart and in line with where you last saw the animal. Walk to where your animal was last seen using these two reference points to keep you on line.

Mark the animal's last seen position (tape, paper, broken branches or rock cairn) and wait for 15 minutes or longer to allow the animal to settle. Then start tracking the animal by following blood spots or other sign of its passing.

Again, mark the blood trail with conspicuous markers. The strategy is to walk up on the animal at the place where it has gone to rest. If you lose the trail, go back and review the flight path the animal has taken.

Carefully check adjacent areas of possible concealment.

Start to walk transects in the direction you think it most likely to have travelled. For example a wounded animal may be more likely to go downhill than up, to go for water than away from it, or to go towards known cover than into the open.

On welfare grounds you must suspend other hunting until the animal is recovered

Scenario 4

A clean miss?

Are you sure? Often the sight picture is lost in the recoil as the rifle sets back on your shoulder. In timbered country, you should always check to see if there are any signs of a hit. Follow the procedure outlined in Scenario 3.

At the position where the animal was last seen, examine the ground carefully, looking for evidence of a projectile strike.

If there is no visible evidence of a hit, still follow the animal's escape path for 20 or 30 m looking for any further evidence. If nothing is found it is safe to conclude that the shot was a clean miss.

Mandatory requirements

These mandatory requirements are from the Hunters' Code of Practice

As a hunter, you must obey four cardinal animal welfare principles:

- no animal may be inflicted with unnecessary pain.
- all reasonable steps must be taken to locate and quickly kill a wounded animal.
- if a female with suckling and dependent young is taken, every reasonable effort is required to find and kill the young.
- dogs and other animals may be used to assist hunters provided that this use is in accordance with the *Prevention of Cruelty to Animals Act 1979*.



Blood trail splashed onto stone and leaf litter from an animal with a fatal gunshot wound to the chest kill zone. Note that the animal was travelling from bottom to top of the picture. This is evident by the thin projections from the blood droplets which always point in the direction of travel. The red and white arrows point to some of these blood projections. A droplet is enlarged in the bottom left corner of the picture.

Photos: M Draisma



Blood trail on grass from an animal with a fatal gunshot wound to the chest kill zone.



Bone and blood spoor where the animal was fatally shot to the chest kill zone. The yellow arrow points to a blood splash and the red to fragments of bone.

References for further reading and learning

- Harvey, N. 1995 *Handbook for Hunters and Shooters Victoria*. Australian Print Group.
- Harrison, M, and Slee, K. 1995. *The Australian Deerhunter's Handbook*. Australian Deer Research Foundation Ltd, Croydon, Vic. pp. 25, 43–44.
- Hopwood, P.R. 2001 *Animal DeLiberations*, Adelaide: SSAA.
- NSW Firearms Safety Training Council Handbook*. Firearms Safety Training Council.
- Smith, G. 1992. *A Guide to Hunting and Shooting in Australia*. Sporting Shooters Association of Australia Publications, Unley, SA. pp 101–104.
- Webster, J. 1994 *Animal Welfare: A Cool Eye Towards Eden*. Oxford: Blackwell.

Example assessment questions

QUESTION	ANSWER
The Code of Practice incorporated in the <i>NSW Game and Feral Animal Control Regulation 2012</i> sets out the mandatory, ethical behaviour expected of hunters in NSW.	True or False?
List four requirements of the Code of Practice.	1.
	2.
	3.
	4.
People utilise animals in a variety of ways and kill both domestic and wild animals. The question with hunting is not if we should hunt, but rather, what are the welfare principles we need to apply to the way we hunt?	True or False?
List four things that you can do to minimise pain and suffering in the animals that you hunt.	1.
	2.
	3.
	4.

Self-assessment checklist

Questions		True	False
1.	You don't need to know where to shoot an animal to ensure a quick and humane kill.		
2.	It is acceptable hunting practice to capture young game animals and release them elsewhere for future hunting.		
3.	The question with hunting is not if we should hunt, but rather, what are the welfare principles we need to apply to the way we hunt?		
4.	A successful shot is one single shot that drops your animal instantaneously on, or within a few seconds of projectile impact.		
5.	You are hunting on foot in the Great Dividing Range. It is hot and you are breathing heavily under the weight of your daypack. You have a sporting rifle with a 4x telescopic sight, a safe trigger pressure and factory load ammunition. You come across animals that are 120 m off and you cannot stalk any closer without them taking flight. You should take a head kill zone shot using an improvised bush rest.		
6.	If an animal is wounded and escapes out of rifle range, run after it as quickly as you can to try and catch it.		
7.	It is easy to mistakenly think that you have missed an animal. Always check out 'clean misses'.		
8.	Dogs and other animals may only be used to assist hunters provided that their use is in accordance with the <i>Prevention of Cruelty to Animals Act 1979</i> .		
9.	Firearms and ammunition, or bows and arrows, must be used so that they can be reasonably expected to kill the target species quickly and humanely.		
10.	The head kill zone includes the spinal cord in the upper neck and the chest kill zone includes the lungs and great vessels of the heart such as the vena cava and aorta.		

SECTION ONE: CASE

UNIT 1.3 SAFE HUNTING PRACTICES

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Glossary of terms

Etiquette – a set of social rules.

Trauma – injury or damage.

Trigger lock – a two-piece locking device that clamps around the trigger making it inaccessible.

Learning objectives

On completion of this unit you will:

- be able to be tested for a NSW Restricted Game Hunting Licence with your nominated hunting method/s.
- have written out a hazard analysis for the particular hunting situations you wish to engage in.
- have written up a safety habit protocol for when you are hunting.
- have identified a range of hunting safety precautions.

This unit of study assumes that you are thoroughly familiar with the **firearm safety rules** set out in *NSW Police Force Firearms Users Guide* available at www.police.nsw.gov.au. and the *Firearms Act 1996*.

Introduction

The *Firearms Act 1996* sets out the licensing and training requirements, purchase and storage requirements and use of firearms in NSW. It is important to know your responsibilities and obligations under this Act when planning your safe hunting practices.

Safety is very much a matter of planning ahead and thinking through the consequences of your actions. A person who recognises the importance of safety will ask them self 'what if' questions and then take the necessary steps to prevent trouble. This unit of study builds on the information you learn in approved NSW Police Force firearms courses required to obtain a Firearms Licence.

Hunting poses risks other than the risk directly related to firearms. This unit of study will encourage you to think through a range of safety issues.

Hazard analysis

In many situations, both in industry and commerce, Hazard Analysis Critical Control Path (HACCP) principles are employed to improve safety and productivity. These principles can also be applied to make your own hunting experience safer.

Think about your next hunting trip. Analyse the potential hazards to yourself, to your equipment and to the community. Write them down.

Hazards can occur in transit, in camp, and while hunting. In transit and in your hunting camp your firearms are more vulnerable than in the home gun safe. They may be damaged, stolen or be accessible to children or others.

Learning exercise: Identify hazards

Take pen and paper and write a list of all the things that you normally do to get to a hunting area and set-up the hunting camp. Now add in the hazards for each activity.

We know that safety manuals list all sorts of oddball dangers. Make this exercise real. Think about those dangers that are most likely to apply to your particular hunting circumstances. Then, for each hazard you identify, list a sensible, practical safety precaution. A lot can go wrong before you even begin hunting.

You are now on the way to constructing your personal safety hunting protocol!

Examples

- Is the drive to your hunting area too far to safely do in one day? Driver fatigue may be a much more serious hazard than any hunting danger.
- If you travel with the family, is it possible that your children could gain access to your firearms while in transit?
- A practical safety precaution may be to apply a trigger lock to your firearm and pack the bolt and ammunition separately. You may decide to do this as a general safety precaution. Your firearms may be more secure if you travel with them in locked, strong, padded gun cases.

You know the firearm safety rules but, while hunting, your concentration on firearm safety will be distracted by many things – how will you maintain your focus amidst the excitement of a stalk; finding a snake under foot; animals suddenly taking flight; fatigue at the end of a tough hunting day? To prevent accidents you need to develop a safety routine that ensures that you are failsafe, even when distracted.

Learning exercise: Safety checks

Take pen and paper and write down the things that may distract you when hunting. These are the predictable and likely dangers. For each instance think out and write down a safety habit that will overcome the distraction.

Example

A deer spooked just before you fired. Your safety routine prompts you to uncock your rifle when not immediately taking a shot. If you were to race after the deer on the chance of taking a parting shot, it would be easy to find yourself running through bush with a cocked rifle. Running with a cocked rifle could lead to you slipping and falling, resulting in a firearms accident.

Learning exercise: Good hunting habits

Take a pen and paper and write down your intended hunting habits.

Examples

- Do you intend to carry your firearm with ammunition in the magazine, with a round in the chamber, and cocked with the safety catch on? If so, write it down. Think carefully on this example!
- In thick scrub, will you tape the muzzle of your rifle to prevent muck getting down the barrel?
- Will you check regularly to see if you have left your firearm cocked?
- Will you require your hunting mate to regularly check to see if their firearm has been left cocked?
- Will you unload your firearm at obstacles such as fences?
- Will you only take the shot when you know that the projectile is going to land in a safe spot or have a safe background?
- Do you intend to hunt in camouflage clothing in an area where there are other hunters?

Your full list will be much longer than these few examples.



When crossing obstacles, such as this creek with slippery rocks underfoot, it is safe practice to unload your gun and keep it open.

Photo: G Harle

Learning exercise: Group feedback

Set up a meeting to discuss your list of intended hunting habits with several friends. This way you can check if what you intend to do is really safe. You can work out if there are even better ways of going about it.

Examples

If you wrote down that you intended to hunt relying on your rifle safety catch to prevent an accidental discharge, your friends would not be impressed. They would tell you that it is too easy to mistake the on/off position of your safety catch, or that the safety catch may fail to operate properly if the rifle is bumped. They would tell you that it is against the firearm safety rules that clearly require you not to load and cock your rifle except immediately before you take a shot.

This exercise is important as it will help you and your friends develop safer hunting practices. Most people are happy to plan a future hunt together, to talk about what and where, but are often reluctant to talk about each other's safety habits. The emphasis should be – this is the way I do it, can you help me to do it more safely?

Fence crossing procedures

Two hunters



Step 1: Both rifles are emptied of cartridges. The first hunter goes through the fence while his mate holds both rifles.



Step 2: The rifles are carefully handed over the fence one at a time.



Step 3: The second hunter then climbs through the fence.

Photos: M Draisma

Fence crossing procedures

One hunter



Step 1: The rifle is emptied of cartridges and placed on the ground while the hunter climbs through the fence.



Step 2: The hunter reaches back through the fence to pick up his rifle.



Step 3: The hunter carefully brings the rifle through to his side of the fence.

Routine safe hunting practices

A case study

Max and Peter regularly hunt together. They hunt in rough country on a large sheep property where they are invited to hunt for feral animal control. Base camp is set up in the shearers' quarters. Their vehicle is a 4WD and takes them a long distance into each day's hunting area. The vehicle then acts as a base station. It is equipped with mechanical recovery gear, meat processing gear, 20 litres of drinking water and a comprehensive First Aid kit.

On the hunt, both Max and Peter each carry a daypack with one litre of drinking water and snack food; one set of game dressing gear and a basic first aid kit is shared between the packs.

Max and Peter have hunted together for many years and have developed a safety protocol that puts trust in each other but not themselves. During a hunt, each reports to the other on the state of readiness of their firearm.

The routine goes: Max to Peter 'my rifle has three in the magazine; the chamber is empty and the bolt up'. Peter then replies 'my rifle has three in the magazine; the chamber is empty and the breech is open'.

The routine starts on leaving the vehicle and is repeated at obstacles such as fences, stony creek crossings, cliff faces and always after any hunting action where a round may have been chambered. The final routine, on return to the vehicle, involves confirming with each other that the firearm is clear of ammunition in both chamber and magazine.

Max and Peter always discuss the hunt plan for each paddock. They stay just in sight of each other as the paddock is hunted and stay in communication by means of light UHF radios (used with ear plugs for greater effectiveness). The radios ensure that both Max and Peter always know what the other is doing and allow the hunt plan to be quickly altered without risk of separation.

The camouflage clothing worn by Max and Peter gives more productive hunts but requires more care and frequent radio communication for each of them to know exactly where their buddy is. They also wear blaze orange caps to readily see each other from a distance.

Max and Peter know that once they press the trigger a projectile cannot be called back. They apply two basic rules.

1. Never take a shot unless the animal is identified beyond doubt.
2. Never take a shot unless the projectile will land in a safe background. That is, they can see the general area of impact to be clear of stock, farm equipment, hard surfaces and other people.

Would you be tempted?

You come across a world-class trophy stag only 30 m away. The stag is on a skyline and unaware of your presence. 'I cannot miss at this range,' you think.

Possibly true, but you do not know where the projectile will finish up. It may pass through the animal and carry on to an unsafe destination.. There are no exceptions, world-class stag or otherwise. Back off, move around and take the shot from a position where you know your projectile will come to earth safely should it pass through the animal or miss it all together. Better to lose the stag than risk a tragedy.



A pair of hunters set out in open country. They are well prepared in both their clothing and equipment. They are wearing strong boots and camouflage gear, complete with hats for sun protection.

Their equipment includes: CB radios, a knife each, binoculars, ammunition pouches, backpacks containing food and water and game dressing equipment.

Their rifles are slung over the shoulder pointing skywards, which is a safe method for carrying firearms while walking.

Photo: G Harle

Safe hunting etiquette

There is more to hunting than being safe. The general public needs to feel safe when hunters are about. There are a number of simple things you need to do. For example:

- You meet a party of bushwalkers in some sort of trouble: help them out; tell them you are a hunter.
- You meet a party of bushwalkers who have just left a scent trail through your best deer-hunting patch. It is their right to be there as much as yours. Be friendly, courteous and helpful. Ask where they are headed and assure them that you will not hunt near them.
- Always unload and sling your rifle during chance meetings in the bush. Tell people you meet that your rifle is unloaded and make it clear that you are not actively hunting near them. Ask them where they are going and hunt elsewhere.
- Do not display firearms around farmhouses, or the camp.
- Do not use the telescopic sight on your rifle as binoculars to watch people or look at farmhouses. You know that your rifle is unloaded but the people watching you through their binoculars don't. All they see is a rifle being aimed at them.

Always point your firearm in a safe direction – loaded or unloaded.



These hunters are walking in single file on a game trail. Safe practice dictates that when they come upon game only the lead hunter will take the shot.

Photo: G Harle

References for further reading and learning

NSW Police Force Firearms Users Guide

Smith, G. 1992. *Guide to Hunting and Shooting in Australia*. Sporting Shooters Association of Australia Publications, Unley S.A.

The Australian Deerhunter's Handbook. Harrison, M. and Slee, K. Aust. Deer Research Foundation, Croydon Vic Second Edition 1995.

Firearms Safety Code. Victorian Firearms Consultative Committee. Victoria Police Unit

Example assessment questions

QUESTION	ANSWER
Safety is very much a matter of planning ahead and thinking through the consequences of your actions. A safe person will ask themselves 'what if' questions and then take the necessary steps to prevent trouble.	True or False?
List four steps you would take to make your hunting safer.	1.
	2.
	3.
	4.
Game and feral animals must not be fired at unless they can be clearly seen and identified and the shot, when taken, poses no discernable risk of injury to any person or significant damage to any property.	True or False?
List at least four things you need to do to take a safe shot.	1.
	2.
	3.
	4.

Self-assessment checklist

Questions		True	False
1.	Safety is very much a matter of planning ahead and thinking through the consequences of your actions. A safe person will ask themselves 'what if' questions and then take the necessary steps to prevent trouble.		
2.	Once you press the trigger a projectile cannot be called back.		
3.	A trophy stag is on the skyline but so close that it is impossible to miss. Therefore, it is safe to take the shot.		
4.	It is safe to fire at movement of bushes in thick scrub.		
5.	You can search for your hunting mates using your rifle's telescopic sight.		
6.	No animal is worth the risk of carrying a loaded, cocked rifle.		
7.	Safe hunting etiquette requires that you not only be safe but are seen to be safe.		
8.	Wearing bright colours, like blaze orange, when hunting deer is a good safety practice.		
9.	Hazard analysis and discussion of critical safety habits with your hunting mates will make your hunting safer.		
10.	Hunting is a risk free sport.		

SECTION ONE: CASE

UNIT 1.4 ETHICS AND CONSERVATION

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Glossary of terms

Ethics – moral principles or code.

Predator – a species that hunts and consumes another species.

Sustainable – able to be continually renewed.

Learning objectives

On completion of this unit you will:

- be able to be tested for a NSW Restricted Game Hunting Licence with your nominated hunting method/s.
- understand your moral and ethical responsibilities towards the animals that you hunt.
- understand the '4 Rs' of hunting in NSW.
- know the basic elements of modern game management and the principles of sustainable use of game animals.
- know of several references for further reading to broaden your knowledge.

Introduction

Today's hunter needs to develop personal hunting rules and ethics to maintain community support for this recreational and industry activity.

It means setting boundaries and restrictions as to how hunters are prepared to hunt within the framework of existing laws.

Experience shows that good ethics develop and grow from an understanding of conservation principles, respect and compassion for the animals that you hunt and from past practices.

Through the NSW game hunting licensing system, which brings an even higher level of accountability to hunting in this state, these core hunting values are communicated to all facets of the hunting fraternity and the wider community.

The major objective of the *Game and Feral Animal Control Act 2002* is to provide for the effective management of introduced animal species, while promoting responsible, ethical and sustainable hunting.

All hunters have an obligation to do the right thing in the way they hunt an animal, to respect landholders' properties and to interact with the wider community. It is a hunter's behaviour that ultimately shapes community attitudes and perceptions about hunting in NSW.

Hunting ethics

Every hunter develops personal ethical standards which are a personal code of practice that determines how a hunter approaches their hunting activities. What standard of personal ethics or code should it be? How do hunting situations determine how a hunter conducts the hunt?

It is fair to say that hunting practices that are legal in some countries may not be legal in others. Within current legal boundaries there may exist some hunting practices that some consider unethical when measured against their own personal code of practice. This diversity of opinions and ethics is recognised and respected.

A hunter's personal hunting ethic goes well beyond what is mandatory and extends to the rationale for the 'why' and 'how' of hunting.

Many hunters are very specific in their hunting practices and engage in only one form of hunting. The context of a hunt will also affect how a hunter applies their hunting ethic. For example:

- Is the hunt for pest control or for meat?
- Are the hunted animals abundant or sparse?
- Is the hunt on private or declared public land?
- Is the hunt a commercially guided hunt or a weekend outing with friends?

In NSW the minimum ethical standard and code of practice of all hunters is based on a very sound and proven value – **respect**.

If we respect a person or a policy, we hold it in esteem. We may aspire to support it and promote it. When it comes to the '4 Rs' of hunting in NSW, hunters are required to affirm their commitment to ethical hunting as part of holding a NSW Game Hunting Licence.

The '4 R's' of hunting in NSW

1. RESPECT for the law

Ethical hunters:

- are role models who obey and promote compliance to all laws, including game hunting and firearm laws
- ensure they have permission before entering any land
- obey all legal requirements of the landowner
- obey total fire bans and ensure they adhere to fire danger ratings
- offer to report to the landowner/police all unusual or suspicious behaviour or illegal incidents.

2. RESPECT for the landowner

Ethical hunters:

- understand that when entering property with permission, they are a guest of the landowner and must treat the property with respect
- obey all reasonable requests and directions of the landowner
- ensure they gain a clear understanding of property boundaries and the areas they have been given permission to access
- look for opportunities to assist landowners for the hunting privileges afforded to them
- treat all other people's opinions and property with respect
- learn about the likelihood or presence of any traditional owner's sites or place and do not, under any circumstances, disturb any aspect.

3. RESPECT for the environment

Ethical hunters:

- are guardians of the environment
- dispose of all litter/garbage and empty shell cases properly
- stay on formed tracks/trails and do not drive where their vehicle will cause environmental damage
- work to preserve the environment and support the existence and sustainability of non-game and endangered species
- take the necessary precautions and safety measures when lighting camp fires.

4. RESPECT for the animals

Ethical hunters:

- learn to shoot accurately, safely and always with the intention of ensuring a humane kill
- learn everything they can about the game they hunt, its habitat, habits and life cycle
- are skilled in the use of the tools that they use for hunting
- transport their harvest in a respectful manner
- learn to fully utilise the animals they harvest.

Any hunter breaching one of the '4 Rs' disgraces themselves; they tarnish the reputation of responsible hunters and the activity of hunting.

The spirit of the '4 Rs' is written into a formal Code of Practice contained in the *Game and Feral Animal Control Regulation 2012*. All licensed hunters in NSW are required to obey the provisions of the Code of Practice for hunting (refer to Section 1, Unit 1.1).

However, the '4 Rs' require more than legal compliance, they require you, the hunter, to actively promote the principles of responsible and ethical hunting. As 'best practice' this means that you should discuss the Code with your hunting buddies and determine how best to implement it on any particular hunt.

As responsible, ethical hunters we should not ever compromise the '4 Rs' of hunting.

Pest animal control

Hunting is an important tool in pest animal control. Pest animal managers have tried every known way, from trapping, poisoning, and exclusion by fencing and shooting, to eradicate growing populations of introduced species. Unfortunately, this has not been successful and pest animals are as numerous and as widespread as they have ever been.

It is now widely recognised that the complete eradication of these species is physically and economically impossible. Best practice pest management programs now combine multiple techniques for the best results.

The role of the responsible hunter in conservation therefore becomes increasingly important. A 2004 report for the Rural Industries Research & Development Corporation (RIRDC) noted that 'hunting relies upon conserving wildlife habitat'. Accordingly, hunters have a long history of conserving and restoring wildlife habitat through their efforts, their funds and their lobbying power.

A further example from the RIRDC report underpins the important role of responsible hunters and is evidenced by estimations that feral pigs cost Australia's agricultural industries \$100 million a year in lost production, mostly in NSW and Queensland. It is also estimated that hunters kill 15–20% of the feral pig population in accessible country.

Under the Act, licensed hunters in NSW can demonstrate an even greater role in conservation by assisting in the battle against pest animals.

Conservation as opposed to preservation

The term 'conservation' is often used erroneously to refer to preservation. Conservation requires the intent to **use** a resource, whereas preservation refers to the intent to **save** the resource from being used on the basis that if things are left alone they will stay as they are. Many examples around the world show this concept is flawed.

Most people would be amazed if they were told that the axe was a conservation tool for the preservation of plants. By cutting away over-abundant or invasive pest species and encouraging the growth of other species, we can restore the ecological balance of a forest community, thus helping more desirable rarer species to survive. Similarly, the firearm and bow has such a role in wildlife conservation.

Many people may see them just as weapons of destruction. Those who know better recognise them as effective and humane tools of wildlife management. For example, where wild goats aggressively compete for food with less numerous rock wallabies, the firearm or bow can be used as a tool to remedy this imbalance, thereby preventing the more competitive and versatile goats from destroying the wallaby's food supply by over browsing.

The food source often requires much longer to recover from over grazing than the goat population takes to recover after such a cull; so repeated culls are often required.

While hunters choose to hunt for a variety of reasons, over-exploitation of desirable species (especially under commercial pressures) must be controlled and carefully limited so that the harvest does not exceed the capacity of the population to replenish itself.

The principles of game management and sustainable use

To manage populations of wild animals we need to keep their living and food producing areas healthy. This in turn will encourage successful breeding and replacement of the individuals harvested by hunters.

We need to know how many there are at the beginning of each breeding season. This can be done by direct count or by doing a sample count and extending this miniature assessment to the whole population.

Hidden animals can be counted by doing sign surveys, that is counting tracks, or droppings or by spotlight counts and by tagging a proportion of the population.

We need to know how many animals are expected to die from natural causes and how many young are likely to be produced during a certain period of time. We can also determine with experience and science what the maximum is, as well as the most suitable carrying capacity of the land. Sometimes this carrying capacity is limited by things other than food. For example, the availability of drinking water in the summer.

All of this information can be combined to calculate the number of animals that can be harvested and yet still retain sufficient numbers to maintain good breeding rates for the following year. This is how sustainable bag limits or quotas are set; for example, those set for kangaroo management in NSW under the Kangaroo Management Program (managed by the Office of Environment and Heritage).

However, in the recent past there has been a groundswell of inquiry and discussion on current management practices involving populations of wild animals, resulting in notable shifts in the community's attitude towards the concept of 'wise use'.

This presents an opportunity to the hunting fraternity to experience broader community acceptance by demonstrating considerable environmental, social and economic benefits.

Laws protecting Aboriginal culture and heritage

Our rich Aboriginal cultural heritage is something to be treasured and respected. As you traverse the landscape it is likely you will come across evidence of past occupiers.

Just as you ask your fellow Australians to respect your hunting heritage, Aboriginal people ask that you respect their cultural sites and heritage. Aboriginal people still retain their rights of traditional hunting on Crown lands and Aboriginal heritage sites are protected by law.

The following are examples of Aboriginal heritage that are protected are under the *Heritage Act 1977* and the *National Parks and Wildlife Act 1974*:

- scarred trees – where bark has been removed for canoes, shields or carry baskets
- rock painting – markings or etching
- foot holes cut into trees, usually to gather honey
- grinding groves – holes worked on bedrock to grind grain and other materials
- stone arrangements, nature does not lay stones in a straight line or circle
- middens – mounds of shells, bones or other evidence of camp
- hand tools – sharp edge tools or hammers, usually a fine grained rock not of local origin
- camping areas – some of which are still used today

The above items are not to be damaged, removed or altered in any way.

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Additional reading

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Example assessment questions

QUESTION	ANSWER
The balance of sustaining both native wildlife populations and agricultural production poses many challenges for landholders and hunters. List one example of how hunters and farmers can benefit from conservation hunting.	
List the '4 Rs' of hunting in NSW.	1.
	2.
	3.
	4.

Self-assessment checklist

Questions		True	False
1.	It is our sense of doing the right thing that lends the greatest satisfaction to our hunting.		
2.	Hunting is one of many tools that can be used to manage pest animals.		
3.	How we, as hunters, conduct ourselves in dealing with the way we approach or manage our hunting practices is really nobody's business.		
4.	It is fair to say that hunting practices that are legal in other countries are legal everywhere.		
5.	Ethical hunters understand that when they enter upon a property with permission, they are a guest of the landowner.		
6.	Hunters must take reasonable care to ensure that no hunted animal suffers unnecessary pain.		
7.	Hunting has always been the major factor in the massive decline and extinction of native species.		
8.	Conservation requires the intent to use a resource, whereas preservation refers to the intent to save the resource from being used on the basis that if things are left alone they will stay as they are.		
9.	It is now widely recognised that it is physically and economically impossible to eradicate pest animal species.		
10.	Understanding that there is a likelihood of encountering traditional owner's sites while hunting is an important consideration of any planned hunt.		

SECTION TWO: R-LICENCE CATEGORIES

UNIT 2.1 HUNTING WITH FIREARMS PART A: RIFLES

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Glossary of terms

Action – firearm part where the ammunition is chambered and the bolt slides into.

Bore – the hole down the barrel.

Breech – the part of the firearm behind the bore.

Calibre – a measure of the diameter of the bore.

Lands – beginnings of the rifling grooves at the breech end of the barrel.

Swaged – die stamp that grooves the projectile to allow the core to bind to the jacket.

Learning objectives

On completion of this unit you will:

- be able to be tested for a NSW Restricted Game Hunting Licence to hunt with firearms (rifles and shotguns)
- know what minimum calibres and projectile weights are generally recommended for hunting each species with a rifle
- understand the effect of projectile construction, weights and velocities on the performance of the rifle
- be able to select rifle projectiles for different purposes
- know how to sight in a rifle and tune it for accuracy
- understand the importance of rifle fit for quick shooting
- have knowledge about common rifle malfunctions and the actions required for their correction.

Note: This unit must be completed in conjunction with Unit 2.1 Part B Shotguns.

Introduction

As a hunter, you are personally responsible to harvest game animals quickly and humanely. To do this, it is safer to be over gunned than under gunned. The information tables in this unit will assist you in selecting the right firearm.

It is in the selection of the correct firearm and ammunition combination and the distance over which you shoot that will ensure a satisfactory animal welfare outcome.

The information tables given in this unit also recommend minimum calibres, cartridges and projectile weights for each animal species. You will notice that different authorities may give different recommendations. This is because you can effectively use a more or less powerful firearm/ammunition combination under different hunting conditions. For example, less powerful firearm/ammunition combinations may be effective in a pest control situation during a drought where the animals are weak from hunger, congregate near a water hole and are being shot at close range.

The firearm/ammunition combination recommendations in this book are for general hunting conditions.

Recommended minimum rifle calibres for game

The following principles in the selection of firearm ammunition combinations are recommended :

1. The firearm/ammunition combination must allow for accurate shot placement over the distance at which the animal is to be shot.
2. The firearm/ammunition combination must provide sufficient killing power to quickly and humanely kill the animal.

Killing power is a function of the interaction between the animal and the projectile. In relation to the projectile, the killing power varies with calibre, weight, construction and velocity.

In relation to the animal, the killing power of the projectile varies with the toughness of the hide, functional importance to life of the targeted organ and depth of penetration required to reach such organs.

Opinions vary on the minimum cartridges you should use on various game animals. The table on the next page gives you recommendations from various reputable sources for general hunting conditions.

It needs to be emphasised that cartridges that are adequate for general hunting conditions may be inadequate under special circumstances.

Always remember that there is no substitute for proper shot placement and even the heaviest calibres must hit in the right place to kill cleanly and humanely. Only dedicated practice will ensure that you can do this. The range at which the animal is to be taken is an important variable that should be taken into account when selecting a minimum calibre for any particular species.

Refer to Table 1.

Table 1: Minimum cartridge recommendations for game species			
Species	*Smith	*Harrison/Slee	NSW DPI
Hog deer	.222 Rem	.243 Win	.243 Win
Fallow deer	.222 Rem	.243 Win	.243 Win
Chital deer	.222 Rem	.270 Win	.243 Win
Rusa deer	.270 Win	.270 Win	.270 Win
Red deer	.270 Win	.270 Win	.270 Win
Wapiti	.270 Win	.270 Win	.270 Win
Sambar	.270 Win	.270 Win	.270 Win
Feral Goat	.243 Win	.243 Win	.243 Win
Feral Pig	.243 Win	Nil	.243 Win
Wild dog	.222 Rem	Nil	.222 Rem
Fox	.22 Rf	Nil	.22 Rf
Feral Cat	.22 Rf	Nil	.22 Rf
Hare	.22 Rf	Nil	.22 Rf
Rabbit	.22 Rf	Nil	.22 Rf

*See references and further reading and learning.

Sights and sighting in

The proper sighting in of rifles is not a thing that can be rushed, but requires meticulous attention to detail. This is best done at an official rifle range. You can't do it well lining up on a tin can over a car bonnet. Limit the number of rifles that you attempt to sight in at a particular sitting as fatigue can impair your results.

You will need a steady table and seat. Unsupported shooting will tell you very little about where your rifle is really zeroed. You will need sand bags or an adjustable fore-end rest, ear protection and a sandbag or soft rest for the toe of the stock. Both ends of the rifle need to be fully

supported. You must be able to set the rifle rock steady on the point of aim. If you can't achieve this, don't proceed further. You are testing the accuracy of the rifle and not your own shooting ability. Avoid moving the rifle in any way while you slowly press the trigger to fire the shot. You must be completely comfortable and relaxed to sight in accurately.

Start your test at 25 m to make sure that you actually hit the target and then make the first sight adjustments before moving to 50 or 100 m. At this range, further fine sighting adjustments can be completed. Your target must be darkly printed so that it is clearly visible from the range that you are shooting. Some people prefer to use concentric ring markings, others a cross configuration. A safe earth mound or butt as a background to your target is mandatory.

Iron sights

Front blade and rear V. The blade (front sight) must be centred in the V and the top of the blade must be level with the top of the V. Do not place the blade ON the point of aim because you will then cover it up and not be able to see its exact centre.

Your front blade should be placed at the central **bottom** of your target aim point. If you wish to shoot high or low the rear sight should be lowered or raised. It is important for you to remember that adjustment of the rear sight **is always in the opposite direction** to the projectile strike. This same rule applies to sideways adjustments. If the rifle is shooting to the right, adjust for this by moving the rear sight to the left.

Peep sights

Here the rear V sight is replaced by a small round ring or aperture. Sighting is by placing the front blade centrally in the ring. Targeting procedures are identical as for the blade and V sight.

Telescopic sights

Your target will be sharper and more easily centred through a telescopic sight than with iron sights once you focus your scope using the screw adjustment on the lens nearest to your eye.

Variations in rifle scope reticles (crosshairs) are numerous with fine, medium, or coarse graded crosshairs, with or without fixed or flip up posts. There are various magnifications in both fixed and variable rifle scopes. Each reticle type and rifle scope magnification capacity has its special purpose for different types of shooting. Preferably, have your scope fitted by a qualified person who will set up the coarse alignment of the crosshairs by adjusting the scope mounts. Further adjustments are then made via top and side mounted and capped fine adjustment turret screws built onto the scope tube.

They will be marked 'up' or 'right' and each is accompanied by a corresponding arrow marking. These markings indicate the direction to move these screws to move the projectile strike in the desired direction. Otherwise, the sighting-in procedures are carried out as already described above.

Shooting technique

You can do a number of simple things to improve your shooting.

Firstly, look to support your rifle. Off-hand shooting from the shoulder is the least stable shooting position; shooting prone with the rifle fully supported is the most stable. When hunting you will need to look for a compromise shooting position, for example, resting your rifle against a tree, over a stump, or even just sitting on the ground using your knees for a rest. Remember that if you rest your rifle on a hard surface it may shoot high, so make sure you pad the fore end with your hat or daypack. You may consider using a bipod or a pair of shooting sticks to steady your aim.

Secondly, focus on your target and keep your rifle sight on the target. Try to actually see the projectile strike. This means that you need to ignore the rifle discharge. With hard kicking rifles this is easier said than done. Loud rifles or rifles fitted with muzzle breaks will have you jumping in anticipation of the noise. The worst thing to do is to anticipate the rifle discharging and flinch in anticipation of the noise and set back on your shoulder. This will cause wildly erratic shot placement.

Finally, you need to control your breathing and trigger release. You will notice that as you breathe your rifle sights fall and rise. Control the fall and rise of your sights so that you are on target without undue muscle tension. (If you find this difficult to do you may need to reposition the rifle on its support). Inhale fully and then expel breath till you are comfortable and on target, hold your breath and gently press the trigger. As you do this remain focused on your target, relaxed and ensure that the rifle sights stay dead on.

Shooting positions



Free standing, off-hand position with no support. This is the least stable of the shooting positions. The sling strap steadies the rifle.



Seated with the rifle supported by bracing both arms and knees. Where no supports are available this position is recommended.



Prone position. The rifle is supported with the arms and elbows. The body is angled away from the line of the target and the legs are slightly spread.



Kneeling with the rifle supported by a fallen tree. The day pack is used to cushion the rifle which must not contact the hard support.



Kneeling, using a shooting stick bipod. The rifle is further supported by bracing the right arm on the knee.



Sitting, using a tree for support. The rifle must not be in contact with the tree and is cushioned with the hand.

Photos: M Draisma

How projectiles fly: trajectories

Gravity acts on the projectile from the instant it leaves the rifle barrel. This means the projectile drops after leaving the barrel and you need to adjust your sights for this drop. It becomes complicated because the rate of drop increases as the projectile slows down. You need to allow for much more drop between 400 and 500 m than between 0 and 100 m.

Let's look at a typical situation with a centrefire rifle mounted with telescopic sights shooting at a target 200 m distant.

Let's say that your shot was good; the crosshairs of your rifle scope were dead centre on the target and the projectile printed in the centre of the bullseye.

Fine – but what if the target had been placed on the end of your barrel, or at 50, 100 and 150 m?

In each case, the crosshairs would still be dead centre on the target but where would the projectile hit the target at the intervening distances?

The exact answer to this question will vary of course depending on the particular rifle/ammunition combination you are using and how your rifle scope is mounted.

The target at the end of your barrel shows a projectile hole about 40 mm low to the bullseye. The reason is that most scopes are mounted about this height above the barrel. This is worth remembering as your rifle scope may show you a clear field of fire when in fact your rifle bore is pointed at a rock if you are firing from the prone position, or by a vehicle side mirror if firing from the back of a utility.

Where the projectile will hit the target at 50, 100 and 150 m will vary with the ballistic coefficient and velocity of the projectile. To be on target at 200 m most projectiles would be a few millimetres high at 50 m, 25 to 50 mm high at 100 m and curving earthwards after 150 m to be back on the bullseye at 200 m. You can work out the trajectory of your projectile from the ballistic tables in the back of your reloading manual.

The projectile travels below the line of sight initially because telescopic rifle sights are usually mounted about 40 mm high of the bore. The projectile then travels above the line of sight because the rifle barrel is inclined slightly upwards. The time that the projectile stays above the line of sight is increased as the barrel is angled upwards and is limited by gravity, which pulls the projectile earthward. This is an important reason why you should not shoot centrefire rifles into tree canopies where there is no background hill. Projectiles fired this way can travel several thousand m and you cannot be sure of a safe area of impact.

Point blank range

This brings us to a very important hunting concept known as point blank range. Imagine that you fire your rifle down an unlimited length of horizontal PVC tubing. How far your projectile travels without touching the side of the tube is the point blank range of your rifle. Alternatively, it is the distance over which you can use your firearm and still aim directly at the target!

The immediate question that springs to mind is – what is the diameter of our imaginary PVC tube?

The answer is the size of the kill zone of the animal that you are hunting. Thus, the point blank range of one type of rifle/ammunition combination will be different for different game animals. The smaller the animal the shorter the point blank range!

The practical application of the point blank range concept is that you zero your rifle to shoot high at 100 m. Most hunters zero their centrefire rifles to shoot between 25 mm and 75 mm high at 100 m depending on the rifle/ammunition combination used, the game to be hunted and the distance over which shots will be taken.

Learning exercise

Calculate the point blank range of your hunting rifle/ammunition combination for animals with kill zones of 50 mm, 100 mm and 150 mm in diameter. To do this you will need to use a chronograph to find out the velocity of the projectiles you are firing and then consult the ballistic tables available in reloading manuals.

Understanding the trajectory of your projectile is only part of the problem. Although you now know the distance over which you can be sure your projectile will remain within a given diameter target zone, you still have the problem of accurately estimating distance to the target.

Learning exercise

Practice estimating distances in the bush. You will need to work out your stride length so that you can accurately pace out distances. This can be done by going to a sporting field and pacing out a known distance. In the bush, estimate the distance to a tree or other feature and then pace it out. Practice doing this until you are confident that you can get within 25 m. Many people tend to overestimate distances less than 200 m.

Rifle accuracy tuning

Assuming that your rifle barrel is in good condition and not worn or damaged, there are a number of ways of improving the accuracy of your rifle.

Trigger pressure

The crispness of the trigger release and the pressure required to release the trigger during the shot can significantly affect shot accuracy. Adjustment should be done by a gunsmith after discussing your requirements. It is dangerous to reduce the trigger pressure too much on a hunting rifle. A trigger pressure of 1.5 kg crisp is recommended by many gunsmiths and used by many hunters.

Action bedding and free floating

The breech section or action is the part of the rifle that attaches the barrel to the stock and, if properly mounted or bedded, will minimise barrel movement during recoil and firing. It can also be done in such a way that the barrel no longer touches the rest of the fore-end of the stock, allowing it to oscillate in a free and more regular manner with the shot recoil.

The tension exerted on the screws fastening the action to the stock is important. If either screw is too loosely or too tightly applied this incorrect tension can be detrimental to accuracy.

Properly bedding and fixing the action to the stock is a job for a professional gunsmith or gun stock maker.

Your qualified gunsmith will be able to recommend what work should be carried out on your rifle to gain the best accuracy as some rifles cannot be bedded and/or free floated.

Tuning and hand loading your own ammunition

Rifles, like people, show individual likes and dislikes. The type of ammunition you use in your rifle will affect accuracy. A rifle may be very accurate with one brand of ammunition and less accurate with another. Certain projectile shapes, weights, lengths and powders and ammunition velocity differences can give improvements in accuracy for particular rifles compared with off the shelf mass produced ammunition.

As an extension of your hunting you may wish to hand load your own ammunition and do some trial accuracy tuning work on your rifle. Work in this area has the potential to double the

accuracy of the average rifle if the other points above have also been attended to. What holds true for one rifle does not necessarily hold true for another.

Most shooters are able to hand load ammunition once they are properly equipped and this can open up a fascinating world of ballistics. This in turn can give you a greater understanding of your firearms, their function and capabilities. All powder loads, primers and projectiles should only be used strictly according to the manufacturer's directions.

Projectiles for hunting

Projectile construction and weight

Most lead projectiles for high-powered centre fire rifles are jacketed with copper to improve ballistic performance. Others are of solid copper or have a copper alloy construction. All are constructed to perform in a particular manner for a specific purpose.

For example: military style Full Metal Jacketed (FMJ) projectiles have very specialised uses and are not suitable for hunting Australian game. These projectiles deform very little as they pass through the animal. Without significant tissue damage they may not deliver an instant kill. FMJ projectiles are also prone to ricochet. Hollow point or soft nosed projectiles by contrast expand on impact, maximising tissue damage and thus ensuring a quick, humane kill.

For example: for harvesting vermin like foxes, a professional shooter may be required to deliver a brain shot at 80 m. In order to allow for small variations in point of impact the professional shooter will use a soft pointed high velocity projectile which opens up after impact to do maximum damage and to guarantee an instant kill every time.

Each projectile type is made to a particular specification. Some have a large opening in the front of the jacket, others a very narrow one. Some have pointed or round tips made of plastic, lead or aluminium. The front edge of the jacket may be uniform or tapered in thickness. The internal lead may be crimped on or swaged onto the jacket, or partitioned off to improve weight retention on impact; or it may be made only of copper alloy. Projectiles may be made in many different weights for a single calibre. All these variations influence how far projectiles penetrate, how quickly they start to expand and open up, and how much damage they inflict in their path through the animal.

Special non-military FMJ projectiles may be required when hunting dangerous game where maximum penetration and bone damage has to occur, such as with buffalo or scrub bulls.

Learning exercise: The phone book target

This exercise is a good one to do with some friends. You can share the costs of the ammunition and the work in setting up the trial. Take a long cardboard box and pack it with six or more thick old telephone books placed side by side. Draw a series of crosses on a sheet of white paper and staple the paper on to the end of the carton. Make sure that you have arranged the telephone books so that a projectile has to pass through all of them before it can exit from the back of the cardboard box.

Note: At the rifle range you will need to obtain the permission of the Range Officer to use your cardboard box target. The Range Officer may also wish to inspect your target.

Place the cardboard box on a rifle range mound remembering that projectiles from some rifles will pass through all six telephone books. At a range of 25 m, fire into the separate target crosses using differently designed projectiles. You will discover that differently designed projectiles are very different in the way they penetrate the phone books.

For example, if you are using a .222 Rem you may need to buy a packet of full metal jacket and a packet of soft point (SP) or hollow point ammunition to see the effects of differently designed projectiles.

Remove the telephone books from the cardboard box and open them up to recover your projectiles. You can compare the penetration and expansion of the different projectile types. Also, weigh the recovered projectiles and check on the percentage of weight loss. The original weight of each projectile will be printed on the ammunition packet. Percentage of weight loss is calculated by dividing the weight of the recovered projectile by the original weight of the projectile and then multiplying by 100.

The massed layers of paper in the phone books reasonably simulate animal tissue. This exercise will tell you a lot about which projectile to use on particular game animals.

Do this with every calibre rifle you own, testing as many different projectile types as possible. The use of different projectile types can make your rifle incredibly versatile.

The ideal projectile delivers **all** of its energy into the animal and comes to rest just under the skin on the opposite side to its entry point. This is a big ask, given the variables we encounter in every day hunting.

What would you expect to find with your full metal jacket and soft point projectiles? The full metal jacket projectiles should penetrate further into the phone books and retain more weight. The soft point projectiles should pulp the paper more but not penetrate so far; they should also retain much less of their weight. That is, the soft point projectiles should fragment more.

There is a further exercise you may wish to try. You may wish to fire the same full metal jacket and soft point projectiles at higher velocity. To do this you may choose to use, for example, a .22–250 or a .220 Swift rather than the .222 Rem. You will notice that the full metal jacket projectiles fired at a higher velocity should penetrate further into the phone books.

Conclusion: Match the projectile (weight, hardness and velocity) to the size and toughness of the particular animal that you hunt remembering that you want to leave the energy of the projectile in the animal.

Projectile velocity

The energy or knock down power of a projectile depends on its weight or mass and its velocity. Energy can be calculated and equals the projectile weight multiplied by velocity and multiplied by velocity again and then divided by two. Velocity therefore contributes much more to projectile energy than projectile weight.

Heavier projectiles cannot be fired as fast as lighter ones in any one particular calibre, but they do retain their momentum better. They lose less speed over distance and therefore lose less energy. They would thus appear to be the best choice were it not for the fact that they drop more with distance than lighter projectiles of the same calibre. That is, they are not as flat shooting.

High velocity ammunition theoretically is more accurate as it is flatter shooting. However, it is not this simple as most fast or 'hot' rounds sacrifice significant stability (and accuracy) for this extra speed.

The compromise is to use the powder loads that give the best velocities with accuracy.

Load the projectile that gives the accuracy, penetration and expansion required for the particular game to be hunted.

You can only do all this if you test different projectiles on the rifle range by firing them into phonebooks. The final word will be the observed performance on the game that you actually

hunt. Examine the wound tracts and entry and exit points and compare the visible knock down results.

Gun fit and hunting

Firearm fit is about being able to quickly shoulder your rifle to find yourself looking correctly along the sight plane of the firearm, ready to shoot without further adjustment of your head or sights on the target point. This makes for rapid target acquisition. Often we find ourselves with only a few seconds to take the shot before an animal takes to its heels, so it can make the difference between success and failure after hours of hard stalking.

People come in all shapes and sizes. Stock makers usually cater for the average shooter, if there is such a person. It would be rare to purchase a firearm off the shelf and have it fit perfectly. Customising a stock is expensive. Better to try several makes of rifle and pick one that suits you.

When using scoped rifles, the final adjustment for gun fit is on scope eye relief. This is the distance between your eye and the back lens when you can clearly see through the entire lens. Incorrect eye relief is present when you see an image only through the central part of the back lens and a surrounding dark ring obscures the rest of your sight picture. The scope tube must be moved forward or backwards until the dark ring is eliminated. Remember that high powered rifles require scopes built with a natural long eye relief otherwise the recoil of the shot will cause contact with the rim of the scope and will result in a nasty cut eyebrow or worse.

Common firearms malfunctions

Malfunctions in firearms can be life threatening. Do not attempt to repair, adjust or alter firearms. Call your local gunsmith.

Hang fire

You have pulled the trigger on a live round and heard the click of the firing pin striking the primer but the round fails to discharge.

Action: Stay still and continue to point the firearm in a safe direction. Do nothing but wait several minutes before ejecting the round. Some primers smoulder before eventually flaring and igniting the gun powder. The danger with a hang fire is that it can explode as you eject the cartridge. Discard faulty rounds.

Faulty safety catch

If you intend to use a safety catch then from time to time you should test its function under controlled conditions. This is done **without** having ammunition in the chamber.

It is safer not to rely on safety catches at all by having the firearm loaded only immediately before you intend to shoot and by having it unloaded at all other times. Many safety catches immobilise only the trigger and cannot stop the trigger sear from slipping off the cocked firing pin. Only safety catches that immobilise the cocked firing pin will prevent discharge if the firearm is dropped.

Learning exercise: The safety catch

Make a list of the firearms that you own and determine for each firearm the exact nature of the safety catch mechanism.

Step 1: Confirm each firearm is empty by bore sighting the firearm from the back end with the bolt out, and emptying and/or removing the magazine.

Step 2: Replace the bolt, closing it on the empty chamber and apply the safety catch. Allow the butt to drop from 30 cm onto a hard surface and listen for the firing pin click. Did the catch fail? If not, go to Step 3

Step 3: Repeat the test three times by cycling the bolt and applying the safety catch each time.

Step 4: Sharply tap the back of the bolt with a small hammer with the firing pin cocked and safety on. Uncock and repeat this exercise another two times listening for the click of a falling firing pin.

Live round stuck in breech behind a closed cocked bolt

You have attempted to eject a live round from the breech but the bolt is stuck and refuses to lift. Remember that the firing pin is cocked and this is an extremely dangerous situation. The firearm is permanently loaded. Any attempts to lever or tap the bolt up can result in an uncontrolled discharge if the trigger sear slips. Engage the safety catch immediately.

If possible, carefully find a safe target like an earth bank and from a safe distance discharge the firearm into it.

Live round in breech, bolt out after extraction fails

A live round is stuck in the chamber. This is because the extractor disengaged from, or failed to engage on the case extractor rim. Remove the bolt from the rifle. Do not repel the round with a cleaning rod as this can cause the powder to ignite. If on a public rifle range, seek the advice of the Range Officer on the correct procedures for dealing with this problem. Also, have your firearm serviced and repaired by a qualified gunsmith.

Projectile stuck in the lands after extracting the live case

This is a particular danger when spotlight shooting. A round of ammunition with a loose case neck or with the projectile seated out too far may result in the projectile sticking in the rifle lands (barrel). In daylight, the problem is immediately apparent, because gunpowder pours out of the case when it is extracted from the chamber. When spotlighting you may not see that you have left the projectile stuck in the barrel because of lack of light. If you chamber another round and try to fire it your gun will explode from barrel blockage. The stuck projectile can usually easily be pushed out with a standard cleaning rod passed from the muzzle end.

Problems with lever and pump action rifles

The scenarios above are resolved in the same way for pump and lever action rifles. These two rifles however, due to their construction and function, do present peculiar problems with bore sighting checks. For this a dental mirror is recommended which can be inserted into the action from the side, as bore sighting from the muzzle end is an unsafe practice and must not be done. For lever and pump models with tube magazines it should be noted that only flat nosed projectiles should be used since the point of each projectile is in contact with the primer of the one in front of it. Sharp ammunition can, on recoil, detonate the round in front of it in such tube magazines.

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Learning exercise

Have your firearms inspected and serviced by a gunsmith. Don't be afraid to ask questions.

Example assessment questions

QUESTION	ANSWER
Firearm/ammunition combinations must provide accurate shot placement and adequate killing power over the distance at which game is to be taken.	True or False?
List four variables that affect projectile killing power.	1.
	2.
	3.
	4.
Rifles, like people, show individual likes and dislikes. The type of ammunition you use in your rifle will affect accuracy. A rifle may be very accurate with one brand of ammunition and lose accuracy with another. Certain projectile shapes, weights, lengths and powders and ammunition velocity differences can give improvements in accuracy for particular rifles.	True or False?
List four things that can be done to tune a rifle to give its best accuracy.	1.
	2.
	3.
	4.

Self-assessment checklist

Questions		True	False
1.	Firearm/ammunition combinations must allow for accurate shot placement.		
2.	Firearm/ammunition combinations must provide sufficient killing power to humanely kill the animal.		
3.	Good hunters shoot animals at long distances.		
4.	Good hunters stalk as close as possible without disturbing animals before taking a shot.		
5.	You are personally responsible to kill game animals quickly and humanely.		
6.	A .222 Rem rifle is adequate for hunting sambar deer.		
7.	Full metal jacket projectiles penetrate further than soft point projectiles and thus are better hunting projectiles.		
8.	The killing power of a projectile varies with calibre, weight, construction and velocity.		
9.	The effective killing power of the projectile varies with the toughness of the hide, functional importance to life of the targeted organ and depth of penetration required to reach such organs.		
10.	It is safer not to rely on safety catches at all.		

SECTION TWO: R-LICENCE CATEGORIES

UNIT 2.1 HUNTING WITH FIREARMS PART B: SHOTGUNS

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Glossary of terms

Action – the combined parts of the firearm that determine how a firearm is loaded, discharged and unloaded.

Bore – the interior barrel forward of the chamber.

Brenneke load – single solid lead shotgun projectile.

Cartridge – a single round of ammunition consisting of the case, primer, propellant, powder and one or more projectiles.

Comb –the top part of the stock on the butt or rear section.

Choke – the degree to which a shotgun barrel constricts a shotgun column thus affecting the spread of the shot or 'pattern' produced.

Shot charge – usually described as the weight of the multiple pellets in a shotgun cartridge.

Learning objectives

On completion of this unit you will:

- be able to be tested for a NSW Restricted Game Hunting Licence to hunt with firearms (rifles and shotguns)
- understand various shotgun types and design
- understand basic shotgun shooting techniques
- understand how to hunt safely with a shotgun
- be able to select appropriate shot cartridges for various classes of game
- understand the importance of shotgun fit.

Note: This unit must be completed in conjunction with Unit 2.1 Part A Rifles.

Introduction

Shotguns are designed to hit moving targets at relatively close ranges. The art of shotgunning is very different to rifle shooting. Shotguns fire a pattern of projectiles where the aim is to cover the game within the pattern. This unit of study will provide basic information on hunting with a shotgun.

Shotguns and cartridges

Shotgun gauge

To cover the range of game available, shotguns are manufactured with different bore diameters. The term used to distinguish between each size is the 'gauge'.

Guns may have an internal bore diameter ranging from .410 to the larger 10 gauge, 12 gauge, 16 gauge, 20 gauge and 28 gauge. The huge 8, 6 and 4 gauge guns are now obsolete. The most commonly used shotgun today is 12 gauge. The 12 gauge shotgun can be used for game bird hunting, target shooting and large game hunting.

Shotgun chamber length

Cartridges for shotguns come in different lengths for different powered charges. For example, a 12 gauge gun may be chambered to accept a 2.5-inch cartridge (65 mm), a 2.75-inch cartridge (70 mm) or a 3-inch magnum cartridge (75 mm). While the smaller charges may be fired in the larger chamber lengths, the reverse is not possible and is highly dangerous. Guns with different chamber lengths are available in each of the gauges, so this issue becomes quite complex. The chamber length for a given gun is printed on the barrel, or action flats, with the proof marks.

Shotgun cartridge shot loads

Each of the different cartridge lengths for a given gauge gun have different weight shot charges available. Thus, a 12 gauge 2.5-inch (65 mm) cartridge shotgun can fire either 1 oz. (28 g) or 1½ oz. (32 g) loads. A 2.75-inch (70 mm) cartridge is available in loads ranging from ¾ oz. (21 g) up to 1½ oz. (42 g) mini-magnums. A 3-inch (75 mm) cartridge is available in loads ranging from 1½ to 2 oz. (42–57 g). A gun should never fire a shot charge heavier than the one it was designed for and proofed for. The weight of the charge the gun was designed for is found among the proof marks on the barrel flats.

Shotgun cartridge shot size

Because shotguns are used to kill a variety of game animals, the size of the shot must also be different if a clean kill is to be obtained. The shot sizes are sequentially numbered. The smallest sized shot available is size 12, or dust shot. As the pellet size increases the pellet size number decreases. Also, the number of pellets found in a single weight charge diminishes. The largest size shot is called letter shot or buckshot and ranges from BB, AAA, SSG to SG. For example, a 12 gauge, 1¼ oz. (35 g) SSG load contains sixteen 7-mm balls. An SG load of the same weight contains 9, 9 mm balls. Synonyms are sometimes used to name the shot size, for example buckshot. These powerful loads are designed for harvesting pig sized animals at about 30 m range. Modern shotgun shot can be made from lead, bismuth, tin, steel, or a combination of alloys, metals and plastic compounds.

Shotgun cartridges with solid slugs

To improve shotgun versatility and achieve greater penetration on larger game animals, all of the currently manufactured gauges are available in a single slug, or Brenneke load. These fire a rifled or unrifled slug that generally weighs 1 oz. (28 g) in 12 gauge. These are commonly used on pig sized animals or deer at close range (to 50 m) and can be fired through a standard shotgun, even if the gun is choked. Firing slugs through choked guns generally reduces

accuracy. To overcome this problem, some shotgun manufacturers provide special rifled barrels, or slug barrels, which may have either open sights, or telescopic sights. These provide good accuracy to 100 m.

Types of shotgun

A large variety of shotguns are available to the hunter. These may vary in action type, barrel configuration, barrel length, stock style or patination. The most significant of these characteristics is action type.

Break action guns

The action is hinged and the gun is opened to load or unload by dropping the barrels down below the action at the hinge point. Single shotguns can be opened by a side lever, top lever or under lever. Double-barrelled shotguns may have a horizontal side-by-side barrel configuration, or an over and under vertical form. They too can be opened by a top, side, or under lever. They may have ejectors that pop out the fired shells when the gun is opened, or have hand extractors. They may have a single trigger, or double triggers to fire the gun. Multiple barrelled shotgun-rifle combinations involving up to four barrels of different calibre or gauge can be purchased.

One piece shotguns

These shotguns rely on the mechanism in the action to load, fire and eject the fired round, thus allowing the barrel and action to remain in one piece. These are available in single shot; double barrel; or single barrel multiple shot configurations. The latter are particularly popular and include a box magazine to hold the cartridges, or an integral tube magazine. Action types for these include bolt action, lever action, pump action and gas operated semi-automatic shotguns.

Shotgun choke

To control the pattern of the shot charge at the target at a given range, the end of the shotgun barrel is constricted to a smaller diameter than the bore diameter during manufacture. This is called choke. A number of choke sizes are available to the gun buyer and these are selected depending on the type of game, or the range, at which the target will be shot. Shotguns can be very specialised. Chokes may be completely open or cylinder bore for very close range shooting. The next slightly tighter choke is improved cylinder, then in sequence, quarter, half, three quarter, full or extra full choke for very long range shooting. Some gun owners use special guns with different choke combinations between the barrels for different types of shooting. To improve versatility for a particular gun, some owners buy shotguns with additional sets of differently choked barrels. Some shotguns are available with hand adjustable chokes. Many modern guns are available with sets of screw in choke tubes, so that the one gun can cover all needs.

Recommended shot sizes

Table 1. Recommended shot sizes for small game*

Feral goat, feral pig, wild deer	Single rifled slug
Fox	BB
Hare	No 3
Duck, rabbit, pheasant	No 3 to 6
Quail	No 10

*Taken from ICI product information.

Basic shotgun technique

There are three main points to understand.

1. The aim is not to shoot at a moving target where it is, but to aim to hit it where it is going to be when the shot arrives.
2. Shotguns are normally aimed with both eyes open. Much the same could be said about purchasing a shotgun. The gun must fit the shooter. That is, when the stock is mounted to the shoulder in a ready to fire position, the stock should fit firmly into the shooters cheek and the eyes should be looking straight down the barrel rib to the fore sight, without having to move the head to do so. Poor gun fit will ensure that the shot goes wide of the target.
3. When shooting at a moving target, the shooter must swing the gun through the target, squeezing the trigger as it is passed and then keep swinging, thus providing an automatic lead to the target.

To become proficient at shotgunning one needs to practice, practice and practice. Practice on clay targets is essential to hone your skill with a shotgun.

Learning exercise: Gun mount and fit

Sight in your shotgun for gun mount and fit.

For a target use a board holding a large sheet of butchers paper marked centrally with a heavy cross or dot. Most shotguns are fitted only with a bead front sight. The rear sight is where your eye is placed when you hold the gun in the mounted position on the shoulder with cheek resting lightly and comfortably positioned on the comb of the stock. Use a new sheet of paper for each test shot.

Test firings will reveal how good the gun fit is and how consistent your gun mounting is. Find the centre of the pattern of shot pellet holes and compare this to the point of aim. If the centre of your shot pattern is so far away from the aim point that you are dissatisfied with it, ask a capable shot gunner to check how you mount your gun. You may need to change your gun mounting technique or to consult your gunsmith about stock modifications.

Hint: try not to flinch when shooting at stationary targets and fire at least ten shots from any barrel to give an accurate indication of where the gun is actually shooting.

Learning exercise: Killing power

Take a cardboard carton and fill it with telephone books. At a distance of 20 m and using a 32 gram load of Number 8 lead shot, fire one or two cartridges into the cardboard carton. Check the telephone books to see what depth of penetration you achieved with the No. 8 shot. Next, take a 28 gram solid lead slug and fire it into the cardboard carton. Again, check the depth of penetration.

Now imagine that the cardboard carton was a feral pig. Would you expect the No 8 shot to do anything more than lodge under the skin, lightly wounding the pig?

How accurate were you with the solid lead slug? Would you expect to be accurate at say 50 m?

Remember always use an appropriate firearm/ammunition combination fired over an effective distance!

Shotgun safety

A novice shotgun shooter should attend or join a gun club and learn how to safely handle and shoot a shotgun at clay targets before attempting to hunt game.

- Before setting out for a shoot, the hunter must make sure that the cartridges are the right gauge for the shotgun being used; that the cartridges are the right length for that shotguns chamber and that the charge of shot to be used is within the proofed load for that shotgun.
- A break-open shotgun should always be kept in the open position and unloaded until the hunt commences. Similarly, a single piece shotgun should have the action open and be unloaded.
- When walking with a shotgun, the barrels should always be pointed to the ground, or kept pointing into the air in a vertical position and never pointed towards a person.
- When crossing a fence, the unloaded and broken or opened action gun should be passed to a person on the other side of the fence, or laid on the ground beneath the fence and picked up by the hunter when they are through the fence.



A family enjoying a day's hunting.



Two hunters walking up small game.



Two hunters with their bag of feral pigeons.



Shotguns are ideal for tailing hare on the run.

Photo: Max King

Photos: *Feathers and Fur Magazine*

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Example assessment questions

QUESTION	ANSWER
Shotguns can be used to kill a variety of game animals. Shot size should be selected depending upon the particular game being hunted.	True or False?
List one species of game animal that may be humanely taken for each of the following shot sizes:	1. SG:
	2. BB:
	3. No 4:
	4. No 10:

Self-assessment checklist

Questions		True	False
1.	The best shot size for a feral pig is BB		
2.	Firearm/ammunition combinations must provide sufficient killing power to humanely kill the animal.		
3.	Good hunters stalk as close as possible without disturbing animals before taking a shot.		
4.	Recommended shot size for a hare is No 6.		
5.	A 12 gauge shotgun can be used for game bird hunting.		
6.	With shotguns the aim is to shoot at the moving target.		
7.	The killing power of a projectile varies with the size of the shot.		
8.	The effective killing power of a shot load varies with the toughness of the hide and the species targeted.		
9.	It is safer not to rely on safety catches at all.		
10.	Tight chokes extend the killing range of the shot pattern.		

SECTION TWO: R-LICENCE CATEGORIES

UNIT 2.2 HUNTING WITH BLACKPOWDER FIREARMS

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Glossary of terms

Barrel flusher – attachment which screws onto the nipple to allow to be drawn through the nipple and barrel for cleaning.

Cleaning jags – various brass attachments used to clean the bore.

Flash cup – a brass cup that sits under the nipple to protect the barrel and stock from burning.

Flash guard – metal device to prevent sparks and burning powder spreading.

Flask filling funnel – brass funnel used to refill powder flask.

Flask spout – a brass spout which attaches to the powder flask head and holds a set charge of powder.

Flint – small piece of rock attached to the hammer of a flintlock musket. The hammer strikes the flask pan and the flint creates a spark igniting the powder in the flash pan which ignites the powder in the barrel.

Flint knapper – small hammer used to keep a sharp edge on the flint.

Flintlock pan primer – used to prime the flash pan of a flintlock. Dispenses several grains of powder each use.

Lock – firing mechanism of the musket.

Muzzle guide – brass attachment to prevent damaging the muzzle and bore during ramrod use.

Nipple – attachment which hold a percussion cap during firing.

Nipple pick – device for cleaning the nipple.

Nipple protector – device which fits over the nipple to protect it from damage.

Nipple wrench – wrench for removing the nipple.

Patch – piece of material used between the powder and the projectile.

Percussion cap – explosive cap that when struck by the hammer ignites the powder inside the barrel of a percussion musket.

Powder flask – a container of various shapes made from static free materials such as copper. Used to hold powder and varies in size from approx. 2 oz. (57 g) through to approx. 12 oz. (340 g).

Powder flask head – a brass attachment that seals the end of the powder flask. These are made from brass and have a lever for dispensing powder in controlled amounts.

Powder horn plug – usually a brass fill plug that screws into a bush located in the wooden sealing plug of the powder horn.

Powder horn valve and bush pouring – a brass bush glued into the horn that allows free pouring of powder.

Powder horn valve and bushspout – a brass bush glued into the horn with a push button valve that dispenses a measured charge.

Powder horns – a powder holding container made from a cow horn. The amount of powder they hold varies with the size of the horn.

Powder measure – made of brass and used to measure out a set charge of powder. They can be adjustable or fixed.

Ramrod – rod used to push the ball or bullet into the barrel of the firearm.

Short starter – device used to start the projectile down the barrel.

Shot head – attachment for the end of the shot pouch that dispenses a measure of shot pellets.

Shot pouch – normally made of leather and hold shot pellets for use in blackpowder shotguns.

Vent pick – device used to clean out the vent on a flintlock musket.

Learning objectives

On completion of this unit you will:

- be able to be tested for a NSW Restricted Game Hunting Licence to hunt with blackpowder firearms.
- know basic information on hunting with muzzle loading firearms.
- know why people hunt according to the historical tradition of firearms.

Introduction

Blackpowder is used as a propellant in two broad categories of firearms:

- muzzle loading
- breech loading.

So why hunt with muzzle loaders?

The answer is in the pleasure of taking part in a living reconstruction of human history. The hunter is prepared to accept fewer opportunities to take game animals in return for the pleasure of hunting in the tradition of early firearms.

This unit of study will assist the muzzle loading hunter to hunt safely, and maintain high ethical hunting standards and acceptable animal welfare outcomes while using antique firearms technology.

Used within their accurate range, muzzle loading firearms are more than capable of delivering one-shot instantaneous kills. These firearms dispatch game effectively and humanely.

Historical information

The world was introduced to firearms with the advent of blackpowder propellant several hundred years ago. Today it is still used by some hunters and target shooters. The invention of a self-contained percussion system allowed cartridges containing the primer, powder, wad and shot to be loaded into a firearm through the shooters end of the gun. The older alternative is to ram the components down the muzzle of the gun and then prime the gun as a second act at the shooters' end.

Breech loading firearms

Many blackpowder firearms in use today are loaded with centre-fire cartridges, which use blackpowder as a propellant rather than modern nitro based powder. Some specialists reload the rarer pin-fire cartridges, although this is a complicated process. Centre-fire blackpowder cartridges are commonly used in shotguns and rifles.

It should be noted that many of the older blackpowder firearms are only proofed for the use of blackpowder and not modern, high pressure nitro powders.

You must at all times give priority to the manufacturer's instructions in respect of and/or relating to the firearm being used.

It is hazardous to use the wrong powder.

The use of nitrocellulose powders in blackpowder firearms is not recommended.

Breech loading blackpowder proofed shotguns are still common at gun auctions and specialist shops and are generally seen in eight, 10, 12, 16, and 28 gauge guns. Firearms may be hammer guns or hammerless and may be found in a variety of action types, many of which are quite unusual such as Jones patent, under lever and side by side shotguns made by Hollis or Purdey.

Blackpowder shotguns may be single shot, two, three or four barrel guns, combination guns, pump action, lever action or bolt action. Barrels may be steel or Damascus. Many of these old guns are beautifully designed and hand made.

Some blackpowder shotguns have chokes, but most do not because choking had not been introduced when they were made. It should be noted that blackpowder shotgun cartridges are available in specialist shops in capital cities and these should be used in blackpowder proofed shotguns.

Breech loaded blackpowder rifle cartridges can be highly accurate and work well on game. There is nothing quite like seeing the smoke haze from the barrel when one is fired. Rifle cartridges for blackpowder calibres are generally hand loading.

This is because there were several hundred different rifle calibres designed and used in British, European and North American rifles, many of which are subtly different in cartridge dimensions. For example, the powerful .500 3¼-inch (83 mm) Express has a different rim thickness to the .50/140 Sharps, although in other respects they are similar. Several companies specialise in manufacturing cartridge cases for some of these obscure calibres to facilitate hand loading.

Blackpowder rifles can be found in a variety of action types including single shot, double rifles, combination guns, lever action, pump action and bolt action. Many modern nitro cartridges were often based on original blackpowder designs.

In many of the North American rifle cartridges, the calibre designation is followed by the charge of blackpowder to be used. For example: .44/70 Maynard, .44/85 Wesson, .44/90 Sharps, .45/100 Ballard. This terminology was used to assist hunters living in remote areas where factory loads were often not available.

It should be noted than many of the blackpowder calibres used on big game and dangerous game are characterised by large bullet diameter and weight propelled at moderate velocities (usually up to 2000 feet per second). Consequently, large rifle calibres such as .577 Express, and ball and shot guns which were as large as four bore were used in smooth bore, rifled or Paradox guns (partially rifled).

Muzzle energy, penetration and wound size secured the kill. In contrast, modern nitro powders use relatively light bullets travelling at high velocity.

Muzzle loading firearms

Muzzle loaders are all loaded from the front end of the barrel. Blackpowder is poured down the barrel with a ball or bullet and then pushed down to be seated on top of the powder charge. There are four basic categories of muzzle loading long arms: rifles, smooth bore ball guns, shotguns and modern blackpowder rifles.

These are generally single shot guns, although two to four barrelled guns can be found and some rifles have revolving chambers. All of the categories of muzzle loading firearms can be subdivided on the basis of their ignition systems; matchlock, wheel lock, flintlock or percussion.

The percussion systems can be further subdivided into the old angled percussion lock and the in line system commonly available in modern percussion rifles and revolving muzzle loaders. Today, amongst the muzzle loading firearms, percussion rifles and shotguns are the most commonly used.

Hunting with a muzzle loader requires more skill on the part of the hunter than the use of a modern rifle. This is because the technology is less advanced and a greater number of variables need to be taken into account.

Wind, rain, snow and heat will all have some effect on the burning rate of the blackpowder. Bullet construction is more primitive, producing a more curved flight path to the target.

Consequently the muzzle loading hunter must know their firearm and understand its limitations and hunt within them.

About blackpowder

Blackpowder is a mixture of sulphur, saltpetre (potassium nitrate) and charcoal. The modern muzzle loading hunter has four-grain sizes to choose from: 1F, 2FF, 3FFF and 4FFFF. The

coarsest is 1F or Fg, which is the slowest burning, to 4F or FFFFg, the finest grained and fastest burning.

Always follow the manufacturer's instructions in using slow and fast burning powders.

Notwithstanding the guidance and direction contained in this manual, you must give priority to the manufacturer's instructions in respect of and/or relating to the firearm being used.

Coarser powders are commonly used in muskets, 10 gauge shotguns as well as very large bore rifles and cannons. Medium grain powders are used in 12 gauge shotguns, 45 calibre and larger rifles and single-shot pistols. Finer powders are used in 20 gauge shot guns, pistols and rifles under 45 calibres.

Safety considerations

- Never use 4F powder as a main charge in any type of muzzle loader – it is for the pan of flintlocks only.
- Never smoke when using, loading or shooting with blackpowder as it may explode.
- Never load directly from a powder flask or horn into the barrel of a muzzle loader.
- Remember there may be smouldering remnants of powder from an immediate previous shot.
- Always pour powder from a measure into the barrel.
- **Never use smokeless nitrocellulose based powder in a muzzle loader.**

Blackpowder hunting loads

Always use safe loads in accordance with the recommendations of reputable hand loading manuals. At a rifle range, work up your loads in safe increments until you have an accurate load for your rifle while staying within the recommendations for a maximum safe load.

Suggested calibres and projectiles

Species	Guidelines
Rabbit, hare, fox, feral cat	32 calibre with round ball.
Feral dog and goat	45 calibre round ball, 130 grain round ball or 230 grain Minie bullet.
Feral pig	50 calibre, 175 grain round ball or 250 grain Minie bullet.
Fallow deer and hog deer	45 calibre, 130 grain round ball or 230 Minie bullet.
Sambar deer and wapiti	54 calibre, 300 grain Minie bullet.

You will also need to work out the best type of projectile for your hunting – either a ball or a conical type bullet, since the bullet type will have an effect on the accurate range of the muzzle loader. Once you have all the variables worked out such as bullet type, patch thickness for round ball and type of powder, then at a range work up loads that are accurate for your rifle to within 100 m.

Calibres and projectiles

Muzzle loaders are all loaded from the front end of the barrel by pouring blackpowder down the barrel, with a ball or bullet pushed down to be seated on top of the powder charge.

In the world of blackpowder hunting, projectile size and mass are very critical due to the low velocities and low ballistic coefficients of the projectiles used.

Loading the firearm

Never exceed the manufacturer's maximum powder load.

Never use smokeless powder in a muzzle loader.

As with all firearms, before loading your muzzle loader make sure it is unloaded. Follow these steps:

Lay your ramrod alongside the barrel of your rifle and permanently mark the length between the touchhole or percussion cap breech plug and the end on the barrel on the ramrod.

Now place the ramrod down the barrel of the rifle. If the mark is above the end of the muzzle then you have a loaded rifle! If it is just below the end of the barrel then the rifle is unloaded.

Once you have loaded your rifle and you are sure the bullet is sitting on the correct amount of blackpowder, with the ramrod still sitting on the load, again place a permanent mark on the ramrod. Now you have a ramrod that you can use to determine if the rifle is loaded or unloaded.

Clean the barrel to avoid the build-up of fouling with successive shots. Fouling will increase muzzle pressure and this in turn will increase muzzle velocity. This will change your point of impact, which means you are now hunting with an inaccurate and possibly dangerous firearm!

Safety considerations

- Never use the half cock as a safety mechanism.
- Never load a muzzle loader with powder in the pan of a flintlock, or a cap on a nipple of a percussion cap rifle.
- Always load so that the end of the muzzle of the rifle is pointed away from you.
- Never look down the muzzle of a loaded rifle.
- Never blow down the barrel of a rifle between shots.
- Never pound down on a ramrod to seat the bullet as it will deform it and reduce accuracy.

Tuning a blackpowder firearm

A good way to do this is to place wet telephone books down range and to fire at them from ranges up to 100 m. Look at the books after each shot and once you have a load that gives good penetration and accuracy shot after shot then you have found the correct load for your hunting rifle.

When things go wrong: hang-fire

A hang-fire is a delay of ignition between the primer and the main charge in the barrel. If you have a discharge failure, maintain your hold on target for as long as possible. If it is a hang-fire, it may only be a delay of a few seconds in the ignition of the powder. Until the firearm is rendered safe you **must** continue to point it in a safe direction.

When things go wrong: misfire

A misfire occurs when the primer ignites but the main powder charge fails to fire. Again hold on target for as long as possible as it may be a hang-fire. If after a few minutes you don't have a discharge then, still pointing the rifle in a safe direction, check the cap or pan. Make sure it is a misfire, and then check with the ramrod that the rifle is loaded correctly. If you're sure it is a misfire, clean the vent or touch hole with a pick, then re-prime and fire.

Things to remember about blackpowder firearms

1. Hunters must understand that there are a large number of variables when using a blackpowder rifle that may affect accuracy, such as weather conditions, the type and grade of blackpowder, patch thickness, and bullet type.
2. Hunters must know and understand the muzzle loading rifle they are hunting with.
3. A muzzle loading hunter must be able to accurately judge distance.
4. Never store blackpowder in the same area as percussion caps.
5. If the rifle has double set triggers, don't set them until you are ready to fire.
6. Always seat the bullet firmly against the powder charge.
7. Never use the half cock as a safety.
8. Always handle a muzzle loader in the same safe manner as any other type of firearm.
9. Muzzle loading blackpowder rifles by their nature are a possible fire hazard and should only be used in low bushfire danger periods.

Learning exercise

This exercise is designed to enable you to understand the trajectory curve of a projectile from your muzzle loader. It will also allow you to set your firearm sights for the most appropriate point blank range for the class of game you are hunting.

Step 1: Set up targets at 25, 50, 75, 100, 150 and 200 m. Aim at the centre of the bullseye of each target with no allowance for holdover. Place five shots into each target and find the centre of each group. You can now calculate the amount your projectile will drop at each of these distances.

Step 2: For the distance that you will most commonly be using your muzzle loader, adjust the sights on your firearm so that it groups on the bullseye at that distance.

Step 3: Repeat Step 1 with a series of targets. From these targets you will now know the amount of hold over or hold under needed at each distance (with your current sight adjustment) to ensure that your projectile lands in the bullseye.

References for further reading and learning

Wright, G. 1996: *Shooting the British Double Rifle*. Published by SSAA.

Big Game Rifle Club. Victoria. Australia. pp 1–126.

Barnes, F.C. 1993: *Cartridges of the World*. 7th Edition. Published by DBI Books, USA. pp 1–464.

Example assessment questions

QUESTION	ANSWER
Hunting with a muzzle loader requires a lot more skill on the part of the hunter than with the use of a modern rifle.	True or False?
List four reasons for your answer.	1.
	2.
	3.
	4.

Self-assessment checklist

Questions		True	False
1.	If a blackpowder firearm fails to discharge you should wait, keeping the barrel pointed down range to see if it is a misfire or hang fire.		
2.	If your firearm fails to discharge immediately maintain your hold on the target as long as possible in case it is a hang fire.		
3.	If a blackpowder firearm misfires you should immediately re-prime.		
4.	Smokeless powder is better to use in a blackpowder firearm as you can see your shot placement more clearly.		
5.	Never load a muzzle loader with powder in the pan of a flintlock or a cap on a nipple of a percussion cap rifle.		
6.	Always seat the bullet well up from the powder charge.		
7.	Muzzle loaders should be loaded from a powder horn.		
8.	A muzzle loader needs to be examined down the muzzle to determine if it is loaded.		
9.	When loading, use the half cock for safety.		
10.	Muzzle loaders kill game quickly and efficiently.		

SECTION TWO: R-LICENCE CATEGORIES

UNIT 2.3 HUNTING WITH BOWS

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Glossary of terms

Archer's paradox – the transfer of energy upon release from the bows limbs to the arrow occurs through the rear of the shaft first and to the point last. This process causes the arrow to flex (horizontally for finger release and vertically for release aid). As the arrow leaves the bow, the fletching stabilises the flexing of the arrow rapidly to increase accuracy. The amount of flexing can be minimised by using properly matched arrows to the bow and an arrow rest that absorbs much of the flexing before the arrow leaves the bow. This helps improve the accuracy of the bow.

Buck fever – a shaking nervousness due to excitement.

Cables – are found on compound bows. They are connected to the cams/wheels of a compound.

Cable guard – is found on a compound bow. It is a metal rod attached to the riser of the bow and is used to hold the cables away from the launch path of the arrow.

Cams/wheels – are the pulleys located on the limb ends of a compound bow. The string and cables are connected to these.

Cast – the horizontal distance the arrow can travel.

Grip – the central part of the bow where the hand connects during the draw.

Haemorrhage – bleeding.

Limbs – the part of the bow above and below the riser and grip, that flexes when the bow is drawn.

Nocking point – a small metal clip located on the string under which the arrow is clipped to the string.

Range finder – is a small device used to accurately measure the distance to a target.

Riser – is the non-flexing part of the bow between the two limbs.

Spine – the stiffness of an arrow shaft.

Tiller of the bow – the distance between the back of the bow and the bow string.

Window – the cut away portion of the riser where the arrow rest is located.

Learning objectives

On completion of this unit you will:

- be able to be tested for a NSW Restricted Game Hunting Licence to hunt with bows.
- know how to select the correct bow equipment for your size, strength and shooting style.
- know the basics of how to tune your bow equipment for optimum performance and accuracy.
- know the basics of shooting a bow.
- know how to determine your Effective Shooting Range.
- know how to sharpen broadhead arrows.
- know basic bow hunting techniques.
- know where to aim a bow to deliver a quick, humane kill.
- know how to safely bow hunt.

Introduction

Modern bow hunting is a fascinating and challenging method of hunting.

It has proven to be a humane and effective method of harvesting targeted animals when used within the effective range of the equipment.

Even with modern technological advancements in equipment and hunting techniques, bow hunting is still essentially a short range hunting proposition. The challenge for bowhunters is to not only master the shooting of the bow and arrow, but to also develop the hunting skills necessary to penetrate a game animal's highly evolved defence system of sight, sound and smell. The challenge is to get as close as possible before taking the shot. Bow hunting is not for all hunters. It requires a great degree of patience and perseverance to be successful.

Historical information

No one knows when the first bow was made, who made it or even on which continent it was developed. What we do know is that bow hunting has been around for up to 20,000 years. With the advent of gunpowder and the subsequent innovation of firearms, bow hunting as a survival tool died off in the western world. The rapid spread of firearms throughout all continents by colonising world powers was the virtual death knell of bow hunting worldwide.

Only in isolated pockets did bow hunting survive as a means for obtaining food, such as with the Bushmen of Africa and people in other remote regions.

Today bow hunting continues to grow with more and more countries opening their hunting grounds to bow hunting.

The three different types of bow

Bows consist of several fundamental parts. They have a grip, riser, window, limbs, string, nocking point and an arrow rest. Compound bows also have wheels or cams, cables and cable guards.

In general, there are three basic types of bows.

Longbow

This bow is characterised by having straight limbs that, when strung, bend back towards the archer in a 'D' shape.

The longbow was developed originally in England for hunting and warfare. It is most commonly associated with the legend of Robin Hood.

Traditionally they were made from yew timber, which was readily available, of good flex, strong and straight of grain. The modern longbow is similar in design but more often made of laminated timber. The longbow is considered a traditional bow and is the most difficult to master.



An Australian-made longbow constructed from Australian timbers.

Recurve bow

This bow is characterised by limbs that point forward from the shooter when the bow is strung. The string sits in a notch along the back of the limb and only comes away from the limb when the bow is drawn.

These bows have a grip cut into the riser of the bow making them much more comfortable to draw and shoot. The curving limb design greatly reduces the shock into the bow arm when the arrow is released.

The recurve bow was developed in Asia, most notably in Mongolia and China, for hunting and as a weapon of war. The great Mongol hordes under Genghis Khan used the recurve to great effect in battle.

It is believed there are two main reasons for the development of the recurve bow. Firstly, this region lacked timber of the quality needed to make long bows. Recurve bows were made of several curved pieces of timber bound together with sinew. The curving design increased the poundage that could be achieved from the timber available.

Secondly, the Mongols were great horsemen and this short recurving bow made it possible for them to shoot from horseback, which gave them a huge advantage in the battlefield.

Today this bow design is made of laminated timbers for increased strength and reliability. It is considerably easier to shoot than a longbow.



A recurve bow made by PSE in the USA.

Compound bow

This bow revolutionised modern bow hunting. It is characterised by having two wheels or cams located on the ends of the limbs. Utilising a system of cables attached to the wheels or cams, the bow is drawn back to the archer's face.

With longbows and recurve bows, the further the string is drawn back the more poundage and strength is required to hold it back. This can make aiming more difficult. The design of the compound requires most draw effort at the beginning of the draw rather than at the end and so, as the wheels or cams roll over, the draw weight at full draw can be reduced to less than 70% of the peak draw weight making the bow much easier to aim and shoot. This also allows the bow's limbs to store proportionally more energy and this increases arrow velocity and flattens

trajectory of the arrow, which makes it more accurate over longer ranges.

This bow type is the easiest to master and considered to be the most accurate.



A compound bow made by PSE in the USA.

Types of arrow

Arrows consist of several parts.

Shaft

There are three main materials used to construct arrow shafts.

1. **Timber:** timber arrows are made from a variety of different timbers with Port Orford cedar being the most popular. They come in different lengths, thicknesses and spines to suit most bow types. Due to the natural variations in timber grain and strength, it is very difficult and time consuming to get a matched set of timber arrows to suit your bow. This variation will affect accuracy. Timber arrows also lack the strength of other arrow materials and can easily break should they hit hard objects like rocks and trees.
2. **Aluminium:** aluminium arrows revolutionised arrow technology and brought about a marked improvement in accuracy. The introduction of aluminium tubing for use in arrow manufacture has made it possible to produce multiple shafts of the same weight, spine and straightness in a huge variety of sizes to perfectly match your equipment. Aluminium arrows are also lighter for the same bow poundage than timber and this reduction in weight increases velocity and flattens trajectory for a consistently more accurate shot. However, aluminium shafts can bend or break when they hit solid objects. Aluminium shafts are generally a little more expensive than timber. They are the most popular shaft material used by hunters today.
3. **Carbon fibre:** the use of carbon fibre is the latest development in arrow shaft design and it has been a considerable improvement over aluminium. It is lighter, stronger and straighter than aluminium. These features provide an increase in accuracy over timber and aluminium. Carbon fibre shafts are also much less prone to breakage when hitting a solid object. Carbon fibre arrows are more expensive than aluminium but the price is decreasing as more and more archers choose this shaft material.

Fletching

Can be made of real feathers (goose or turkey), or plastic. Feathers are more often the choice for traditional archers as they provide better arrow flight when shooting off the shelf of the bow. However, they are not as durable as plastic (vanes) and are badly affected during wet weather. Vanes are perfect when using an arrow rest, they are very resistant to wear and impervious to weather. Their smooth surface increases arrow speed.

Nock

This is a small, notched piece of plastic glued onto, or inserted into, the shaft at the tail end. The nock is clipped onto the string to give the arrow stability during aim. Nocks are generally made of plastic and come in a variety of sizes and colours to suit all applications.

Points

There are two main types of arrow points:

- field points, used for target shooting; and
- broadheads, used for hunting.

Accessories

There are several basic accessories required to set up your bow to shoot. Each accessory comes in a variety of styles that all serve the same purpose. The style of a particular accessory is a matter of personal preference.

Arrow rests

These provide a launch pad for your arrow. They are designed to reduce the archer's paradox and minimise contact of the fletching with the bow rest to give a consistent and accurate launch path for the arrow.

Sights

Sights come in a range of designs. They are most commonly affixed to compound bows and sometimes to recurve bows but never to longbows. The bow sight is usually attached to the front of the bow window and comprises up to five pins that sit in a vertical line above the arrow. A peep sight is attached to the string and when the bow is drawn, the archer can see through the peep and can centre the end of the pin on the desired point of impact on the target. The pin sights are usually set at 10 m intervals with the top pin being for the closest distance of 20 m and then 30 m, 40 m and 50 m.

Gloves, tabs and release aids

Gloves and tabs are used when using your fingers to draw, hold and release the string. A release aid is a mechanical device that is strapped to the drawing hand. A metal latch hooks the string and a trigger is used to release it. Release aids remove the inconsistencies of a finger release.

Arm guards

These are strapped to your bow arm to protect your forearm from the slap of the string and to keep loose clothing from coming into contact with the string as this can affect accuracy.

Quivers

These are used to hold the arrows in a safe manner. There are three main types of quiver.

1. **Back quivers:** these are the most traditional type favoured by longbow and recurve enthusiasts. It is a full-length pouch usually made from leather and it has a strap going over the shoulder. Arrows tend to rattle around in these types of quiver and broadheads can become dull from rubbing against each other.
2. **Bow quivers:** these attach to the side of the bow and can hold up to 8 arrows. Broadheads are secured in the hood on the top and a clip holds the arrow shaft. These are very popular for compound bows and they safely and securely hold the arrows. They can however upset the balance of the bow and this can affect accuracy.
3. **Hip quivers:** These attach to the belt of the archer. They must be fitted with a hood which fully encloses the broadhead to protect the archer. The shaft is attached by a clip to hold the arrows securely.

Camouflage

It is considered essential that bowhunters wear camouflage clothing to assist a close stalk. Camouflage breaks up the human outline and the pattern and colour should be carefully selected to match the terrain of the hunt. It is important to recognise that camouflage clothing may increase the risk of a hunting accident in areas where rifle hunters are active. Safety is improved if you wear an item of blaze orange clothing such as a cap or vest.

Bow, arrow and broadhead selection and tuning

Bow selection

Prospective bowhunters need to consider four things when selecting an appropriate bow.

1. Whether they are right or left handed.
2. Draw length – this is the length of pull for the archer to draw the string back to a comfortable anchor point on the face.
3. Draw weight – this is the amount of pulling pressure, measured in pounds, required to bring the bow back to full draw.
4. The type of bow the person wishes to learn to shoot and hunt with.

A novice bowhunter should seek the advice of trained archery shop staff, a bow hunting club coach or a friend who is very experienced in bowhunting to help with the selection of a hunting bow. A poorly fitting bow will make accurate shooting nearly impossible.

Arrow selection

Arrow manufacturers have created charts that need to be consulted when choosing arrows. These charts consider draw length, draw weight, shaft material and point weight and then give you a range of three to five arrow sizes that will suit your equipment. The use of incorrectly matched arrows will greatly affect accuracy and can be incredibly dangerous.

Broadhead selection

Broadheads are the arrow points used for hunting. They are designed to fly accurately, penetrate deeply and cut vital organs to facilitate as rapid a blood loss as possible.

There are two basic types of broadheads.

- **Fixed blade design:** these have two or more blades that need to be manually sharpened.
- **Replaceable blade design:** these have blades that are pre-sharpened in the factory to a shaving sharp edge and can be replaced after the shot.

Broadheads with two blades provide the best penetration and are suitable for hunting all animals. As the number of blades increases, there is a corresponding decrease in penetration due to the drag of the extra blades, although this can be offset with an increase in the size of the wound channel and ability to sever tissue. Generally, bows of lighter weight should use two bladed broadheads and those hunters using heavy weight bows can choose to use broadheads with more than two blades.

Recommended minimums for bowhunting

The following equipment minimums are recommended to ensure that bowhunters humanely and effectively harvest their target species.

Arrows

- All arrows must be equipped with a broadhead of not less than 25 mm in width.
- All broadheads must have a minimum of two sharpened cutting blades.

Draw weights

All draw weights apply to peak draw weights of longbows, recurve bows and compound bows.

Species	Minimum draw weight
Rabbits, hares, feral cats, foxes	30 lb (13.5 kg)
Wild dog, feral goat	40 lb (17.5 kg)
Feral pig, chital deer, fallow deer	45 lb (20.0 kg)
Rusa deer, red deer, sambar deer, wapiti	50 lb (22.5 kg)
California quail, partridge, pheasant, peafowl, turkey	45 lb (20.0 kg) Arrow specifications: points 1 & 2 only

Bow tuning

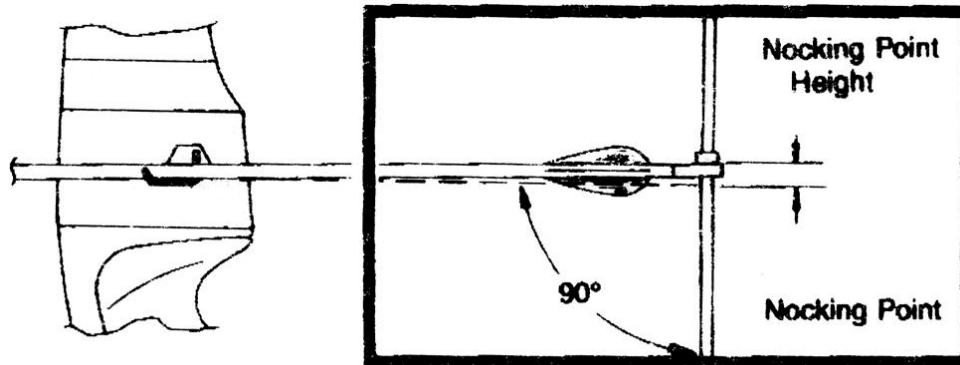
Once you have made your equipment selections you will need to precisely tune your equipment to its optimum performance level. This can take some time. Broadhead tipped arrows do fly differently to field pointed arrows because of the different aerodynamics produced by the larger broadhead. If the incorrect fletching size and configuration is used, there can be a tendency for broadheads to plane erratically because of their large flat surface area.

Generally, broadhead tipped arrows require a minimum of 300 mm (12 inches) of fletching (3 x 100 mm [4 inch] feathers/ vanes) in a helical pattern. This will force the arrow as it leaves the bow to spin, thereby eliminating the flat broadhead surface and the planing effect. A new bowhunter should enlist the advice of an archery shop dealer, club coach or experienced bowhunter to help with the initial set up of the bow. There are also several good books on the subject available from archery dealers.

Basic bow set-up

The bow is set-up by adjusting the nocking point on the bowstring to the correct vertical height and adjusting the arrow rest for proper centre shot. These adjustments are slightly different for each bow type and are used as a starting point for fine tuning your equipment for optimum performance.

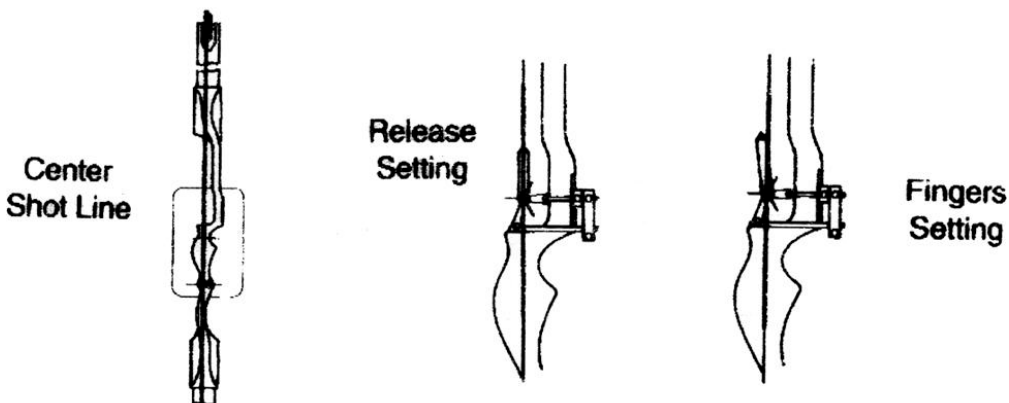
Recurve and longbows (shot with a finger release) should set the nocking point at 9.5 mm ($\frac{3}{8}$ inch) above centre and the arrow rest should be set with the tip of the arrow just to the left of centre (right handed bows). See the diagram below.



Nocking Point

In regards to compound bows, you will first need to adjust the tiller of the bow so that the bowstring is the same distance from the limbs. This will ensure that both limbs are working in unison and are generating equal amounts of energy. See the diagram below.

If the shooter is using a finger release then adjust nocking point and arrow rest as above. If using a release aid then the nocking point should be set at 6 mm ($\frac{1}{4}$ inch) above centre and the arrow tip should be directly in line with the string. See the following diagrams.



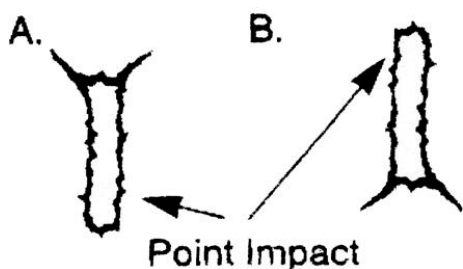
Fine tuning

This can be best done using a method called paper tuning. Put simply, arrows are shot through a piece of paper into a suitable backstop located beyond the paper. A picture frame works well when the paper is tightly taped to it.

Start shooting 3 m from the paper and make adjustments according to the resultant tear directions in the paper.



Holes with high tear patterns require a slight lowering of the nocking point (3 mm or $\frac{1}{8}$ -inch increments). Do the opposite for low tears. Refer to the next diagram.



For right-handed shooters, tear patterns to the right show an arrow that is too stiff in spine for the bow weight. Try the following:

1. Move arrow rest towards the bow.
2. Increase bow weight.
3. Increase arrow point weight.
4. Decrease cushion plunger tension if using such an arrow rest.
5. Try a weaker spined arrow.

For left tear patterns, do the opposite of the above. See the diagram below.



Acceptable tear patterns are achieved when the point of the arrow and the fletching go through the same hole. Slight tears are acceptable and will not affect accuracy. Perfect results can only be achieved with perfect shooting form.



Basic and fine tuning information and diagrams are courtesy of the Hoyt Archery Company *Compound Bow Manual* 1994.

Shooting techniques

There are three main shooting techniques that work well for bow hunting.

Instinctive shooting

This is perhaps the most difficult technique to master. Characteristically, it requires very regular practice, often daily, to reach and maintain an acceptable level of accuracy. It involves becoming so familiar with the bow, arrow and trajectory of the arrow that it becomes an extension of your body. All the shooter's concentration is focused on the point of impact with no reference to the bow or arrow in the sighting sequence. The process is very similar to throwing a ball.

Gap shooting

In this style the archer lines up the point of the arrow when at full draw to a point from below the intended point of impact for close targets to right on the point of impact for longer distances. The distance below the target is known as the 'gap'.

This 'gap' changes with the distance from the target. With practice, it can become a very accurate method of shooting.

The above two styles of shooting are known as bare bow shooting and can be done using any type of bow.

Sighted shooting

This is the use of pin sights, with or without the aid of a string affixed peep-sight. The sights are adjusted to exact distances for each bow. Once the estimated or exact distance to the target is known, the bow is drawn and the correct sight pin is placed on the desired point of impact and the arrow is released.

When adjusting the sight pins to the bow/arrow combination, start at a known distance such as 20 m for the first pin (top pin) and shoot a group of three arrows. Adjust the pins in the direction of the group's impact. For example, if the arrows all shoot high and to the left of the target, move the sight pin up and to the left. Try another three shots. Keep making the adjustments until the groups and the intended point of impact are the same.

Once the first pin is set correctly, move back to 30 m and follow the same procedure for the next pin and so on.

Shooting basics

Stance

Your stance is very important in providing a stable shooting platform for your body. Your position needs to be comfortable and stable. Generally, this is achieved when you stand side on to the target with your bow arm closest to the target. Your feet should be shoulder width apart with your rear foot approximately half a foot length forward. This creates an open stance that is stable and provides a good level of clearance for the bowstrings travel path.

Draw

The bow string should be drawn back to your chosen anchor point in one fluid motion without the need to raise the bow above your head or contorting your body to reach full draw. If you need to do this then the bows draw weight is too high for your physical strength. With a compound bow, simply decrease the draw weight. With a long bow or recurve you may need to consider changing to a lighter draw weight bow. Release aid shooters must never draw back the string with the finger on the trigger. The finger should only be placed on the trigger at the moment of release.

Anchor point

This is the point where you draw your string back to. For finger shooters it is usually the corner of your mouth and for release aid shooters is under your chin. Regardless of where you choose to anchor, it needs to be comfortable, easily found and you need to do it the same each time. For sighted shooters the installation of a peep sight in the string makes exact anchoring shot after shot relatively simple.

Aim

Once the bow string has been anchored correctly, the archer then needs to aim using whatever technique they prefer. However, be careful not to stay at full draw aiming for too long as muscle

fatigue will soon have your bow arm shaking off target. If you cannot align your sighting before you begin to shake then let down the string without releasing the arrow and try again. If this occurs consistently then reduce the draw weight of the bow.

Release

For finger shooters, when the bow is properly sighted, relax the fingers on your drawing hand and the pressure on the string will pull it free of your fingers and release the arrow. For release-aid shooters, simply depress the trigger as you would a rifle trigger.

Follow through

Follow through is vital for accurate shooting. It requires the archer to hold the bow arm in the same position as just prior to the shot, until the arrow reaches its target. It takes the arrow a split second from release to clearing the arrow rest. Any movement of the bow arm or body during this time will greatly affect the impact point of the arrow.

Common shooting mistakes

An occasional arrow hitting high or low is usually the result of moving the bow arm up or down a fraction after the release. Arrows that hit low usually result from the archer dropping the bow arm to see where the arrow went. An arrow occasionally impacting right or left of target is usually the result of a finger shooter pulling their release hand away from their anchor point at the moment of release.

Other causes of erratic arrow impacts can be misjudging the distance to the target, muscle fatigue, poorly tuned equipment and incorrectly matched equipment or a slightly bent arrow/incorrectly aligned point.

Preparing for the hunt

Broadhead sharpening

For a broadhead to be effective, it must be shaving sharp. Many bowhunters choose to use broadheads that can be sharpened. These broadheads come with a basic ground edge that is by no means sharp enough to hunt with. A more expensive option is the pre-sharpened broadheads manufactured in the USA. When purchasing your broadheads, be sure to read the packaging well to ensure you have the exact type that you are after.

To sharpen broadheads by hand you will require a file (flat second cut or mill bastard), a stone (medium grade) or diamond hone. It will take a lot of practice and a little patience until the technique is mastered. The best results will be achieved by using tools of full size and good quality.

To hand grind to a shaving sharp edge you need to sharpen both sides of the blade evenly and maintain the same angle of grind. Start with the coarser file and finish with the stone.

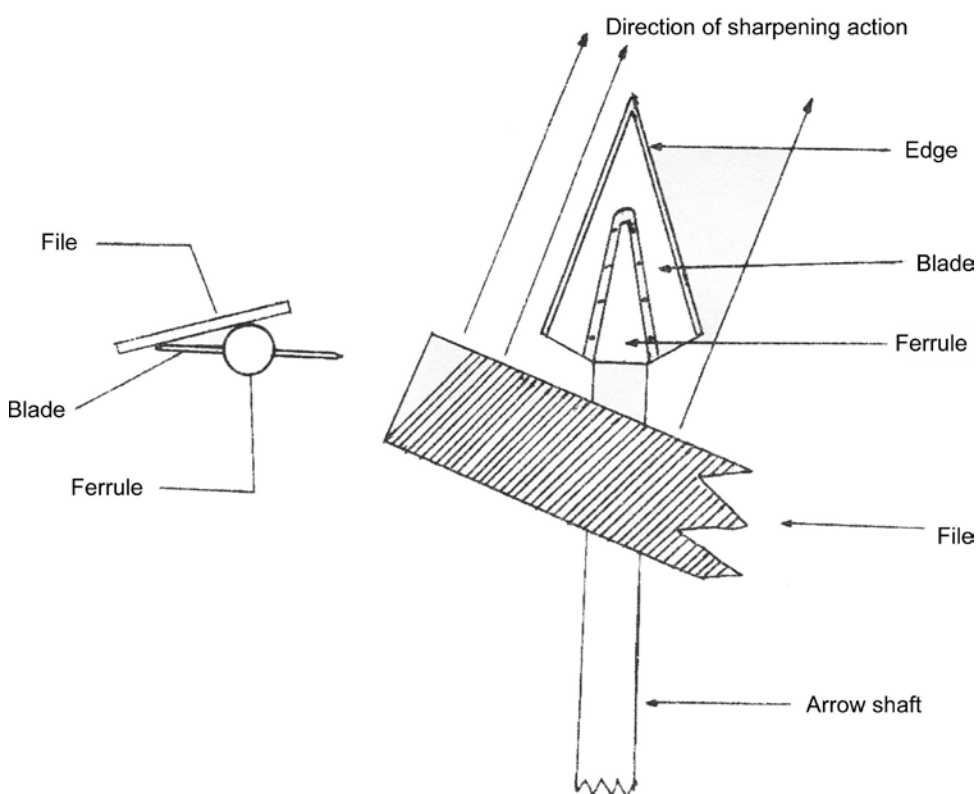
In practice you need to grip the shaft of the arrow in your left hand close to the back of the broadhead. Place your index and middle fingers under the back part of the broadhead blade and grip down on the shaft with your thumb to ensure you are holding the broadhead safely and securely.

First, lay the file at the back of the broadhead perpendicular to the blade and at an angle that touches mainly with the blade but also lightly on the ferrule of the broadhead. This gives the correct and easily repeatable sharpening angle. Next, using firm pressure and with the file perpendicular to the blade edge and the angle of contact the same, push the file off the end of the broadhead. Repeat this process until a uniform cut is achieved and the edge has a slight burr along its complete length.

Turn over the broadhead and sharpen the other side of the same edge until a uniform and sharp edge is achieved. The last few strokes on each edge should be done progressively lighter.

Once both sides and both blades have a fine burr on them, use the same technique with the stone or diamond stone. Use gentle pressure, getting lighter with each stroke until the burr is removed and a shaving sharp edge is achieved. Test the edge periodically on your arm hair for sharpness. Once a shaving edge has been achieved, place the arrow into your choice of quiver with the broadhead completely covered by the hood of the quiver.

Equipment limitations



Bow hunting is a short range hunting experience. While a modern hunting bow may be able to cast a hunting arrow several hundred m, in real terms its **accurate** range and ability to kill humanely is very much shorter. Over a short distance of 20 up to 30 m for a compound bow, the arrow's trajectory is relatively flat. This is the optimum distance for taking the shot. Beyond this distance the arrow's speed drops and the arc of trajectory falls considerably, making range estimation critical in achieving accurate shooting. Range finders can be used to positively determine the distance to a target and increase accuracy.

It must also be remembered that a fast hunting bow can cast a hunting arrow in excess of 80 m per second. Over a longer shot distance this allows for some flight time for the arrow in which an animal can move, resulting in a less desirable hit. In real terms, a modern hunting bow and arrow combination is quite capable of humanely killing targeted animals at longer ranges. However, this does not take into account the ability of the hunter to shoot accurately over this distance, or the variables of wind, terrain and animal movement.

Effective shooting range

Bowhunters need to be able to determine their own Effective Shooting Range (ESR) prior to hunting and they must develop the discipline to stick within their own boundaries of ability.

Bowhunting is a discipline that requires considerable practice before becoming proficient enough to hunt. Generally speaking, the kill area of deer, feral goats and feral pigs is 20 cm in diameter.

Naturally this size changes, depending on the age and species of the animal being hunted. A bowhunter must be able to consistently hit a target of this size at a predetermined distance, say of 20 m, before being confident of shooting at game at this distance. As the hunter's ability to shoot accurately over longer distances develops so too does their ESR.

It is a good idea to practice shooting at a field range that has animal shaped targets set out at various distances in varied terrain to simulate actual hunting conditions. Shots can be made up hill or down, across gullies or waterholes. This variation helps a bowhunter to judge distances and trajectories. Many clubs use three dimensional (3-D) targets that are of the correct size for the animals and this allows for practice that is even more realistic. The targets have kills zones marked on them to help hunters learn where to target the animals for a humane kill. Most of these clubs also hold regular competition shoots and these are invaluable in helping the bowhunter learn to cope with the pressure of competitive shooting and the buck fever of hunting.

In a hunting situation, the bowhunter's ESR will be determined by considering their ability and other variables such as wind, terrain and the likelihood of an animal moving once the arrow is released. This means that the ESR will be different in different situations, and with different bowhunters.

The hunt

Safety

Bows and arrows can be dangerous when used incorrectly. As long as basic safety measures are adhered to, bowhunting is a safe and enjoyable activity.

The razor sharp broadhead is the most potentially dangerous piece of bow hunting equipment. It is designed to cut through skin and vital organs causing fatal haemorrhage. Therefore, broadhead arrows should always be carried in a quiver that completely covers the broadhead. The arrow should only be removed from the quiver just prior to the shot being taken. Never carry an arrow in your hand for long periods or in steep country. It is quite possible that a trip or fall could result in the hunter falling on the arrow. This could prove fatal.

When preparing for a shot **always positively identify your target**. This includes the animal you are aiming at, the area immediately in front of the target and to the sides and behind. You must be absolutely certain that your shot will not hit an unintended animal or person. While arrows don't travel as far as projectiles do, they still have the ability to travel over 100 m or ricochet off hard objects such as the ground, trees and rocks and this can cause the arrow to change directions quite abruptly.

Avoid shooting at animals that are on the skyline or on the crest of a hill. You cannot see what may lie beyond the ridgeline and could be hit by the arrow. Arrows can completely pass through an animal and travel a considerable distance beyond their target.

At the completion of a day's hunt, be sure to place your bow and arrows back into a case. Stepping on or knocking over your bow can damage the bow. Stepping on the arrows will often break or bend them. Check your bow's string/cables periodically for fraying and wax it or replace it if necessary.

Animal welfare

Modern bowhunting has been proven to be a humane method of harvesting game animals. Studies in the USA and South Africa have found that an arrow will kill just as efficiently when targeted through the chest as a projectile*. The average time for death was within a few seconds of each other for rifle and bow.

*Natal Parks Board: *Evaluation of hunting bow as a form of recreational hunting in Natal 1985*.

How broadheads kill

Broad heads kill by causing massive haemorrhage. Animals targeted at the chest (heart/lung area) will die quickly and humanely. This area of the animal's body provides the largest target area of vital organs and so provides the greatest opportunity to achieve a humane kill.

When a shaving sharp broadhead hits an animal through the chest it causes a massive amount of blood loss. This blood loss rapidly decreases the animal's blood pressure rendering the animal unconscious. Further blood loss kills the animal.

Shot placement

Under no circumstances are bowhunters to target the head/ brain. Large bones can impede and deflect the penetration of the arrow and may prevent the arrow from reaching a vital area. Therefore, all bowhunters should avoid shots that will connect with the shoulder blade, leg, hip and skull bones. Bowhunters should learn and commit to memory the location in the chest of the vital organs of the species they wish to hunt and importantly their location when the animal is standing at various angles from the bowhunter.

Hunting techniques

There are several different hunting techniques utilised by hunters to get close enough for a shot. The difficulty with bowhunting is the need to be close to your quarry before taking a shot. An animal's response to danger at close ranges is more heightened than at the longer ranges from which most rifle hunting is done.

An animal's sense of sight, sound and smell can be used to the advantage of the bowhunter. By stalking into or across the wind the bowhunter will avoid being detected by the animal's sense of smell. Quiet movement can be achieved by using clothing that makes little or no sound when brushed against itself or foliage. Good soft-soled boots will absorb a lot of the sound from walking; noise is further reduced by walking slowly and carefully placing your feet. An animal's sight is geared towards spotting danger through movement. Even with good quality camouflage clothing it is the movement which will alert an animal to danger. There are two ways to get close to an animal. One is to move towards the animal and the other is to let the animal come to you.

To be consistently successful at bowhunting it is imperative that you spot the animal before the animal spots you. An un-alarmed animal is much easier to approach than one that has caught a glimpse of movement or a shape and thinks all is not right. The critical part of any stalk with a bow is the moment that you draw your bow to take the shot. This requires a considerable amount of movement and at such close range the action must be timed perfectly so as not to spook your target.

Stalking

This requires that the wind direction is right, that you can move silently and time your movements to when the animal is not likely to see you. Stalking is often done in conjunction with spotting animals from a vantage point with binoculars, or moving through habitat likely to contain game.

Stand hunting

This is a technique whereby the animal comes to you. The hunter will need a good degree of knowledge about their quarry's habits, such as bedding and feeding areas and the travel routes they use. The bowhunter must be positioned in an area where they believe the animals will come to. This is usually a feeding/watering area or a known travel route. A ground blind can be constructed downwind from the attracting source to provide cover for the hunter.

A hunter may also wish to use a tree stand. This involves placing a tree stand in a good location overlooking a food source, water source or travel route. A tree stand helps to get the hunters scent above the animals and the hunter is also above the animal's line of vision.

One of the draw backs of tree stands is that, should an animal come by that is out of range, it is often not possible to move closer for a shot. There are also very big safety concerns when using tree stands. The hunter should make sure that the stand can carry their weight, is securely fastened to the tree and has a safety strap attaching the hunter to the tree to prevent a fall. A fall from even a small height can have disastrous results for the hunter, especially if they are in the process of taking a shot and an arrow is out of the quiver. Good commercially manufactured tree stands are available from some archery dealers in Australia or via mail order from the USA.

The shot

Once the bowhunter is in range of the targeted animal it is time to prepare for the shot. At this point it is common for the bowhunter to be struck by buck fever. This is caused by nervousness at being in such close proximity to an animal and as a result, the body will react by releasing a surge of adrenalin. This causes shaking and rapid breathing, making an accurate shot very difficult. It is best to wait out attacks of buck fever by breathing deeply and evenly.

Drawing the bow is the most critical part of a bowhunt and requires a certain amount of movement at a very close proximity to a wild animal. To successfully draw the bow without alarming or spooking the game, the bowhunter should wait until the animal's vision is obscured by a tree/rock or bush or the animal's head is turned away.

Timing the draw is critical to a successful shot. Animals alerted by the movement can flee before the draw is completed or become very alert and charged with adrenalin. This alertness can result in even a fatally wounded animal covering a longer distance before dying than a relaxed animal hit in the same place. Remember that the arrows flight path to the animal's vital organs must be completely unobstructed. Even a small branch or leaves can deflect an arrow resulting in a miss or worse, a poorly placed hit.

Tracking

After the shot, it is vitally important that you not move. The bow shoots an arrow silently, often the animal has no idea where the shot came from and there is no loud noise to trigger an adrenalin rush in the animal. Un-alert animals will often jump forward a few paces on contact with the arrow and may just slowly walk to a nearby spot to die. In thick cover you may need to track the animal.

Tracking techniques

- Using paper or tape, mark the position of the animal when the shot was fired, and also your location when you fired.
- Note the reaction of the animal when hit with the arrow and its direction of flight.
- Look for signs of blood, hair and the arrow itself on the ground.
- Periodically mark the location of blood with the paper or tape to provide a line of travel of the animal in case the blood trail is lost. Cast ahead on the line of travel looking for more blood. If no more blood is found go back to the last blood spot and make widening concentric circles until more blood or sign is located. Shot animals often make sharp direction changes.
- If a good blood trail suddenly ends, look carefully in any cover in the vicinity.
- In steep or hilly country, animals generally head downhill when shot.
- Tracking should always be done slowly and carefully. It is important to spend as much time looking forward as looking on the ground.

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Example assessment questions

QUESTION	ANSWER
Describe where you would shoot your arrow to hit the vital organs of a pig, goat or deer.	
Name the vital organs you would hope to hit.	

Self-assessment checklist

Questions		True	False
1.	Large bones can impede and deflect the penetration of the arrow and may prevent the arrow from reaching a vital area. Therefore, bowhunters should avoid shots that will strike the skull bones, shoulder blade, hip and leg bones. Under no circumstances are bowhunters to target the brain.		
2.	A broadhead tipped arrow needs to be shaving sharp to humanely kill the targeted animal.		
3.	A successful bowhunter has a high degree of patience and perseverance. Bowhunters must learn not only to master the art of shooting a bow but also the art of stalking prey animals to within close range.		
4.	Although bowhunting is a close range hunting style, the bowhunter must still always positively identify their target and what lies beyond it.		
5.	A bowhunter's Effective Shooting Range is determined by their choice of equipment, their ability to use it and the specific shot situation.		
6.	After the shot has been taken, the bowhunter should immediately chase after the targeted animal to verify if the arrow hit the animal.		
7.	It is not necessary to fine-tune your equipment to achieve optimal performance and accuracy.		
8.	An arrow striking an animal anywhere in the body is sufficient to achieve a quick, humane kill.		
9.	When bow hunting from a tree stand the bowhunter should always wear a safety belt, as a fall from even a low height can cause serious injury or death.		
10.	When blood trailing an animal, it is acceptable to give up searching when the blood trail stops.		

SECTION TWO: R-LICENCE CATEGORIES

UNIT 2.4 HUNTING WITH DOGS

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Glossary of terms

1080 – sodium monofluoroacetate – a deadly poison for dogs that is used in baits to kill pigs and other pest animals.

Bailed up – the pig remains stationary facing the dog.

Blind – a hide made from branches or other material which the hunter sits in.

Carrion – the meat of dead animals.

Lug – where a dog holds a pig by an ear.

Sticking – stabbing a pig in the heart with a specially designed knife.

POCTAA – *Prevention of Cruelty to Animals Act 1979*.

Learning objectives

On completion of this unit you will:

- be able to be tested for a NSW Restricted Game Hunting Licence to hunt with dogs
- select an appropriate breed of hunting dog
- care for and transport hunting dogs
- understand the theory behind several methods of hunting with dogs
- understand the basic training techniques for hunting dogs
- humanely dispatch game with dogs
- conduct a hunt with dogs safely

- select and maintain appropriate hunting equipment for your hunt with dogs.

Introduction

Hunting with dogs is an ancient practice that continues today. Dogs may be used to scent and trail, flush, retrieve and bail up game. When dogs are taken into the Australian bush there are animal welfare matters to consider.

These may be as diverse as car motion sickness, heat stress, tick paralysis, grass seed abscess, and stake or fight wounds. Where dogs are used to hunt large or dangerous game such as pigs, there are additional welfare issues.

This unit of study will assist hunters who hunt with dogs, particularly those hunters who hunt pigs with dogs, to comply with the requirements of the *Game and Feral Animal Control Act 2002* and its associated Regulation of 2012, as well as the *Prevention of Cruelty to Animals Act 1979* (POCTAA).

Identifying suitable hunting breeds

Dog breeds vary in behavioural characteristics and within a breed; individual dogs vary in temperament and ability. It is important to choose a dog that has those characteristics and abilities necessary for your particular hunting interests.

Having selected the breed of dog most appropriate to your purpose, ask reputable breeders about the particular abilities and characteristics of their family of dogs.

Small breeds

Small breeds such as spaniels and terriers flush or drive out game for the gun. They work close to the hunter, about 15 m either side or 15 m in front. They work in a 'window wiper' investigative pattern; finding game and making it fly, run or go to ground. When game is flushed and a shot is taken, the dog remains perfectly still. If the shot is successful, the dog runs out and quickly locates, then returns the game to the hunter in a condition that is fit for the table.

Game taken using these breeds may commonly include rabbit, hare, California quail, pheasant, partridge, peafowl and turkey. They may also be used to flush animals such as feral cats and foxes.

Medium to large sized breeds

Retrievers can range from medium to large in size and are used more for their retrieving ability than for their direct involvement in the hunt.

They are capable of retrieves over long distances and a good retriever will ensure that all game retrieved is fit for the table. These dogs are mostly used for waterfowl hunting. The dog sits at wait with the hunter and remains perfectly still. If the shot is successful, the bird is then retrieved by the dog and returned to hand.

Dogs such as pointers and setters should hunt in a 'window wiper' or quartering motion up to 100 m or at a distance the handler is still able to control from, depending on the terrain and the experience of the dog. They perform better when directed into the breeze. When they locate game they will 'come on point' which means they point their nose in the direction of where the game is hiding.

They should remain on point until the hunter commands the dog to flush the game out from the cover. If the shot is successful, a well-trained dog will either retrieve to hand or point to the game.

All-purpose gundogs include breeds such as German Short Haired Pointers (GSPs), Brittany spaniels and Weimaraners. All these breeds point and retrieve on land or water and track large game.

Scent trailing hounds may be used both on leash and free ranging. Difficulties may be encountered in both recalling free ranging hounds and in obtaining permission to use packs of hounds. A single animal on a leash has become a popular method of hunting with hounds.

Pig dogs

Pig dogs are discussed in more detail later in this unit.

Basic training methods

The reward

Dogs learn by reward and repetition. If the reward is held in high esteem by the dog the more likely it is that the behaviour will be repeated. The more the behaviour is repeated the more conditioned the dog becomes to the task.

The principle behind all training is positive reinforcement. A reward is given for each correct response, and this should comprise 95% of all your training. Rewards can be praise, a pat, a throw and retrieve, or food.

Dogs, like people, have individual preferences. You will need to assess the preferences of your dog to determine the most effective reward to be given. What does your dog particularly like, dislike or work the hardest for?

Undesirable behaviour

The key to suppressing undesirable behaviour is to ignore it. It is essential your dog does not receive any positive reinforcement for the behaviour.

Corrections are only given to a dog when it completely understands the command, but does not obey. Correction must be given at the exact time the dog makes the mistake, and should have no lasting physical effect on the dog.

Clear instructions

Finally, you must be careful to give your dog clear instructions. Your body language and voice must send precise and clear signals to your dog.

For example, it will help your dog to understand what is required for both 'heel' and 'stay' if you always step off with the left foot on a 'heel' command and with the right foot on a 'stay' command.

Begin the training program with simple tasks such as 'sit', 'come', and 'stay'. Gradually familiarise your dog with firearms and the species targeted.

Once your dog can complete simple commands you then need to proof your dog to obey these commands in the presence of distractions which will arise during hunting.

Be patient and work at a pace that suits your dog. Remember to have realistic expectation while your dog is learning.

Learning exercise: Getting started on training your dog

Obtain at least three books on how to train your dog. Then, take your hunting dog along to a professional dog trainer who specialises in the type of hunting you intend to do.

You may be advised to attend with your dog for a few initial formal training sessions. A small outlay in training fees at this stage will pay off in the long term.

Care and transport

If their boisterous body language is anything to go by, dogs seem to enjoy a hunting outing. However, it does expose them to various risks which require a higher level of veterinary attention than for most pet dogs.

A copy of your dog's medical history card, obtained from your local vet, should be taken on each hunting trip to assist local emergency veterinarians if required.



Use the following guide to ensure your dog travels safely.

The best form of security for your dog is a well-constructed crate, one in which your dog can comfortably stand and turn around in. At no time should your dog be allowed to ride unrestrained in your car or on the tray of a utility.

Think of the crate as a safety belt that is tight and comfortable. Where dog crates are located on a vehicle tray, the dog should be protected from rain, wind, sun and exhaust fumes.

Metal vehicle trays heat up quickly in direct sunlight and your dog must be protected from direct contact with the tray. Alternatively your dog may be secured by a harness or leash to a seat in your car.

On long road trips you will need to 'Stop, Revive & Survive' every two hours. Exercise your dog and provide it with water at each of these breaks.

Plan to avoid known dangers. In the field, your dog may be in unfamiliar country and prone to stake injury or wire fence cuts. In certain seasons there is also the increased risk of ectoparasites, grass seeds and extremes of heat and cold.

Know where your dog is, what it is doing and keep it under control at all times when hunting. Only obedient hunting dogs equipped with radio tracking collars should be taken into the field. Dogs that are known to chase domestic stock, protected wildlife or other non-target animals must be retired from hunting and should not be used to breed hunting dogs.

Ethical behaviour

There are a number of simple rules to follow to ensure ethical behaviour while hunting with dogs.

- When you obtain permission to hunt, make sure the land manager also allows you to hunt with a dog.
- Keep your dog under control at all times.
- Keep your dog within the boundaries of the property you have permission to hunt on.
- Attend to the comfort of your dog in harsh weather.
- Ensure your dog avoids confrontations with other dogs.
- Do not allow your dog to disturb domestic stock or protected fauna.
- Do not overwork the dog. Be alert for signs of foot soreness, exhaustion and dehydration.
- Do not take your dog hunting until it is adequately trained. This means that, in addition to learning to obey simple commands, your dog will be field 'proofed' to not chase domestic stock or protected wildlife. Only then can you start serious hunting.

Learning exercise: Testing for dehydration

This exercise is a simple way of checking for dehydration in your dog while in the field on a hunt. Where possible always allow your dog free access to water.

Gently pat your dog, moving your hand over the back just in front of the hips. Using your thumb and forefinger, gently squeeze on the skin until you raise a fold of the skin as high as is comfortable for the dog. Release the skin fold and watch the skin return to its normal position over the back muscles.

Do this several times until you are confident that you know how the skin springs back into position in a normal dog. In dehydrated dogs, the skin fold stays raised for several seconds.

Hunting feral pigs with dogs

There are several reasons for hunting pigs with dogs, but in particular dogs, with their keen sense of smell and good eyesight, make it easier to find pigs. Once the pigs have been found it is more difficult for them to escape in thick bush as the dogs are readily able to track them until the pigs 'bail up'. The hunter can then get close enough to dispatch them.

Hunting pigs with dogs is a physically dangerous activity with a high level of risk to the hunter. It requires athletic stamina and good reflex coordination and is best left to specialist commercial operators. Individuals wanting to take up hunting pigs with dogs should do so under the instruction and supervision of an experienced pig dog hunter.



The importance of good training for your dogs cannot be over-emphasised. Strict adherence to animal welfare guidelines is mandatory and failure to comply with the provisions of the *Prevention of Cruelty to Animals Act 1979* (POCTAA) relating to inflicting unnecessary pain is a criminal offence.

Identifying suitable pig dog breeds

The dog you select should be able to integrate well with your family and other people.

A friendly demeanour and a slightly submissive attitude will be a much better platform on which to train a successful pig hunting dog.

Irish staghounds, wolfhounds, Labradors, boxers, mastiffs and greyhounds are all good breeds for this purpose. They integrate well with people and are easily trained.

Avoid breeds that have been developed for fighting. Aggressive dogs are harder to train and will pose greater risk of a mauling attack on a pig, or even people.

Special equipment

Protective clothing

With your personal equipment, focus on protective clothing. If you are attempting to catch live pigs in scrub you will need to wear long sleeved shirts and long pants to avoid scratches.

Water

Australian survival standards state that the minimum water requirement is two litres per person, per day. This figure is for a person who is stranded and awaiting rescue, not someone covering long distances on foot while chasing pigs. A more realistic figure would be at least six litres.

Firearms

With your firearm you should focus on calibre and sights. Amongst rifles, a 30 calibre is a good all round choice. In thick scrubby country a low power (2×) telescopic sight, red dot electronic sights or iron sights are preferable, while in open country a higher magnification telescopic sight is more useful.

Less powerful firearms are recommended for 'bailed up' pigs shot in the brain from close distance. They avoid muzzle blast and uncontrolled bullet penetration, both of which may be hazardous to both dogs and hunters.

If you are hunting with a shotgun, there are certain factors that must be taken into account. Shotgun ammunition comes in varying load sizes and calibres. An acceptable cartridge would be one with a solid shot, which can be a single ball of lead, a rifled slug or a sabot slug in 12 gauge calibre, or else shot loads such as the popular SG (00 buckshot) with nine balls.

Knives

A special knife is needed for hunting pigs with dogs. When a pig wallows in mud, the mud and plant fibres get trapped in the pig's tough, bristly hair. The mud dries to form a tough fibrous mat over the pig, which adds to its ability to protect itself. As well as this mat of mud, pigs have very thick, tough skin.

Adult boars develop a heavy 'shield' of connective tissue under the skin of the neck, shoulders and chest. This protects the underlying tissues. This 'shield' is up to several centimetres thick and will obviously require a high quality stainless steel or titanium knife to be able to penetrate.

As a guide, your knife needs to:

- be between 12–15 cm long and only about 2.5 cm (or less) wide, double edged and 5–10 mm thick; and
- have a non-slip handle and a good hilt to stop the user's hand from slipping down onto the blade. This is a likely scenario and accounts for a number of injuries to pig hunters.

There are various reasons for the knife dimensions that are recommended above. A smaller point will penetrate more deeply, avoiding surface laceration and resulting in a quicker and more humane kill.

Also, the blade will be able to fit between the ribs of the animal, rather than have to cut through them, which will enable you to get to vital organs more quickly and induce haemorrhage faster. This will result in a more humane kill.

Different knives will need to be used for carcass dressing. Boning knives with a single sharp edge are used for procedures requiring a delicate touch. Cleavers are needed for rougher and tougher cuts through small bones and sinew.

When these are combined with a bone saw and small axe, you are well prepared to dress a pig carcass.

Legal requirements

Game and Feral Animal Control Act 2002

Schedule 2, Section 8 of the *Game and Feral Animal Control Regulation 2012* states that dogs may only be used to assist hunters if such use is in compliance with the *Prevention of Cruelty to Animals Act 1979* (POCTAA) and provided that the hunter has the permission of the land manager to hunt with dogs.

It is unacceptable to set a dog onto a feral pig with the intention of physically attacking it. The *Game and Feral Animal Control Regulation 2012* sets out the number of dogs that may be used (maximum of three dogs for a single hunter or five dogs for a group of hunters), that each dog must wear a collar with a metal tag or label with the owners name, address and telephone number, that dogs must be microchipped, and places the responsibility on the hunter to ensure that their dogs are not left abandoned in the bush or allowed to chase any other animals while on the hunt.

Prevention of Cruelty to Animals Act 1979

Section 18 of POCTAA prohibits any person causing two animals to fight and Section 21 prohibits any person from allowing a dog to chase, catch or confine another animal. The Act then goes on to exempt pig dogging under Section 24(b) which allows dogs to be used to hunt, capture, and shoot pigs.

Hunters need to understand that Section 24(b) of POCTAA requires that **no unnecessary pain**, or suffering and distress, is to be inflicted on hunted animals. It is a criminal offence to hunt pigs with dogs in a way that results in unnecessary pain or suffering for either the pigs or the dogs.

An offence would be committed, for example, if an excessive number of dogs are used, or if dogs are set upon a pig that is already in a situation where it can be readily killed.

Welfare of the dogs

Pig dogs need to be trained to locate pigs in dense bush and then to 'bail up' or hold the pigs until the hunter arrives. Dogs must not engage in unnecessary battle with the pig.

POCTAA is very clear on the need to avoid unnecessary animal pain and suffering. Pigs need to be killed quickly and efficiently, avoiding injury to the dogs as far as is possible.

To achieve this you will need to spend time training your dogs. Not only will this ensure that there are good welfare outcomes for both your dog and the pigs that you hunt, but it will also ensure that you do not contravene the POCTAA's mandatory prohibition on inflicting unnecessary pain on animals.

Muzzles

Where you have a concern that a dog may attempt to maul a pig, a muzzle is required.

Select a muzzle that will not cause the dog to heat stress (dogs need to pant to cool) and that will not catch in scrub.

A muzzle will prevent your dog from engaging in battle with a pig or mauling either protected fauna or domestic stock. Muzzle or no muzzle, the bottom line is that aggressive and disobedient dogs must be retired from hunting.

Collars, chest plates and tracking collars

To protect dogs against injury, good quality protective collars and chest plates are essential. They protect the dog from the tusks of pigs charging to get away and also from sharp sticks poking up from the ground as the dog is running through the bush.

Selection of collars and chest plates should be made according to the size of your dog, and the cooling, weight and construction of the equipment. There are various styles of protective equipment, from just a simple 8–10 cm wide, thick leather collar to protect the dog's neck to the full neck/chest/legs/face synthetic armoured collars and plates.

When wearing one of these collars, dogs will heat up and tire more quickly, so special care must be taken to limit the length of the hunt and to have fresh water, shade and a comfortable place for the dog to rest.

Radio tracking collars are reasonably priced and lightweight, and will prevent your dog from becoming lost in the bush. They easily affix to the dog's collar and will also assist you in locating bailed up pigs.

Remember, a lost dog left out in the bush may die or become feral. It is an offence to wilfully abandon a dog in the bush.

Hunting after dark

If hunting in low light situations, there are small battery powered lights available to attach to your dog. Chemical glow sticks are also very effective; they are lightweight, last for eight hours, come in a range of colours and are safe and non-toxic. They have a small loop built into one end and can be tied to a dog's collar.

A popular method for tracking your dog in low light is to attach a red reflector on the left side of your dog's armour and a green reflector on the right side. This way your dog can easily be identified. Hunting after dark is hazardous and you should take extra precautions.

Remember, you cannot hunt at night on public land unless the forest has been specially identified as a night-time pig dog hunting forest.

Transportation

Your vehicle needs to be set up to ensure the welfare of your dogs during the hunt. An abundance of fresh water must be available for them as well a comfortable, shaded resting place.

Dogs must be secured to the vehicle to prevent them from being injured by falling off the tray as the vehicle bounces along on rough tracks in cross country pursuits. A mattress will prevent the dogs getting pressure sores. Shade is of particular importance, especially in summer.

Injuries: prevention and treatment

First aid is important for your dogs. Make sure you carry a First Aid kit in your vehicle. From a legal viewpoint, the three Acts that need to be considered are the *Prevention of Cruelty to Animals Act 1979* and the *Veterinary Practice Act 2003*.

These Acts can be found via the internet at www.legislation.nsw.gov.au. They will help with information on how much First Aid should be administered before seeking veterinary assistance. Use common sense and seek veterinary assistance where available.

Wounds, cuts and lacerations

The first priority for any type of wound, cut or laceration is to control bleeding. This may be done with a pressure bandage. A fresh wound should be bandaged to prevent contamination whereas an infected contaminated wound may best be left un-bandaged to allow the wound to drain. Veterinary attention should be promptly sought for all wounds.

Falls

Car accidents, falling off cliff ledges and other misadventures lead to tissue trauma, fractures, and possible shock. If an accident occurs the hunt must be suspended and the dog taken to a veterinarian without delay. Keep the dog quiet and restrained on the way to the veterinarian.

Heat stress

Heat stress with hyperthermia will progress through rapid panting, then collapse. If left untreated the dog will die. Heat stress is a rapidly fatal medical emergency. When hyperthermia occurs cool the dog with water. If possible immerse the dog in a dam or place it under a tap or hose until the dog is no longer panting excessively and is able to walk. Once the emergency is over seek veterinary advice.

Stings, bites, poisoning

Insect stings, ticks and snake bites are common hazards. Check your dog regularly to remove any ticks. Identify the snake where it is safe to do so. This will allow your veterinarian to use the most appropriate antivenin.

Poisoning is a potential hazard. Avoid any areas posted with 1080 warning notices – pigs poisoned with 1080 are themselves poisonous to dogs and other scavengers and dogs are particularly susceptible to this poison.

Learning exercise: Monitoring breathing patterns

The purpose of this learning exercise is to make you familiar with a normal dog's breathing pattern both at rest and while panting. Once familiar, you will be able to pick up subtle changes that occur with the onset of heat stress and to recognise the urgent laboured respiration that will precede collapse in clinical hyperthermia.

While your dog is quietly resting, count the number of breaths it takes per minute. To do this watch the chest rise and fall and count the number of times this happens over two or three minutes. Then calculate your dog's resting respiration rate or breaths per minute. Make a note of the figure for future reference.

Now take your dog for a run. The exercise should be sufficiently vigorous to make your dog pant. Observe the different breathing pattern during panting when compared to normal resting respiration. This is normal and nothing to be alarmed at.

Welfare of the pigs

Animal welfare guidelines for humane slaughter require that an animal must not be inflicted with unnecessary pain and suffering. Pigs are a major pest species and there is no question about the need to control them. However the method of slaughter used must be reasonable when compared to available alternatives.

The best possible welfare outcome occurs when pigs are taken undisturbed with a kill zone shot delivered with an appropriate firearm ammunition combination. There are a number of situations where this is not practicable and dogs are required to assist in the harvest of pigs.

Where pigs are hunted with dogs, there are a number of ways animal welfare outcomes may be achieved. These may be divided into two approaches depending on whether the hunter intends to kill the pig with a firearm or knife.

Using a firearm

The dogs are released to 'bail up' the pig. The hunter then moves in to kill the pig using a firearm at close range. The pig is shot and then stuck to bleed out.

Advantages

- In this situation you have a 'standoff' between the dogs and the 'bailed up' pig. Consequently there is less likelihood of fight injury to either the dogs or the pig.
- The pig is killed with a firearm without contact by the hunter. This is safer for the hunter.

Disadvantages

- 'Bailed up' pigs may break from the 'bail up' and charge to escape. This may then require further pursuit and a second 'bail up'.
- Using a firearm at close range has hazards to both the hunter and the dogs. A dog may be accidentally shot. Dogs shift position during a 'bail up' and may pass through the line of fire just as the hunter fires.

Using hold and stick

The dogs are released to 'bail up' the pig. The hunter takes hold of the pig, usually by a hind leg, pulls the legs out from under the pig and then fatally sticks it to the heart. The pig rapidly loses consciousness due to a sudden drop in blood pressure and will die due to massive blood loss.

Advantages

- The technique is effective, especially in thick scrub where it is difficult to use a firearm safely in the rapidly moving confusion of dogs and pigs.
- The technique leaves less time for the pig to charge away from a 'bail up'.
- The pig carcass is recovered without gunshot damage.

Disadvantages

- There is significant risk to the hunter.
- Sticking with a knife may cause more panic and stress to a pig in the very short holding period between capture and sticking. The pig does experience panic, will vocalise noisily and does suffer a short period of pain and stress in the hold and stick;
- The technique may result in tusk wounds to the pig dogs.

Slaughter

It needs to be remembered that abattoir slaughter also produces noisy vocalisation and some stress of the pigs during slaughter. The possible pain and suffering inflicted on pigs by field sticking may be justified on the grounds that it is minimised to only that which is necessary and that it is within the pain and suffering level generally agreed to as being acceptable to the community.

It is much quicker than death induced by widely used agents such as 1080 poison. Sticking prior to stunning has precedents in kosher and halal slaughter. Field slaughter avoids the transport and abattoir stresses suffered by commercially raised and slaughtered pigs.

References for further reading and learning

Burch, M.R., Bailey, J.S. *How Dogs Learn*. ISBN 0-87605-371-1

Moxon, P.R.A. *Gundogs: Training and Field Trials*. Century Hutchinson: Australia. ISBN 0091647606

Other useful references

Pryor, K. (1985) *Don't shoot the dog! The New Art of Teaching and Training*. New York: Bantam Books.

Martin, G. and Pear, J. (1996) *Behaviour Modification: What it is and how to do it*. New Jersey: Prentice Hall

Campbell, W.E. (1992). *Behaviour Problems in Dogs*. California: American Veterinary Publications

American Kennel Club (1998) *The Complete Dog Book* 19th Edition New York: Howell Book House

Example assessment questions

QUESTION	ANSWER
Pig dogs are used to find and 'bail up' pigs. They must be trained not to unnecessarily maul a pig.	True or False?
Give four reasons to support your answer.	1.
	2.
	3.
	4.

Self-assessment checklist

Questions		True	False
1.	Dogs can travel for long distances in cars without needing to be watered and exercised.		
2.	Individual dogs within a breed may vary greatly in hunting aptitude and temperament.		
3.	In training a hunting dog the emphasis should be on positive reinforcement.		
4.	A dog should never be given corrective discipline.		
5.	Aggressiveness is not a desirable trait in a pig dog.		
6.	The maximum number of dogs that can be used by a single pig dogger is three.		
7.	Protective breast plates should be fitted to pig dogs.		
8.	Radio tracking collars are reasonably priced and lightweight, and will prevent your dog from becoming lost in the bush. They affix easily to the dogs collar and will also assist you making a kill, because you won't have to wander the bush looking for where your dog has bailed up a pig.		
9.	Carcases of pigs poisoned with 1080 are safe for dogs to feed on.		
10.	Dogs should be released as close as possible to the pig being hunted.		