

**To hunt and return**  
**-developing safe hunting practice**

**By Joe Green**

**Wellington**  
**New Zealand**  
**2003**

## **Abstract**

This paper analyses the deaths of 33 deer hunters, shot by other deer hunters while hunting in the New Zealand bush. The shot is identified as the culminating event that is preceded by a number of contributing factors. Those factors are outlined and a range of protective behaviours listed. These are specific to deer hunting and, taken together with the New Zealand *Arms Code*, provide suggestions for minimizing the occurrence of these tragic incidents.

## **Joe Green: biographical note**

Joe Green is an Inspector of Police with nearly 20 years service in a range of operational and administrative roles. He is currently the Manager for the Licensing and Vetting Service Centre, the section of Police responsible, among other things for the planning and implementation of the New Zealand arms control regime. A trained teacher before joining the Police, Joe has completed qualifications as a trainer and holds a BA Honours degree in Sociology. A bushcraft instructor with the New Zealand Mountain Safety Council, Joe also convenes the Council's Risk Management Technical Advisory Committee.

## **Photos**

The photos on the front and back cover of this publication are used with the permission of Clyde, Steve and Egon Graf.

**Edited by Jackie Chapman**

**Layout by Bunkhouse Graphic Design**

Published by  
The New Zealand Police  
Wellington  
July 2003

## Contents

### INTRODUCTION

### LITERATURE REVIEW

- Principles of outdoor safety management
- How many hunters, how many deer
- Hunting practice
- The case of high vis orange
- Wearing high vis orange in Virginia

### METHODOLOGY

- Coroners' reports
- Colour recognition
- Survey of shooters
- Optometry

### RESULTS AND TABLES

- When the incidents occurred
- The environment
- Who is shooting who – shooter and deceased
- Who did what – actions of the deceased and shooter
- Stag/buck fever?
- The use of alcohol or other drugs
- Target identification
- Target identification and shooter experience
- Target identification and snap shooting
- Target identification and using the scope
- Colour and the question of colour blindness
- Distance
- Characteristics of the shooter – survey results
- The shot
- Colour recognition project

### DISCUSSION AND CONCLUSIONS

- The typical event
- Applying the principles of outdoor safety management
- Wearing high vis orange
- Suggestions for minimizing incidents
- Conclusion

### BIBLIOGRAPHY

### ACKNOWLEDGMENTS

### THE NEW ZEALAND ARMS CODE

### COLOUR RECOGNITION PROJECT – representative photos

## INTRODUCTION

The deer hunter stands on the open ridge and hears the roar. 'I'll have a go', he thinks. Calling on his years of hunting experience he responds, not too heartily, nothing to send the big fellow below off.

The roar comes back, trees shake. The hunter gives another roar, another response follows, more crashing. The big fellow approaches, eager to have a look at, and have on the interloper on his territory.

A flash of white and red in the pepperwood – here he comes! The big moment! The hunter prepares. He can feel the excitement building, his heart rate climb, breathing quicken as he gears himself up for the emergence and speedy demise of his prey. There, the red!

A hat emerges from the bush edge onto tussock, with a similarly excited hunter beneath it – holding a .308, ready to shoot the big fellow roaring above him in the tussock.

This particular event ended happily, with the two hunters, mates from way back, sitting down for a brew discussing the experience of roaring each other up, and how all too often similar incidents end in tragedy, with one hunter shooting another.

The purpose of this research project is to identify patterns of behaviour apparent in those incidents that have resulted in the deaths of deer hunters, and make recommendations for strategies that might contribute to safe hunting practices. The project analyses 33 of those tragic events between 1979 and 2002 in which one deer hunter shot and killed another deer hunter<sup>1</sup>. The analysis does not extend to 'near misses' because a 'near miss' within this context, if it means not shooting another hunter, is arguably a desirable event. The incident above, for example, might be termed a 'near miss'. Neither do incidents resulting

---

<sup>1</sup> There is no indication that other users of the same recreation space, for example trampers, are shot by deer hunters (Badland, 1991, p. 1)

in injury form part of the analysis, because there is no systematic mechanism for recording them in a way that is retrievable, as there is for deaths. This paper does not address firearms safety specifically in terms of the mechanics and technical handling of firearms. This is more than adequately dealt with in publications such as the *Arms Code*. Nor does it address wider safety associated with deer hunting, such as bushcraft, camp craft, navigation and first aid.

In chapter one I review the literature relating to hunter safety. This includes the principles of outdoor safety (risk) management, the numbers of deer and hunters, and hunting practice safety advice currently available to hunters, including the argument for high visibility (high vis) orange as a protective factor. In chapter two I describe the methodology used in this research project. Chapter three outlines the results and tables and in chapter four I discuss these results, concluding with a number of behavioural strategies that hunters might adopt in order to avoid or minimize the likelihood that they become a participant in a shooting incident.

Throughout this paper I use the terms ‘protective’ and ‘contributing’. The term ‘protective’ indicates that a factor or behaviour is such that it may avert a shooting incident. A factor or behaviour is ‘contributing’ in that it contributes to the situation that culminates in the shooting incident.

Contributing factors are not necessarily causal factors. The cause of death in each of these incidents is the shot fired by another hunter. This paper therefore has as a basic premise: the shooter as being responsible for the shot they fire, irrespective that they are but one participant in what might be termed the field of deer hunting.

This study is necessarily limited, firstly by the very small number of incidents available for analysis. Some of the information relating to these deaths is sparse, at times limited to a very brief paragraph retained on file. In many cases the information available is based on the statement of the shooter, though this is often corroborated by the scene examination carried out by investigating Police. In some cases the event was witnessed by

another member of the party. The colour recognition project might be enhanced by using video footage to take into account the variable of movement. Finally, full text analysis of the incidents that form the basis of the Virginia database would have enabled a greater depth of comparison between the behaviours of hunters in New Zealand and Virginia, particularly the value or otherwise of wearing high vis orange.

## LITERATURE REVIEW

It seems that every book about hunting includes a story about a near miss, usually emphasizing the importance of identifying the target, or not shooting in an area where another hunter is known to be hunting. Philip Holden (1986, pages 73 & 74) describes just such an event. Having met a group of hunters and explained where he was going to be hunting he was moved to make a 'crude outburst' at those same hunters when they fired over his head at a deer. They justified their action by saying, 'couldn't resist it'.

Some are less direct. Bill Axbey in *Along the track – a collection of New Zealand hunting yarns* (1991, p.129) was so wary that when he became aware of another hunter in the area he 'went home and left him to it'.

In what follows, I outline the principles of outdoor safety (risk) management, the number of hunters and the number of deer they shoot and hunting practice as described in several commonly available hunting guides. I examine the reported outcomes of the legislative requirement to wear high vis orange in the state of Virginia, USA.

### **Principles of outdoor safety management**

The New Zealand Mountain Safety Council manual *Managing risk in outdoor activities* written by Cathye Haddock (1993), and its forthcoming rewrite by Cathye, *Safety management in outdoor activities*, are core sources for the principles of outdoor safety (risk) management. As an outdoor activity that takes place in the New Zealand bush, often in the back country, these principles apply to and should be exercised by hunters.

Risk is defined as the ‘potential to lose something of value’ (Haddock 1993, p. 11). Participation in risk activities is motivated by a potential to gain something of value, including ‘good health, the challenge of adventure, increased confidence, fun and the like’ (Haddock, forthcoming). The uppermost limit of risk inherent in any situation, with no safety controls present, is referred to as absolute risk. When absolute risk is adjusted by safety controls, the risk remaining is referred to as real, or residual risk. Perceived risk is the individual’s assessment of the real or residual risk present. A person’s ability to assess and manage risk is based on their skill, knowledge and experience and is influenced by a range of factors including confidence level, familiarity with equipment, mood, degree of tiredness, psychological make up, awareness of one’s limitations and knowledge of the situation (Haddock 1993, p. 20; Haddock, forthcoming).

A number of social and psychological factors ‘can permeate an activity at various stages of its progression and also lead to accidents’ (Haddock 1993, p. 33 – 37; Haddock, forthcoming). These include:

- Familiarization with the situation, ‘where continued exposure to a hazard in a frequently used area reduced the leader/s perception of risks associated with the hazards’, with a resultant belief that ‘it can’t happen to me’.
- Dropping your guard, often on the return from the outdoor activity.
- Risk shift, or the transfer of responsibility for managing risks, occurs when a person places the responsibility for safety management onto someone else. Usually associated with group activities and predominant among males ‘the shift occurs partly because the consequences of decisions are borne by the group, not the individual’ (Haddock, forthcoming).

For the hunter the phenomenon known as ‘stag, or buck fever’ needs to be added to the list of social and psychological factors. Stag or buck fever might best be described as a high expectation of seeing or shooting a deer, such that the excitement and emotion overrides rational thinking. Often associated with the moment of shooting it can cause the hunter to miss what would otherwise have been an easy, short range shot (Kevin Watson

in *NZ Outdoor* magazine April/May 2002, p. 34). It appears that stag/buck fever can strike even the most experienced of hunters.

Cathye (Haddock 1993, p. 66) suggests that causal pathway analysis ‘allows us to find pathways to block or changes to make in the web of events leading to an accident to reduce the chances of it happening again’. In carrying out such an analysis the aim is not to attribute blame, but to ‘look at management systems and practices to ensure that accidents don’t happen’ (Haddock 1993, p. 67). A basic understanding of attribution theory is required if the real causes of incidents are to be identified. This is ‘the human tendency to take credit for positive behaviours or outcomes but to deny responsibility for bad or negative ones’ (Haddock 1993, p. 36). This stems from the human desire to be seen in a good light.

These social and psychological aspects of outdoor safety (risk) management underpin and inform this research project. They enable us to look beyond the shot fired, seeing it as a culminating event that has a series of contributing events, factors and behaviours.

### **How many hunters, how many deer**

Nugent’s survey of licensed firearms owners in New Zealand carried out in 1989 remains the most comprehensive source of information relating to hunters and the animals they hunt. Nugent (1992, p. 75) concluded that 117 200 New Zealanders did some hunting in 1988. 42% (49 224) of these hunted big game, including deer, pigs, goats, chamois and tahr. Of these, at least 37 251 hunted ‘any deer’ for a median of seven days during 1988 (Nugent 1992, p. 78). Nugent (1992, p.80) found that 30% of deer hunters were unsuccessful, with 80% of those who did experience some success taking five or fewer deer. 61% of the harvest was taken by 10% of the hunters, being in the main commercial hunters (Nugent 1989, p.12). When considering ground based harvesting of deer, Nugent (1989, p. 12) estimated that in 1988 about 29 700 hunters, hunting for an average of 13.2 days, harvested 52 500 deer in 1988. The average hunter took 1.8 deer.

Fraser (2000, p.18) reporting on the *Status and conservation role of recreational hunting on conservation land* suggests the total wild deer breeding population size to be 250 000, from which, based on research by Nugent and Fraser (1993) about 80 000 animals is taken. About 77% of these being red deer, about 13% sika, 7% fallow and 3% white tailed deer.

From this information, and given that the number of firearms licence holders who hunt has not been reviewed since 1989, we might accept that, based on the median number of days hunted, approximately 40 000 hunters spend approximately 260 000 days per year hunting deer in New Zealand. Viewed within this context, the number of accidental fatal shootings of hunters is a statistically rare event. It is however an event that is of huge consequence in that it is both tragic and long term for those involved, whether they are the family and friends of the deceased, the shooter and their family and friends or the Police investigating. This provides the motivation to search for ways to make these incidents even more rare, and is the impetus for this research project.

### **Hunting practice**

In his *Guide to hunting in New Zealand* (1987, pages 21 &22) Philip Holden lists five basic rules of rifle safety. In terms of avoiding the likelihood of shooting another hunter he advises to ‘identify your target’, ‘beyond all possible doubt’. He urges hunters to ensure that ‘the firing zone to and beyond the target’ to be safe, ‘with no flat hard surfaces or rocks to cause ricochet’.

Roger Lentle and Frank Saxton (1991) devote a chapter to strategies and tactics for hunting red deer. On page 100 they present a diagram of a technique to be used by two people hunting together in parallel. They suggest that visual communication must be maintained at all times, with hunting ceasing until that contact is re-established if it is lost. The arc of fire of each hunter is 180 degrees away from their companion, with an area of dead ground between. If a deer is sighted in this no fire zone ‘one hunter will have

to stop and move backward to allow the other to gain a position from which to take the shot' (Lentle and Saxton 1991, p. 101).

In *Hunting Smarter- a practical guide to successful hunting in New Zealand*, Hans Willems (2001, p. 60) offers advice for firearm and hunter safety that could prevent the shooting of one hunter by another. He lists fifteen 'Golden Rules of Firearms Safety', including:

Always point the gun in a safe direction.

Treat every gun as though it were loaded.

Unload your gun when you meet others and when you enter camp or hut.

When you're hunting with two or more, only the leader should assume the semi ready position with half-cocked bolt.

Always keep your finger off the trigger until ready to shoot.

Know your target and what's beyond.

Never use alcohol or drugs before or while shooting.

And last but not least: Before squeezing the trigger identify your target beyond all doubt!

Be safe, not sorry!!!

Willems (2001, pages 64-65) also promotes the wearing of Blaze Orange™, arguing it 'can be a life saver'.

The *HUNTS Training Manual* is the authoritative text for hunter training developed by the New Zealand Mountain Safety Council (NZMSC) and the New Zealand Deerstalkers Association (NZDA). Chapter 6 of this manual addresses firearms safety while hunting, listing and expanding the seven firearms safety rules that form the basis of the New Zealand official firearms code. Specific examples address the deer hunter, arguing that failure to identify your target is the 'most culpable of all because the shooter makes a deliberate decision to pull the trigger'. The shooter is to check their firing zone to ensure that 'no other hunter is in the area where you are going to fire; or behind the target, or in front of it?'. A warning is also given to avoid alcohol or drugs when handling firearms. The *HUNTS Training Manual* gives a brief overview of accidents with firearms, including identifying the percentage attributed to breaching each of the seven firearms safety rules.

## **The case of high visibility orange**

A number of hunting commentators promote the wearing of high vis orange. Hans Willems (2001, pages 64-66) asks the question ‘How many of the hapless victims who are shot and die would still be alive had they worn Blaze Orange™?’. Martin Askes (editorial, *NZ Outdoors*, June/July 2003) considers ‘that the one thing that you can do to protect yourself from being shot is to wear a decent amount of bright Blaze Orange™ clothing’. The following paragraphs and section briefly outlines the argument for wearing high vis orange and the impact this has had on the accidental shooting of deer hunters in the state of Virginia, USA, where the wearing of a set area of high vis orange has been mandatory since 1987.

The booklet *How game animals see and smell* (1999) written by Kurt von Besser of ATSKO/SNO-SEAL Inc. is one of the key supporting documents for promoting the wearing of high vis orange. It includes photos of the colour spectrum arguably visible to game animals and an insert (pages 11 – 13) about visual sensitivity written by Jay Neitz, Ph. D., Vision Scientist at the University of California, Santa Barbara, USA. Some of the material in this booklet is reproduced in the clothing manufacturer Stoney Creek’s catalogue, promoting the wearing of their Blaze Orange™ products.

A careful reading of *How game animals see and smell* indicates that the publication addresses UV brighteners present in most clothing, including ‘garments from any color from camo to blaze orange’ (page 7). When treated with the product ‘UV Killer’ the colour responds less to UV light and is less visible to deer. When washed with UV Killer ‘your Blaze Orange is still protecting you from other humans but blends into the deer’s yellow landscape’ (page 17).

The reason that the Blaze Orange™, when treated with this product, blends into the deer’s view of the landscape is because, it is argued, the photoreceptors in the eye of a deer do not detect colour in the light range of Blaze Orange™, but do detect colour in the

shorter wavelength, including blue, violet and near ultraviolet (*How game animals see and smell*, page 13). In summary, based on analysis of the visual capability of the eye of deer, this publication argues that Blaze Orange™ and camo clothing are equally visible to deer when UV brightener is present, but neither is visible to deer if UV brightener is removed. However, it is argued that Blaze Orange™ remains visible to humans, and is thereby a protective colour for hunters.

Andrew Allen (*NZ Hunting and Wildlife*, April/June 2002, pages 29 & 30) argues that ‘so long as everything around remains still, the deer see almost nothing at all’. Allen suggests that deer are almost colour blind, and ‘beyond 20 metres they are unable to distinguish colours at all and their world dissolves into a featureless grey haze, faintly tinged with sepia’. While the deer’s eye is capable of seeing a range of colour, Allen argues that the visual lobes of the deer’s already tiny brain are incapable of analyzing and interpreting it. For the deer, the senses of smell and hearing ‘take up a relatively large part of what little brain it has’. Allen argues that one cannot deduce what an animal sees by looking at the optics of its eye: ‘An animal’s eye can be optically identical to a human’s – and still see an entirely different world because its brain is wired in a different way’. However the eye of the deer is not at all useless. It is ‘packed full of movement detectors – to the virtual exclusion of shape and colour detectors’.

So, arguably, the deer’s eye is not capable of seeing orange, and its brain is incapable of seeing almost any colour at distance, relying instead on detecting movement. This would appear to support an argument for deer hunters to wear high vis orange as a protection against being accidentally shot. In the following section I examine the case of Virginia, USA, where the wearing of ‘Hunter Orange on the upper body, visible from all sides, or a Hunter Orange hat, or display 100 square inches of Hunter Orange within body reach, at shoulder level or higher, visible from all sides’ is mandatory (*Hunter Orange the laws of the land*).

### **Wearing high vis orange in Virginia**

An internet search of articles relating to hunter safety produces headlines such as:

‘Twenty two big game hunters in New York have been killed since 1989 after being mistaken for deer or bear. Only one of those victims – a hunter shot after sunset – was wearing hunter orange’ (New York State Department of Environmental Conservation News, 15 November 2002).

‘Wearing some item of blaze orange clothing makes hunters easily identifiable to others’ (Dr Dale Rollins, August 1995).

‘But not even one person (of hunters killed in New York State) who was wearing hunter orange was mistaken for game and killed’ (New York State Department of Environmental Conservation News, website, updated February 10, 2003).

However the article that most took my attention was *The Virginia-Pilot* (online) January 10, 2003 in which it was reported by Patrick Lackey that David Gulliver, a *Virginia-Pilot* reporter, had collected Virginia game wardens’ reports of hunters shooting hunters, and had written an article on the dangers confronting hunters who fail to wear high vis orange clothing. His research showed that from 1960 to 2001 ‘hunters shot at least 741 people who weren’t wearing orange clothing, compared with a mere 242 people who were’<sup>2</sup>. A quick calculation indicates that 24% of the people shot were wearing the protective colour high vis orange. I asked David if he would be prepared to analyse the data to parameters provided by me, specifically:

- Limit the analysis to deer hunters hunting deer where visual identification of the target was an issue.
- A comparison of pre 1987 accident rates with post 1987 accident rates (to measure if the legislative requirement to wear hunter orange had made an impact).
- Analysis of deer hunters shot while hunting in the bush (the most common environment for New Zealand incidents).

---

<sup>2</sup> In giving feedback on this paper David Gulliver pointed out that in his original report he did not use the word ‘mere’. In his original report, supplied by him, David used the words ‘only 242 were shot while wearing orange, 22 fatally’.



database is consistent within itself and provides valuable opportunity for learning that might be applied to New Zealand.

## **METHODOLOGY**

The data collection for this project had four parts.

### **Coroners' reports**

The New Zealand Mountain Safety Council (NZMSC) has an ongoing research facility which includes analysis of Coroners' reports into deaths in the outdoors, including deaths involving a firearm. NZMSC supplied copies of 33 Coroners' reports collated about the deaths of hunters, where one hunter was shot by another while hunting. Some were limited to a brief summarizing statement, others included statements, affidavits and the summary of facts from any prosecution. The reports included incidents from 1979 to 1996.

I added the reports into 2 deaths of hunters occurring in 2000 and 2001 to the data provided by NZMSC. Only cases in which the investigation, Court action and Coroners proceedings were complete were used.

In 10 cases I obtained the investigation file into the death. These included detailed descriptions of the environment in which the event took place. This was essential for the colour recognition part of the project.

### **Colour recognition**

Police and the NZMSC have been reluctant to recommend that any specific colour be worn in the New Zealand bush as a protective measure against being shot by another hunter. As part of this project, John and Janet Greenwood, outdoors enthusiasts and photographers, were contracted to photograph a range of coloured clothing within various

bush settings which replicated, as far as was possible, the environments in which the accidental shooting of hunters took place. John's background as a Department of Conservation officer and experienced deer hunter were invaluable.

The objective was to ascertain what colours were most visible in a range of hunting environments and lighting conditions. The clothing was sourced from outdoor retailers and included forest camo, dark green, 'United Nations'/NATO blue, bright red, a range of high vis orange (both solid and dispersed pattern), rescue yellow (SAR vest), and a purple/blue striped polypro top. In Southland a blue/black check and orange/fawn check were also used.

Locations included Waikato forest and scrubland in a variety of light conditions; Waikato farmland looking out from within forest; Pureora forest and scrubland; Mount Ruapehu tussock and sub alpine, mountain shrubbery at Tongariro National Park; Pouwhenua Southland Coastal forest and Lewis Pass beech forest with dappled sunlight.

Photography was done using an Olympus Canedia E10 Digital SLR camera high resolution. The camera was mounted on a tripod for all except one location (open farm land viewed from within forest).

### **Survey of shooters**

The current address of 25 of the 33 shooters was located and a survey form designed to learn more about the shooter before the event sent to each. The survey instrument was accompanied by an information sheet explaining the project, and a consent form. The consent form included a commitment that the information provided could only be used for this research project and could not form the basis of any further judicial proceedings. An assurance was given that the shooter's name would not be used without their permission and that they would not be identified by description in the report. Permission was given for the New Zealand Police and me to use the information in preparing this report, and for any subsequent publications arising from the project. Shooters were

offered a copy of the report. I also arranged with the National Office of Victim Support that support from local Victim Support offices might be offered to shooters surveyed. No shooters took up this offer.

The survey instrument sought information about types of firearms the shooter was experienced with; hunting experience; game animals hunted and numbers shot; shooting club membership; firearms safety training; the wearing of corrective lenses and firearms licence status. Two questions probed the likely existence of stag/buck fever.

Seventeen survey instruments were returned. In 4 cases the shooter no longer lived at the address and no forwarding address was known. In 3 cases shooters did not consent to participate. Ten shooters agreed to participate and completed the survey instrument. While this is a very small sample group it comprises 30% of all shooters in hunting incidents between 1979 and 2002. As such, some trends are discernible.

## **Optometry**

In the early stages of this project I learnt of the interest of Peter O'Hagan, an optometrist, in the accidental deaths of hunters. I consulted with Peter early in the project. It was he who alerted us to the characteristics of viewing and identifying a target through a scope, suggesting that this limited and restricted the field of vision<sup>3</sup>. He recommended that a target should always be identified using binocular vision. Peter offered to review this paper and comment from the perspective of optometry.

## **RESULTS AND TABLES**

The firing of the shot that kills another hunter is seldom an isolated event. Instead it is the coming together of a 'web of events' (Haddock 1993, p.66). In what follows I present an analysis of the circumstances that comprise that web. Percentages have been rounded.

---

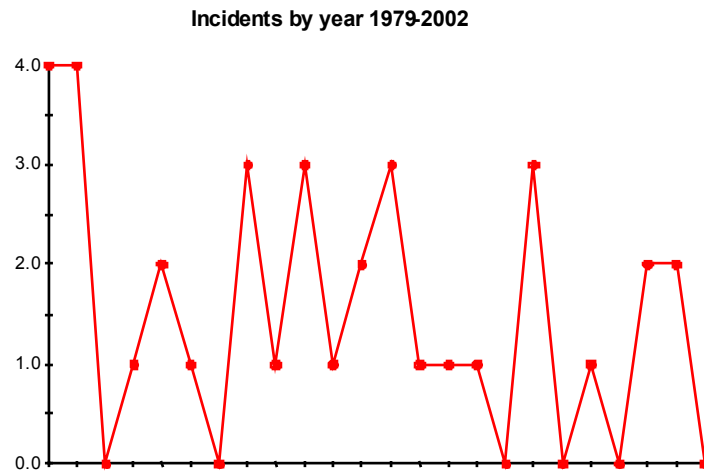
<sup>3</sup> In his advice to Mr Macalister, Coroner, in 1998 Bob Badland, Firearms Programme Manager for the New Zealand Mountain Safety Council warns of the effect of tunnel vision when viewing a target through a scope. He points out that a scope 'limits your view to each side' (in all directions).

## When the incidents occurred

From 1979 to 2002 there were 36 events in which one deer hunter killed another while hunting, an average of 1.5 per year. This project analysed 33 events, being those in which Coronial proceedings were complete.

*Number of incidents by year*

Year(s)	Number of incidents in each year
1979, 1980	4
1986, 1988, 1991, 1996	3
1983, 1990, 2000, 2001	2
1982, 1984, 1987, 1989, 1992, 1993, 1994, 1998	1
1981, 1985, 1995, 1997, 1999, 2002	0



39% (n=13) of the events occurred in April, the month of the ‘roar’ (mating season for deer). The remaining events were spread throughout the year, with 12% (n=4) in each of the months January, September and November. 6% (n=2) of the events took place in each of the months March, May and June. One event took place in each of the months August and October, with none indicated for February, July and December.

Of the 26 events in which it is indicated, 85% (n=22) of the shootings took place during the day. Two of the incidents happened at dawn, two at dusk. None happened at night. Daytime was determined as being ½ an hour after sunrise to 1 hour before sunset; dawn

as being 1 hour before sunrise to ½ an hour after sunrise, and dusk as being 1 hour before sunset to ½ an hour after sunset. Sunrise and sunset were determined from the times published for each area, for the Friday of the week in which the event happened.

### **The environment**

64% (n=21) of the 33 events took place in the six conservancy areas<sup>4</sup> where more than one hunting permit per square kilometer was issued. This indicates that most shootings take place in popular hunting areas, those most heavily occupied by hunters.

In 22 cases the nature of the environment, in terms of bush cover, is described in the files. They describe the environment as being dense bush (36%, n=12), light native (21%, n=7) or scrub/fern (9%, n= 3). In 7 of the remaining 11, the bush cover might be inferred from the geographic location of the shootings, with those 7 taking place in State Forests.

It can reasonably be concluded that 88% (n= 29) of these events took place in a bush environment, with both the shooter and the deceased in the bush, or one or the other in the bush.

In most cases neither the weather at the time of the shooting nor the level of visibility is indicated.

### **Who is shooting who – shooter and deceased, characteristics and relationships**

In all cases both the shooter and the deceased were male. In the 23 cases in which ethnicity was able to be determined, the shooter was Caucasian. One other shooter had a surname that suggested that he might be Maori, but this has not been able to be confirmed. The ethnicity of the deceased is not generally given, though, as a very broad (and unreliable) indicator, their surnames and other file information suggest them to be

---

<sup>4</sup> Conservancy area (permits per square kilometer): Hawkes Bay (3.65), Tongariro/Taupo (3.43), East Coast (3.16), Waikato (2.39), Wanganui (1.84), Wellington (1.12). Number of permits issued based on data obtained for twelve months 1992/93, or 1993 (Fraser 2000, p.17).

Caucasian, with one exception (the same case as that for the shooter above) where the deceased's name suggests Maori ethnicity.

The ages of the deceased were able to be determined in 26 of the 33 cases; the ages of the shooters in 32 of the 33 cases. The mean age (arithmetic average) of the deceased is 31.5 years, that of the shooters 30.5 years. The median age for both groups is 29 years.

*Figure: Ages of deceased and shooters compared with Nugent's profile of big game hunters (1989, p. 11)*

<b>Age range (years)</b>	<b>Nugent (1989) %</b>	<b>Deceased 1979-2002 %</b>	<b>Shooters 1979-2002 %</b>
5-19	5.9	11 (n = 3)	6 (n = 2)
20-24	11.1	19 (n = 5)	19 (n = 6)
25-29	16.2	15 (n = 4)	28 (n = 9)
30-39	30.2	15 (n = 4)	31 (n = 10)
40-49	19.7	23 (n = 6)	16 (n = 5)
50-59	10.8	4 (n = 1)	Nil
60+	4.2	4 (n = 1)	Nil

There is a very approximate match between the age profile for big game hunters in New Zealand as presented by Nugent (1989, p. 11) and that of both the deceased and shooters in this study.

In 64% (n = 21) of cases the deceased and the shooter were in the same hunting party. In 18% (n = 6) cases they were not. In the remaining 6 cases it was not indicated if the shooter and deceased were in the same party.

In 58% (n = 19) of cases the shooter knew the deceased to be in the area, their presence was not therefore unexpected. These included the deceased and the shooter hunting together, with the deceased moving forward of the shooter, at times with the knowledge of the shooter; or the deceased and the shooter hunting in parallel, either on the same side of a gully, or on opposite sides; or having agreed on separate hunting areas the deceased moved onto the boundary line of the agreed areas, being mistaken for a deer by the shooter. In another case the shooter shot at a deer sighted in a gully, knowing that the deceased was further up the gully, but out of sight.

In 24% (n = 8) of cases the shooter did not know the deceased was in the area. In two of these the deceased and the shooter were in the same group, but the deceased was not expected to be in the area. In one case the deceased was thought to be sick at camp, in the other, the deceased moved into the zone of fire contrary to the usual hunting arrangements, and was not seen by the shooter who was genuinely shooting at deer. In the remaining 18% (n = 6) it is not indicated if the shooter knew the deceased was in the area.

### **Who did what – actions of the deceased and shooter**

While the shot can only be attributed to the shooter, and the shooter carries the responsibility for that, it is apparent that both the shooter and the deceased are active participants in the events leading up to the shooting. In 42% (n = 14) of the 22 cases, where the behaviour of the deceased is indicated, the deceased placed themselves in the situation which culminated in their death. This included running in front of the shooter during the stalking of a deer, then being mistaken for that deer; continuing to behave like a deer (for example roaring) knowing the shooter is present; in one case pretending to be a deer, telling the shooter that 'he had seen him coming and had been having him on'; carrying a deer carcass on his back without any contrasting cover; wearing clothing that replicated the colouring of a deer, such that the investigating Police considered the deceased looked like a deer; or knowingly moving into the firing zone of the shooter (without the shooter necessarily seeing them or knowing they were there).

In 43% (n = 9) of the 21 cases where the deceased and the shooter were in the same hunting party, the deceased was out of the hunting area they had agreed to hunt in. This included moving into the shooter's hunting area; in one case deciding that their own agreed area had no deer, so stalking back toward the shooter in the block designated to the shooter. In another case the deceased had spent the previous day at camp sick, and the shooter had told him of a promising area where he believed a deer to be. Having left the deceased in camp the next morning, the shooter observed the likely area, seeing movement and what he believed to be the antlers of a deer. He shot his hunting

companion who had entered the area, the ‘antlers’ being a configuration of branches in silhouette.

In 43% (n = 9) of the 21 cases where the deceased and shooter were in the same party, the deceased was not out of their agreed hunting area. The shooter either shot into the deceased’s hunting area or shot the deceased while hunting in parallel.

In the remaining 3 cases it is not indicated if either was out of the agreed hunting areas. In one it appears that the shooter was on the edge or out of the agreed hunting area, and seems to have been hunting on the way back to the hut. In another it appears that both the shooter and the deceased were out of their agreed areas and, according to another member of their party, ‘should have been 200 to 300 yards away’. The deceased was mistaken for a sika deer, a herd of which was sighted immediately before the shooting by the shooter, and, it would appear, also by the deceased. In this case the Coroner commented on the ‘poor communication between the hunters as to the whereabouts of each other, and apparent vague navigation’.

There is insufficient information available to determine exactly what the deceased was wearing so as to determine any pattern. In 78% (n = 24) of cases the clothing worn by the deceased is not indicated.

### **Stag/buck fever?**

In none of the cases is the role of stag or buck fever, as a stand alone phenomenon, identified. The existence of stag/buck fever might be deduced from statements suggesting a raised level of excitement or emotion such that rational thinking is over ridden because a deer has been sighted; or a high expectation that deer would be found because one was sighted or shot in a short time preceding. This situation is present in 42% (n= 14) of the incidents where one hunter shot another. In 8 of these incidents it would appear to have affected both the deceased and the shooter. This is suggested, for example, when the deceased has rushed forward of the shooter.

## **The use of alcohol or other drugs**

In 33% (n = 11) of cases it is confirmed that alcohol or other drugs were not involved in the incident. In one case alcohol might have been involved. In this case, the hunting party had been at camp for the afternoon, and had their evening meal before reconnoitering a likely hunting area with their guns. In 63% (21) of cases the involvement of alcohol or other drugs is not indicated.

## **Target identification**

Target identification is an issue where the shooter has sighted the deceased and (mistakenly) identified them as a deer. This occurred in 64% (n=21) of the 33 events<sup>5</sup>. These events occur when clothing or a flash of skin is mistaken for a deer, often the back end of the animal. In some events it was movement that attracted the shooter's eye. Some shooters state that they clearly identified they were looking at a deer, including in one case 'the head, ears, neck of a deer'. Looking through the scope this shooter saw 'the tapered neck, the shoulders, the chest, the front legs and back' of a deer. Another saw what he thought to be the 'back of an animal, that is, its torso, and also its tail'. One shooter, having sighted a herd of deer, thought he saw the 'inner ears of another deer' and took this to be his target. One shooter saw the movement of bushes in a bluffy area, with what he thought to be the antlers of a stag above. In each case the target was the deceased.

Of the remaining, in 6% (n=2) the deceased had moved forward of the shooter<sup>6</sup>, where deer had been seen and the Court accepted that they had been hit by a ricochet. In one case the deceased was in the firing zone of the shooter, unknown to the shooter and not sighted by the shooter. In another case, the deceased was in the firing zone of the shooter,

---

<sup>5</sup> This is a strikingly similar percentage to that reported by the International Hunter Education Association for North America. For the years 1994-1997 and 2000, the percentage of deer hunters fatally shot, due to being mistaken for game, is 69.8% ([www.ihea.com](http://www.ihea.com)). For some unknown reason the intervening years 1998 and 1999 were not recorded on the website at the time of preparing this report.

<sup>6</sup> Again, very similar to the north American experience. In the IHEA report noted above, 10.5% of those fatally shot had moved into the line of fire.

known to be there by the shooter but was not sighted. In the remaining 24% (n=8) cases it is not indicated if target identification was an issue.

### **The relationship between target identification and shooter experience**

In 66% (n=14) of the 21 cases in which target identification was an issue, the shooter might be described as an 'experienced hunter'. The definition of 'experienced hunter' is problematic as the information available does not indicate any formal logging of experience. A person who indicates they have hunted for a number of years may have only hunted for a few days in each year, and this is supported by Nugent's research. I have therefore defined 'experienced hunter' in this context as being a person who has hunted for some years and had shot a number of deer, or had shot deer in the same hunting season prior to the event. In 10% (n=2) the shooter cannot be described as 'experienced' within this definition. In 24% (n=5) of the cases the experience of the shooter is not indicated.

### **The relationship between target identification and snap shooting**

I have defined snapshooting as being those occasions when the shooter 'saw the target, thought it a deer, and fired within one continuous movement'. I consider it is not snapshooting when the shooter 'has made deliberate observation of the target, identified it as a deer, and fired'. In 33% (n=11) of all cases a snap shot was indicated, in 25% (n=8) a snap shot was not taken. In 42% (n=14) it is not indicated if a snap shot was taken or not.

In 48% (n=10) of the 21 cases in which target identification was an issue it would appear that a snap shot was taken by the shooter. Of the remaining cases, in 24% (n=5) the shooter made deliberate observations of the target (mistakenly) identifying it to be a deer, and in 28% (n=6) the deceased was either not seen by the shooter (1 case) or there is insufficient information to determine if the shot was a snapshot or not (5 cases).

## **The relationship between target identification and using a scope to identify the target**

In 36% (n=12) of the 33 events a scope was used to identify the target. In 13% (n=4) of the events a scope was not used, and in the remaining 51% (n=17) it is not indicated if a scope was used or not.

In 43% (n=9) of the events in which target identification was an issue a scope was used to identify the target. In 19% (n=4) it was not used. In the remaining 8 cases where identification was an issue it is not indicated if a scope was used or not.

In 4 of the events where a scope was used to identify the target the shooter states that they had positively identified the target as a deer. In one case the target was a deer being carried by the deceased on his back. In another, the target was identified as being the fore end of a deer including the head, ears, neck, front legs and back, and these were observed to be moving. In one case the shooter saw and observed the brown of the deceased's jacket for 20 – 30 seconds before identifying him as a deer (the colour, combined with the whistling he was making and no response to the call of his name, lead the shooter to consider his target a deer). In the fourth case the deceased was observed with both the scope and the naked eye for about 30 seconds, before the flash of white at his neck and shape lead the shooter to believe him to be a deer.

In 8 of the events where the shooter used a scope, less positive identification was made that the target was a deer, including colour, noise, movement, shape or a combination of these. In one case where a scope was used, the shooter was confirmed as shooting at a deer, but he overshot, hitting the deceased some 90 metres beyond.

## **Mistaken identification – colour and the question of colour blindness**

In any discussion about mistaken identification of the target the issue of colour blindness is raised as a contributing factor. In those cases where it is indicated, what the shooter

describes as seeing is the same as the characteristics of the deceased or their clothing. This includes the flash of white at neck or hip; the combination of white and brown clothing; the ‘brown’ of a dirty, worn yellow raincoat (a case in which colour blindness was canvassed and not present); the ‘reddy colour’ of the deceased’s hair, and the brown jacket of the deceased. While not conclusive the information available does not support any assertion that colour blindness is a factor in the shooting of hunters by other hunters<sup>7</sup>.

## **Distance**

The distance for all shootings ranged from 6 to 90 metres. Both the median and the mean (arithmetic average) being 35 metres.

<b>Distance</b>	<b>No of shootings</b>
0 – 10 metres	2
11 – 20 metres	4
21 – 30 metres	5
31 – 40 metres	5
41 – 50 metres	3
51 – 60 metres	2
Beyond 60 metres	2 (75 & 90 metres)

The distance for those shootings, where target identification was an issue, ranged from 9 to 90 metres, with the median being 34.7 metres and the mean 27 metres. 50% of these shootings took place over a distance of between 18 and 35 metres.

## **Characteristic of the shooter – what the survey of shooters tells us**

With only 10 useable responses it is not possible to draw reliable conclusions about the characteristics of shooters prior to the incidents as revealed by the survey. However general trends can be observed.

---

<sup>7</sup> In providing feedback on this paper Peter O’Hagan, Optometrist noted ‘from an optometry point of view there are factors such as uncorrected refractive error, change in contrast sensitivity with age and underlying pathologies (eg cataracts) which would benefit from consideration’. This highlights the importance of hunters, as individuals engaging in a precision, high risk activity to ensure that their eyesight, and general health are up to the requirements of that activity.

All 10 had shooting experience with an air rifle, 8 used a shotgun and all 10 had experience with bolt action rifles. Four had used a single shot rifle, 3 lever action and 3 had experience with semi automatic rifles in sporting configuration (not military style). One had used a range of target pistols, another had been a black powder pistol shooter.

While the responses to the question about hunting experience were variable, it appears that the experience of the shooters ranged from 3 years to 30 years, with one stating he had been hunting all his life. However it appears that while some had been hunting deer for a number of years, in each year they hunted only for a month or so. This would seem to be consistent with Nugent (1989 and 1992).

Of the 10, 2 had never shot any deer, 2 had shot 2 deer, and 5 shooters had shot 8, 12, 90, 120 and 150 deer respectively. One other had shot an 'unknown', that is, numerous number.

Two of the 10 had been members of a shooting club prior to the incident. The remaining 8 had never been members of a shooting club.

Only one of the 10 had completed any formal hunter training. Three had no training other than the pre licence firearms safety course offered by the New Zealand Mountain Safety Council. Three had no formal firearms or hunter training whatsoever.

Nine of the 10 held a firearms licence or permit at the time of the incident. One did not, but appears to have been under the supervision of another shooter at the time of the shooting.

Only one indicated he wore corrective lenses, and he was wearing those at the time of the shooting.

### **The shot**

In all but 2 cases the deceased was killed by a single shot. In one of the remaining cases two shots were fired when the deceased moved after being shot the first time. In this case the shooter was convicted of manslaughter. In the other case the number of shots fired is not indicated.

In 33% (n = 11) of the incidents the shot was to the head. In the remaining 67% (n = 22) the shot was to the body. No shots are recorded as hitting the arms or legs.

In only 4 cases it is indicated that an Armourer tested the firearm. In each case the firearm was not faulty. In the remaining 29 cases it is not indicated if the firearm was tested. In none of the cases is it indicated that an Armourer examined the ammunition used.

### **The colour recognition project**

The results of the colour recognition are best described graphically, and a sample of photos is presented as part of this report. A more complete presentation is available on CD. These need to be considered together with the other behaviours of the deceased and the shooter, and the Virginia experience.

The colour recognition project demonstrates that that no one colour is satisfactory as a protective factor for all conditions. 'United Nations' or 'NATO' blue is the most visible colour in the greatest variety of conditions<sup>8</sup>. While high vis orange was good in most conditions, there are circumstances where this colour can be confused with deer, especially in the open and in some light conditions<sup>9</sup>. Red had a somewhat similar result. SAR yellow was readily seen in most conditions, but the large amount of this colour in the bush, especially when wet, makes this colour of limited value.

Dark and various types of camo green, the colours traditionally worn by hunters, can lead to confusing patterns in the forest. While they make the hunter partly invisible, the

---

<sup>8</sup> Care needs to be taken in selecting blue: some shades of blue go very dark when wet.

<sup>9</sup> In terms of high vis orange, and given that several brands were used in the project, no one brand stood out as performing noticeably better than any other.

exposed parts of the body - the face, hands and hip - when clothing exposes skin, can lead to confusion about what is being observed.

## **DISCUSSION AND CONCLUSION**

### **The typical event**

It is apparent then, that in a typical hunting incident where one deer hunter shoots another, both the deceased and the shooter will be men, aged in their mid twenties to mid forties. They are likely to be hunting companions, or have met each other at the forest hut prior to the incident. They will have discussed hunting areas and procedures.

They will be wearing a range of colours of clothing, including browns, whites, greens and green camo, and perhaps high vis orange. They may have hunted together many times. They will have had some experience hunting deer and other big game, but neither is likely to belong to a shooting club or have any formal hunter training. It is likely they will both have a heightened level of expectancy of coming across a deer, either because they saw or shot one in that same location some time previously, or they have seen one immediately prior to the incident.

One is likely to enter the firing area of another, perhaps by leaving the area they agreed to hunt in, or perhaps moving forward of their hunting companion if they are hunting together. They may have lost sight of each other for a few minutes. One might fire into the designated hunting area of another, or in the direction they know the other to be.

Their eye will be attracted by movement, colour, shape or sound, or a combination of these. The shooter is likely to identify the target as being a part (perhaps a small part) of a deer through the restricted vision of a scope. No one contributing factor will stand alone; these behaviours culminating in the firing of a shot that is most likely to hit the deceased in the body, sometimes in the head.

## **Applying the principles of outdoor safety (risk) management**

Deer hunting is an outdoor activity where the absolute risk originates from using firearms in usually remote country with the intent of shooting and killing (a deer). This absolute risk is managed by putting in place a number of safety controls with the aim of eliminating or minimizing the likelihood of loss. In terms of the firearm used, these safety controls are found within the *Arms Code*. Generic bushcraft, campcraft, navigation and first aid skills are also applied. What remains is a level of residual, or real risk associated specifically with deer hunting that has to be managed by the hunter. In order to manage this residual risk the hunter needs to be able to correctly perceive it as such. The hunter can only do this if they have a certain level of skill, knowledge and ability. Skill, knowledge and ability can only be developed by training, supervision and experience. It would appear that few hunters have any formal hunter training. Few hunters belong to a shooting club, the environment where peer supervision is most likely to be found. Given the results of Nugent's research it would appear that few hunters have a very high level of experience. Any hunter therefore would be most unwise to drop their guard, or to think that such an event might not happen to them (either as shooter or deceased).

As active participants within the field, sharing both physical space and a common activity, all hunters have a responsibility to manage risk. This responsibility, which includes identifying and managing any one or several contributing factors to a deer hunting incident (including the firing of a shot) cannot be transferred to another. This includes correct target identification. For example, risk shift, or the transfer of responsibility for managing safety, might occur if a hunter believed that because another hunter was wearing high vis orange, their responsibility to manage the risks associated with target identification was reduced in some way.

To extend this example, after the shooting of another hunter the responsibility for the failure to identify the target correctly might then be attributed, perhaps in part, to the deceased - if they were not wearing high vis orange, or if it were considered the amount

of orange they were wearing was not sufficient. While the deceased is an active participant in the field, the decision to fire a shot remains with the shooter.

### **The wearing of high vis orange**

From the results of analysis of the Virginia game wardens' reports into shooting incidents it can be concluded that the legislated requirement to wear high vis orange has had negligible if any impact on the number of deer hunters shot in incidents in which target identification was a factor, and that high vis orange is not necessarily a protective factor for deer hunters as a population group<sup>10</sup>. Further text analysis of the shooters' and any witness' statements is necessary before any conclusion could be reached about the degree to which the wearing of high vis orange might be a contributing factor, that is, that high vis orange lead the shooter to believe they had sighted a deer. Anecdotal material, both overseas and in New Zealand, suggests that the wearing of high vis orange may have prevented individual incidents. These are generally not reported in any systematic way, and appear to be based on a supposition that to be visible by wearing high vis colour averts shooting incidents. Such a supposition is not, on the face of it, supported by the Virginia data.

Just as the shooting is the culmination of a number of factors and behaviours, no one factor or behaviour is likely to stand alone as protective. Rather, the modification of a range of factors and behaviours is likely to be more effective.

### **Suggested behaviour for minimizing the likelihood of these events**

While as a basic premise the shooter is always responsible for the shooting, and it is incumbent on the shooter to fully identify their target and comply with the New Zealand *Arms Code*, it is possible to identify, from the analysis of the deaths of deer hunters,

---

<sup>10</sup> Generalised statements about the reduction of hunter related shooting incidents following the legislated requirement in the USA to wear high vis orange need to be treated with caution. In many States a compulsory hunter education programme was introduced at a similar time. USA data into shootings involving hunters includes self inflicted injuries and deaths, unintentional discharges, falls and other incidents resulting from shooting from trees and stands and deer driving as a hunting technique. In the case of shootings during deer drives the incidents appear to parallel duck shooting incidents in New Zealand.

specific behaviours that might be described as ‘protective’. They are listed below in descending order of the frequency in which the corresponding contributing factor appears (that is, the first is the most common contributing factor).

1. A hunter must not shoot at shape, sound, movement or colour, including those that belong to a deer, without confirming that their target is a deer.
2. A wise hunter will wear clothing that contrasts with the environment, including deer in that environment.
3. When hunting together with a companion, cease hunting if visual contact with that companion is lost, and do not resume hunting until visual contact is made and confirmed.
4. A hunter must develop a self-awareness that enables them to identify buck/stag fever in themselves, and counteract it with extra care while hunting.
5. Use binocular vision to identify the target; use the scope only to place the shot.
6. Snap shooting (as defined in this paper) is to be avoided unless target identification is complete.
7. If an area is obviously heavily occupied by other hunters consider going hunting elsewhere.
8. Hunters should undergo hunter specific training.
9. Hunters should belong to a club. Club membership is most likely to be the source of training and peer guidance.
10. Hunters should agree on hunting areas (‘blocks’), with a clearly defined ‘no fire zone’ between areas. Do not hunt outside the agreed area, including on the way back to camp.
11. If a linear boundary is agreed (for example a ridge line or creek), no shots may be fired toward or over that boundary line.
12. If it is absolutely necessary for one hunter to knowingly move into another’s area, perhaps because of an emergency, do not stalk into the area. The hunter should enter in a way that it is obvious they are not a deer.
13. Do not move into the firing zone or arc of fire of a hunting companion.
14. Sight more than a single small part of the deer and confirm it as the target.

15. Minimise the likelihood of colour similar to that of a deer being visible.
16. Do not shoot when others are known to be in the firing zone.
17. When hunting together with a companion in parallel keep sight of each other, maintain an arc of fire 180 degrees away from your hunting companion with a 'no fire zone' between shooters, including forward and back.
18. When hunting together with a companion, and taking turns hunting, the non hunting companion does not resume hunting until mutually agreed.
19. Hunting is not a time to fool around. Do not behave like a deer knowing your mate is hunting nearby. He may end up hunting you.
20. If carrying a deer carcass cover it in some way so that it is clearly contrasted with the environment, including deer in that environment.

## **Conclusion**

This project has analysed 33 incidents resulting in the deaths of one deer hunter at the hand of another between 1979 and 2002. I have reviewed the literature relating to hunter safety including the principles of outdoor safety (risk) management, the number of deer hunters and deer shot and the hunting practice safety advice currently available in books about deer hunting. From an analysis of the shooting incidents I have identified those factors and behaviours that have come together in the culminating event – the firing of a shot that killed another hunter. I have argued that irrespective that all hunters are participants in the field, the responsibility for taking the shot remains with the shooter and cannot be transferred to another.

Given the interplay of risk factors including the existence of firearms, rough and bush covered terrain, the need to behave somewhat like a deer, particularly during the roar and the excitement of the hunt, one Coroner concluded that 'it is a very distressing and sad thing that an accident such as this should have happened, but unfortunately in a pastime such as hunting they will from time to time happen even when all care is taken' (case 92COR0237). I have presented 20 protective factors and behaviours that, taken together with the *Arms Code* and competent bushcraft, campcraft, navigation and first aid,

contribute to safe hunting practice, thereby minimizing the likelihood of such incidents occurring.

## BIBLIOGRAPHY

- Allen, Andrew. What do deer see? *New Zealand Hunting and Wildlife*, April/June 2002, pages 29 - 30.
- Askes, Martin. Life and death? What to wear while hunting! *NZ Outdoor*, April/May 2002, pages 42 – 43, and, Editor's Shot. *NZ Outdoor*, June/July 2003.
- Axbey, Bill. (1991) *Along the track – a collection of New Zealand hunting yarns*. Collins, Auckland.
- Badland, R. (Bob) Correspondence to the Department of Conservation, 20 August 1991.
- Badland, R. (Bob) Advice to A. P. M. Macalister, Coroner, 1998.
- Banwell, D. Bruce. (1999) *The Sika*. Halcyon Press, Auckland.
- Burdon, B. (1993) *Of mountains, men and deer*. Halcyon Press, Auckland.
- Forrester, R. (1997) *A hunter's life – the life and times of a professional hunter*. Penguin, Auckland.
- Fraser, K. W. (2000) *Status and conservation role of recreational hunting on conservation land*. Department of Conservation, Wellington.
- Greenwood, J. (2002) *Report on hunter colour recognition project*. Private correspondence.
- Gulliver, David. Investigative reported, Virginia, USA. Personal correspondence
- Haddock, Cathye. (1993) *Managing risks in outdoor activities*. The New Zealand Mountain Safety Council, manual #27. Wellington, New Zealand.
- Haddock, C. M. (forthcoming) *Safety management in outdoor activities*. Rewrite of New Zealand Mountain Safety Council manual #27. Wellington, New Zealand.
- Holden, Philip.(1983) *The golden years of hunting in New Zealand*. Hodder & Stoughton, Auckland.
- (1985) *New Zealand, hunter's paradise*. Hodder & Stoughton, Auckland.
- (1986) *Holden on hunting*. Hodder & Stoughton, Auckland.
- (1987) *The deerstalkers – a history of the New Zealand Deerstalkers Association 1937 – 1987*. Hodder & Stoughton, Auckland.
- (1987) *A guide to hunting in New Zealand*. Hodder & Stoughton, Auckland.
- (1995) *Pack and rifle*. Reed, Auckland.

- Hunter Orange – The laws of the land (USA). Web: <http://members.aol.com/BERLIER1/ORANGE.htm>.
- International Hunter Education Association (IHEA) Web site.
- Janes, Charlie. (1993) *Time for a brew*. Reed, Auckland.
- Lentle, R., and Saxton, F. (1991) *Red deer in New Zealand – a complete hunting manual*. David Bateman, Auckland.
- Miller, L. (Ian) Affidavit for A P M Macalister, Coroner, 16 December 1998
- New Zealand Police & New Zealand Mountain Safety Council. (2001) *Arms Code – firearms safety manual issued by the New Zealand Police*.
- Nugent, G. (1989) *Hunting in New Zealand in 1988: survey results*. Forest Research Institute, Christchurch.
- Nugent, G. (1992) Big game, small game, and game bird hunting in New Zealand: hunting effort, harvest and expenditure in 1988. *New Zealand Journal of Zoology*, 1992, Vol. 19: 75-90.
- O’Leary, Bill., and McMillan, Rob. (2002) *HUNTS – hunter national training scheme training manual*. The New Zealand Mountain Safety Council, manual #35. Wellington, New Zealand.
- Rollins, Dale. (1995) *Hunter orange bright idea for deer hunters*. Web, <http://agnews.tamu.edu/dailynews/stories/WFSC/orange.htm>
- Schasching, K. H. *The New Zealand recreational hunter: profile and requirements*. Not dated, School of Forestry, University of Canterbury, Christchurch.
- Scrimshaw, W. (23 April 2003) Private correspondence to New Zealand Deerstalkers Association.
- Severinsen, K. (1990) *Hunt the wild blue yonder*. David Bateman, Auckland.
- Von Besser, Kurt. (1999) *How game animals see & smell*. ATSKO/SNO-SEAL Inc, USA.
- Watson, Kevin. Buck fever. *NZ Outdoor*, April/May 2002, pages 34 – 35.
- Willems, Hans. (2001) *Hunting smarter – a practical guide to successful hunting in New Zealand*. Halcyon Press, Auckland.
- Willems, Hans. Thou shalt not shoot thy fellow hunter. *NZ Outdoor*, June/July

1997, pages 55 – 57.

## ACKNOWLEDGEMENTS

The assistance of all those who participated, commented, encouraged or gave feedback during this project is acknowledged with gratitude. Especially:

Bob Badland, firearms programme manager of the New Zealand Mountain Safety Council who constantly reiterated the importance of the project, provided source documents, arranged feedback and was always enthusiastic.

Ian Nicholson, Executive Director of the New Zealand Mountain Safety Council – for support at executive level.

David Walsh, Research Officer for the Mountain Safety Council – for collating and making available Coroners' reports.

Cathye Haddock, expert on outdoor safety (risk) management – for regular review of many drafts.

Former Senior Constable Bruce Butland – for tracking down the addresses of shooters in the 33 incidents studied.

David Gulliver, investigative journalist, Virginia, USA – for making the time in a busy schedule to interrogate the Virginia database to parameters set by me.

John and Janet Greenwood – for the colour recognition project and feedback.

Peter O'Hagan – for providing the perspective of optometry.

Chaz Forsyth, Mike Massaar (DOC) and Rob McMillan – for feedback on the initial draft.

Clyde, Steve and Egon Graf – for permission to use photos and video footage of deer in their natural environment.

Adam Birch, project officer for the New Zealand Police – for coordinating publishing of this report within a short time frame.

The shooters who participated in the survey – for having the courage to share your experience for the benefit of others.

Victim Support – for agreeing to provide support to the shooters in incidents who participated in this project.

Upper Hutt Deerstalkers – for running a great HUNTS course. Every hunter needs to do this!

The numerous deer hunters, Mountain Safety Council and HUNTS instructors who shared their experiences, opinions and advice.

My wife, Anne –for putting up with rooms scattered with project material, and for acting as a sounding board when something didn't make sense.

Any mistakes therefore, are entirely my own.

## **THE NEW ZEALAND ARMS CODE**

(compiled by the New Zealand Police and the New Zealand Mountain Safety Council)

1. Treat every firearm as loaded.
2. Always point firearms in a safe direction.
3. Load a firearm only when ready to fire.
4. Identify your target.
5. Check your firing zone.
6. Store firearms and ammunition safely.
7. Avoid alcohol or drugs when handling firearms.

The full publication of the *Arms Code* can be found on the New Zealand Police website

[www.police.govt.nz](http://www.police.govt.nz) (look under ‘service units’, ‘firearms’)

# **COLOUR RECOGNITION PROJECT**

**Representative sample of photos**