

Discussion paper - Game Council NSW

Blaze Orange Hunting Clothing

- Educate or Regulate?



Submissions

Comment or submissions can be sent via mail or email to;

Game Council NSW Blaze Orange Discussion Paper
P.O. Box 2506, Orange, NSW 2800
ea@gamecouncil.nsw.gov.au

Submissions close 31 May 2011

Wearing blaze orange clothing when hunting in NSW:

– Educate or Regulate?

Game Council is continuously striving to make hunting safer in NSW. The Council is currently considering whether, (apart from hunting ducks under the NSW rice mitigation program), the wearing of blaze orange clothing when hunting under licence should be mandatory in NSW.

Discussion, comments and feedback is sought from NSW Game Hunting Licence holders and Approved Hunting Organisations on whether the wearing of blaze orange clothing when hunting under licence in NSW should be mandatory or whether hunter education would play a better part in increasing safety in this area for licensed hunters in NSW.

Submissions

Comment or submissions can be sent via mail or email to;

Game Council NSW Blaze Orange Discussion Paper
P.O. Box 2506, Orange, NSW 2800
ea@gamecouncil.nsw.gov.au

All persons e-mailing a submission are recommended to put a “delivery” and “read” receipt check on their e-mail to confirm that it has been delivered and received by Game Council.

Submissions close 31 May 2011

Background

Hunting incidents

The International Hunter Education Association’s (IHEA) definition of a hunting incident is “an occurrence or an event that results in the physical injury or death of a person or persons which involves the discharge or use of a hunting implement while engaged in hunting activity.” Hunting is defined as “to pursue, take, and attempt to take, search for, stalk or lie in wait for any animal.”

There are four main causes of hunting incidents according to the IHEA:

- **Vision-related**, such as mistaking another person for game, not checking the foreground or background before firing, or covering another hunter while swinging on game.
- **Safety rule violations**, including pointing the muzzle in an unsafe direction and ignoring proper procedures for crossing a fence, obstacle, or difficult terrain.
- **Lack of control and practice** that can lead to accidental discharges and poorly placed shots.
- **Mechanical failure**, such as an obstructed barrel, improper ammunition, or malfunctioning safety.

Blaze orange requirements are aimed solely at reducing the number of vision-related incidents; other causes of hunting related incidents would not be affected.

While Game Council encourages the wearing of blaze orange clothing when hunting on private land there is no legal requirement to wear it. The wearing of blaze orange clothing is currently only a condition for hunting on declared public land in NSW. It is important to understand this requirement to wear blaze orange clothing was identified in a Risk Assessment and it was instituted for hunter safety from other forest users including: machinery operators and trucks and other vehicles; not from other hunters while hunting.

What is “Blaze” orange colour for hunting clothing

Blaze orange clothing is fluorescent coloured clothing. Normal dyes in clothing reflect only certain wavelength and reflect them at those same wavelengths, i.e.; when white light hits the pigment of a dye in clothing some of the wavelengths are absorbed while others are reflected. The various combinations of wavelengths: red, green and blue which are reflected give us colours. So if a dye absorbs all the green and blue wavelengths, it is seen as the colour red.

Fluorescence is different: it is a type of luminescence. The light wave is absorbed into a special chemical in the pigment of the colour in the invisible ultraviolet wavelength and is then re-emitted in a different wavelength as light in the visible range we can see. As the sun goes down the wavelengths of visible light reduce but other invisible wavelengths from the atmosphere are hitting and being re-emitted as visible light from the fluorescence-treated fabric: more visible light is given off the garment than is actually hitting it. This is blaze or dazzle colour and this is why blaze orange clothing appears so bright in low light conditions.

Colour vision in animals – why can’t they see blaze orange as we do?

Studies in the late 80’s and early 90s indicate that most non-primate species have dichromatic (two colour) vision. Dichromatic colour vision does not give animals much ability to discriminate among the colours of objects that reflect light in the middle to long wavelengths, i.e. green, yellow, brown, orange, and red. It is because of this that hunters can wear what appears to be very brightly coloured blaze orange clothing without disturbing or alerting game animals (See Appendix).

Hunting is a safe activity!

It is important to put any discussions about hunting safety in perspective. One important fact to remember is that hunting is a safe form of outdoor activity and this becomes apparent when Australian and international statistics related to deaths and injuries related to outdoor activities are examined.

Australian and NSW perspective

In November 2010 the Victorian Institute of Forensic Medicine researched the National Coroners Information System to provide data to the Game Council of NSW on the number and nature of external cause sporting-related fatalities contained on the NCIS between 1 July 2000 and 1 August 2010. The purpose of the report is to contribute to the development of firearms safety and hunter education, planning for compliance programs and provision of accurate advice to the NSW State Government.

Australian sport related deaths statistics 2000 to 2010

Sporting Code/Jurisdiction	ACT	NSW	NT	QLD	SA	TAS	VIC	WA	Total
Individual Water Based Fishing, Other Individual Water Based, Surf Life Saving, Surfing, Swimming, Underwater Sports, Water Skiing, Wind Surfing	6	283	39	172	62	34	136	132	864
Motor Go-Karting/Karting, Motor Cycling, Motor Racing – Car, Other Motor	<3	46	11	30	14	20	16	33	Between 170-173
Aero Gliding, Hang Gliding, Other Aero, Parachuting, Para-Gliding	<3	46	11	30	14	20	16	33	Between 72-75
Wheeled BMX, Cycling-Mountain, Cycling-Road, In-Line Skating(Roller Blading), Other Wheeled, Skate-boarding	<3	37	<3	16	10	12	23	9	111
Boat Boat including canoeing, Other Water Team, Rowing, Yachting	0	26		16	12	7	21	10	Between 92-95
Equestrian Gliding, Hang Gliding, Other Aero, Parachuting, Para-Gliding	0	10	<3	13	<3	<3	6	3	35
Adventure Hiking, Mountaineering, Other Adventure, Rock Climbing	0	7	<3	5	<3	4	10	4	34
Individual land based Athletics, Orienteering, Other Individual Land Based	0	11	<3	8	4	0	10	<3	36
Target Billiards and Snooker, Darts, Golf, Lawn Bowls, Shooting	0	7	<3	3	<3	0	8	<3	22
Ball Team Australian Football, Basketball, Indoor Soccer, Netball, other Ball team, Rugby League, Rugby Union, Soccer, Touch Football	0	5	0	<3	<3	0	<3	<3	Between 72-75
Ice and Snow Cross Country Skiing, Down Hill Skiing, Snowboarding	<3	<3	0	0	0	0	<3	0	6
Bat and Ball team Cricket, Hockey, Other Bat and Ball Team	0	0	0	0	0	0	0	<3	<3
Racquet Tennis, Badminton	0	0	0	0	<3	<3	0	0	3
Other Aussie Sport (Modified Sport), School Free Play	0	3	0	0	0	0	0	0	3
Power Strength and Conditioning, Weight Lifting	0	0	0	0	0	0	0	<3	<3
Combative Aikido, Karate, Other Combative, Taekwondo	0	0	0	0	0	0	0	<3	<3
Unspecified Still Enquiring, Unlikely to be known	0	8	0	0	0	0	0		8
TOTAL	12	465	62	273	113	82	261	205	1473

Note: Some totals have been provided as a range eg "Between 92-95" to avoid unintentional identification of particular cases where low numbers are involved.

Between 1 July 2000 and 1st August 2010 in Australia there were a total of 1,473 external cause deaths while the deceased was undertaking sporting-relating activities identified on the NCIS. Of these 1,473 fatalities, 22 involved a Target Sport which includes, but is not solely restricted to, shooting and hunting, with 13 of these deaths relating to an unintentional shooting incident. An additional 12 fatalities involving an unintentional shooting event during a leisure/hunting activity were identified where the activity had not been coded as occurring during a 'Sport'.

Statistics related to hunting and shooting deaths in Australia 2000-2010

Type/Jurisdiction	NSW	VIC	QLD	WA	SA	ACT	NT	TAS	TOTAL
Shooting from vehicle/boat	1	1	4	0	1	0	0	1	8
Hunting/shooting on foot	0	4	*1	0	0	0	1	0	6
Firearms handling related (not-hunting)	1	2 (1)	0	0	0	0	0	0	3
Vehicle related death while shooting/hunting	2	1	2	0	1	0	2	0	8
TOTAL	4	8	7	0	2	0	3	1	25

Note:

1. Figures in parenthesis denote that deceased had been handling firearm while not holding a firearms licence.
2. * Denotes death resulting from knife injury while pig hunting

In NSW since 1 July 2000, there have been four hunting/shooting deaths with two due to injuries sustained as a result of vehicle accident (one while kangaroo shooting), one due to a shooting incident in a vehicle while kangaroo shooting and one involved a shooting accident before going rabbit shooting.

Australia-wide the greatest risk to hunters and shooters appears to be from vehicle accident while hunting or shooting or firearm discharge in vehicle while shooting from a vehicle or carrying loaded firearms in vehicle. Of the 25 deaths in total related to hunting and shooting with 64 per cent related to vehicle accidents or deaths from firearm discharge in and around vehicles while shooting. 25 per cent of the deaths Australia-wide were while hunting on foot, none of these incidents occurred in NSW.

Based on these statistics, hunting on foot as per the conditions of a NSW Game Hunting Licence granted by the Game Council of NSW is a relatively safe outdoor pursuit. Emphasis needs to continue on hunter and firearms education, especially in relation to having loaded firearms in or around vehicles and the use of vehicles while hunting or shooting or travelling to and from hunting areas.

To date, no studies have been undertaken into vision related hunting incidents in Australia.

USA perspective

As a measure designed to reduce vision-related hunting incidents, forty states in the United States have passed laws that require of the blaze orange while hunting.

According to a 2009 Industry Intelligence Report released by the National Shooting Sports Foundation in the United States (NSSF), **hunting is one of the safest forms of recreation in the United States** with an estimated 5 injuries per 100,000 participants. This is very low, especially when compared to other common forms of recreation. For example, bicycle riding can expect 1,351 injuries per 100,000 participants; soccer can expect 1,440 injuries per 100,000 participants; and football can expect 2,557 injuries per 100,000 participants.

National Shooting Sports Foundation (NSSF) statistics related to sport activities in the US in 2009-10

Activity	Estimated Participants	Estimated Injuries	Estimated Injuries per 100,000 Participants
Basketball	24,100,000	481,011	1,996
Boxing	794,000	14,844	1,870
Wrestling	2,100,000	37,320	1,777
Soccer	13,800,000	198,679	1,440
Skateboarding	10,100,000	143,682	1,423
Bicycle Riding	37,400,000	505,413	1,351
Baseball	14,000,000	167,661	1,198
Ice Hockey	2,100,000	18,679	889
Cheerleading	3,800,000	26,786	705
Martial Arts	4,700,000	26,655	567
Volleyball	12,000,000	57,039	475
Swimming	52,300,000	171,704	328
Weight Lifting	33,200,000	72,369	218
Fishing	35,300,000	71,615	203
Water Skiing	5,300,000	9,652	182
Tennis	12,300,000	21,775	177
Golf	22,700,000	36,886	162
Mountain Biking	7,400,000	10,458	141
Mountain Climbing	4,600,000	3,875	84
Archery	6,600,000	4,393	67
Bowling	43,500,000	21,819	50
Billiards	29,500,000	5,045	17
Hunting	19,400,000	916	5

Source: Oregon Department of Fish and Wildlife, Hunter Orange Report to the Commission, June 4, 2010

The most recent report available from the United States on blaze orange clothing was published by the Oregon Fish and Wildlife Division in June 2010

(http://www.dfw.state.or.us/agency/commission/minutes/10/06_jun/Exhibit%20I_Attachment%204_Hunter%20Orange%20Proposals.pdf).

The report found that department's Hunter Education Program has placed heavy emphasis into encouraging the voluntary use of hunter/blaze orange. The practical safety benefits of wearing hunter orange are covered in all hunter education course materials in that State and discussed extensively in the classroom, and promoted through the media prior to each hunting season. Despite significant effort to encourage the voluntary wearing of hunter orange, a survey of Oregon State Police (OSP) Fish and Wildlife Division Troopers estimated that only 15% - 25% of Oregon hunters they encounter in the field wear hunter orange during big game rifle and upland game bird seasons.

The Oregon Fish and Wildlife Division states it is universally accepted amongst hunter education experts in the United States that the use of blaze orange reduces vision-related hunting incidents and fatalities; however accurate statistics that provide specific hunting related incident information are hard to come by.

Studies conducted in New York, Maine and North Carolina all concluded that there was a reduction in vision-related hunting incidents as a result of the use of blaze orange clothing (New York) or after hunter orange requirements were enacted (Maine, North Carolina). New York, a State without mandatory blaze orange requirements, found that of the 125 injured hunters mistaken for game between 1989 and 1995, 117 (94%) were not wearing blaze orange. Beginning in 1967 Maine began requiring hunters in York County to wear blaze orange clothing. In the five years prior to the one-county requirement York County accounted for 41% of the State's vision-related hunting incidents, but only 23% in the five years after. Finally, a study conducted in North Carolina found that in the four years prior to that State's blaze orange requirement there were 12 vision-related fatalities, but only 2 vision-related fatalities in the four years after the requirement.

New Zealand Perspective

Non-Intentional Firearms Deaths 2000-2010

Mike Spray from the NZ Mountain Safety Council in a recent (March 2011) article in NZ Hunter stated that in the past 10 years there have been 24 non-intentional firearms deaths. Of these: 9 were caused during deer hunting when the hunter failed to identify the target; 2 were caused by spotlighters failing to identify their target; and one caused when firing at a moving target and the companion ended up in the firing line.

Inspector Joe Green of the New Zealand Police has undertaken research into deer hunting and firearms accidents in his country and published the results in 2003. The following is a summary and key points from his publication "*To hunt and return – developing safe hunting practice*" (New Zealand Police, 2003. http://www.mountainsafety.org.nz/assets/images/to_hunt_return_abs.pdf).

Conclusion

The research analysed 33 shooting incidents between 1979 and 2002. It identified those factors and behaviours that have come together in the culminating event – the firing of a shot that killed another hunter.

What contributed to the incidents?

While the cause of death in each case was the shot fired by the shooter, and the shooter always retains responsibility for that, both the shooter and the deceased did things that contributed to the incident. Target identification was a factor in just under two thirds (64%) of cases.

Nearly all shootings took place in a bush environment, with either: the shooter, the deceased or both in the bush. Most occurred on the public estate. The distance of shootings ranged from 6 to 90 metres, with the average being 35 metres. The time of the shooting is recorded in 26 of the 33 incidents. Contrary to popular belief in New Zealand, 85% of the shootings took place during the hours of daylight, and were spread evenly throughout the day. None of the incidents analysed took place at night. In the cases where it was canvassed, and given the shooters description of what they shot at in most other cases, there is nothing to support any assertion that colour blindness or other vision related issues are contributing factors.

Colour recognition project

Inspector Green's research included a colour recognition research project. The objective of the colour recognition project was to ascertain what colours were most visible in a range of hunting environments in New Zealand, replicating those in which shooting had occurred. No one colour is

satisfactory as a protective factor for all conditions, however 'United Nations' blue came out as the most visible colour in the greatest variety of conditions, but can be affected by going darker when wet if made of an absorbent material. A range of high visibility orange clothing was tested. It was good in most conditions, but there are circumstances where it might be confused with deer, especially in some light conditions. The outcomes of this project indicate that the wearing of colour that contrasts with the environment, on its own, is not sufficient. Rather, hunters need to modify a range of behaviours including: minimising the likelihood of colour similar to that of a deer being visible.

Conclusions of New Zealand Study

The analysis of 33 shooting incidents between 1979 and 2002 identified those factors and behaviours that have come together in the culminating event – the firing of a shot that killed another hunter. 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, this project suggests a number of protective factors and behaviours (*including wearing contrasting clothing*) that, taken together with the New Zealand Arms Code and competent bushcraft, camp craft, navigation and first aid, contribute to safe hunting practice, thereby minimising the likelihood of such incidents occurring.

Appendix:

Colour Vision:- Jay Neitz, Phd. Vision Scientist

The ability to see colour is an important aspect of human vision. Colour differences often allow us to easily identify objects from their backgrounds that would otherwise be invisible. For example, at a distance, ripe red tomatoes on the vine are much more easily seen among the leaves than unripe green ones.

Humans are able to see colour because of three different types of cone photoreceptor cells in the retinas of their eyes. One cone type is most sensitive to short wavelength (blue) lights a second is most sensitive to middle wavelengths (green) and a third is most sensitive to long wavelength (red) lights. The three different cone types are the basis for what has been termed trichromatic (literally three-colour) vision in humans.

It should be noted as an aside that the majority of the cone photoreceptors in the human retina are the long-wavelength sensitive type, the middle wavelength sensitive type are the next most common, and the short wavelength sensitive are rare-only about 10% of the cones. The blue sensitive cones are important for colour vision, but because of their small number they provide little or no over-all sensitivity to short wavelength light.

Scientists have studied colour vision capacities in a number of animals. Among mammals, only primates (monkeys and apes) have been found to have trichromatic colour vision like that of humans. However, a number of other mammals have colour vision that is based on only two different cone types; this is dichromatic (two-colour) vision.

This simplified type of colour vision seems to be common among mammals and has been observed in carnivores (e.g. dogs and cats) and ungulates (hoofed mammals). Although vision is predominantly based on rods in these animals (more than 90 per cent of the total photoreceptors in their eyes are rods giving them excellent night vision), they have enough cones to provide colour vision.

Colour vision based on only two different cone types is not going to be as good as human colour vision that is based on three types. The deficiency in dichromatic colour vision is in the ability to discriminate among the colours of objects that reflect light in the middle to long wavelengths, i.e. green, yellow, brown, orange, and red.

The ungulates and carnivores with colour vision based on only short wavelength sensitive cones and long wavelength sensitive cones, would find these colours difficult or impossible to distinguish. However, for these animals, blue, and violet and near ultraviolet (which is invisible to us because it is blocked by the lens) stand out from the other colours. The colours of earthly objects are mostly browns, tans, greens and yellows. To an animal with dichromatic colour vision, a sportsman wearing garments that strongly reflect short wavelength light would stand out against these backgrounds like a ripe red tomato on a green vine.

Source: Miller, K., 1993 *Abstract of a study on the vision of the white-tail deer which was presented at the annual meeting of the Southeast Deer Study Group, February 21-24, 1993, in Jackson, Mississippi, USA.*