Review

The Motivations of Recreational Hunters Who Violate Wildlife and Game Hunting Regulations: Implications for Crime Prevention

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Abstract: Recreational hunting is a highly regulated activity, in part because it can give rise to a variety of deleterious social, environmental, and economic harms. It provides an interesting area for those interested in community safety because of the way in which both formal (e.g., enforcement officers, proscribed areas and times for hunting, licensing, etc.) and informal (e.g., community awareness and education, conservation) methods of crime prevention are applied. And yet, the criminological literature on effective regulation is not only limited but diverse in terms of scope, types of behavior considered (e.g., poaching, wildlife trading, recreation, etc.), and the context that is considered (e.g., geographical, cultural, etc.). In this paper, we present how a crime prevention and compliance response can be used to understand the nature of the issue and the individual and socio-political processes that result in non-compliance with hunting regulations. We present an overview of the status of recreational hunting in an Australian jurisdiction and locate the regulatory issues that arise within the research literature that explores the various motivations that are known to drive illegal hunting. These are then considered in relation to how community-oriented and non-coercive measures might be employed to improve prevent criminal behavior at the primary, secondary, and tertiary levels.

Keywords: recreational hunting; illegal hunting; regulation; situational crime prevention; game management; Australia

1. Introduction

Recent years have seen the development of more proactive and community-oriented approaches to crime prevention across all areas of criminal justice (National Academies of Sciences, Engineering, and Medicine 2018), with frameworks and toolkits now available for use in contexts previously thought to require specialist responses, such as in relation to illegal recreational hunting (hunting in ways that breach local regulation, such as hunting out of season or without appropriate licensing; see Fauna & Flora 2023). The prevention of illegal recreational hunting is an important aspect of a distinctive subdiscipline of criminology (sometimes referred to as 'wildlife criminology'; Blevins and Edwards 2009) that is primarily concerned with understanding offences against wildlife and preventing the social harm that results. Previous interest in this area, in Western countries at least, has tended to focus on diverse activities such as pest control, blood sports, hunting for food, animal abuse in zoos, and poaching (see Nurse and Wyatt 2020), even though

these are practices that are not readily accommodated by the categories that have been used to describe criminal activity (e.g., 'crimes against the person' or 'property crime'). Furthermore, despite wildlife crime being widely recognized as a global problem (Wilson-Wilde 2010) it has, at times, been viewed as a 'victimless' crime that does not warrant comparable attention (Blevins and Edwards 2009).

The aim of this paper is to consider how community safety (along with the need to ensure sustainability and to protect animal welfare) might best be achieved in relation to illegal recreational hunting and to illustrate some of the ways that criminological theory and research might inform crime prevention efforts in this area. We report the findings of a narrative review of the published research literature to document current understandings of the reasons why recreational hunters breach regulations. Drawing on situational crime prevention methods, we then consider how this might inform the work of a regulatory authority that is responsible for promoting sustainability and responsibility in game hunting. Given the importance of local context, we apply this work to one jurisdiction—the state of Victoria in southeastern Australia—where the regulatory authority (the Game Management Authority; GMA) currently employs a range of prevention and targeted enforcement strategies designed to prevent harm both to wildlife and to the community. As is the case in other jurisdictions, the GMA operates in a sociopolitical context in which there has been, and continues to be, considerable public interest in the regulation of recreational hunting, as illustrated by a recent parliamentary inquiry into recreational native bird hunting in 2023 that considered a number of issues, including annual bird hunting seasons, environmental sustainability, and social and economic impact. We begin by providing a summary of the context for recreational hunting in Victoria, before outlining current regulatory goals and mechanisms. We then summarize the Australian and international research literature that seeks to identify key motivations for recreational hunting before identifying implications for effective wildlife management practice. In doing so, we draw upon contemporary crime prevention approaches to identify a range of strategies that may contribute to ongoing efforts to reduce the motivation for recreational hunters to breach current regulations.

2. Historical and Cultural Context

Prior to the development of the first wildlife and game management agencies around 150 years ago, both native and introduced species were freely hunted in most parts of the world. This led to the near extinction of some species (see Gigliotti et al. 2009), and the primary goal of early regulation efforts was simply to maintain population levels through predator control, reservation of land for game, and a range of other methods. In Australia, there has only ever been a limited need for regulating the hunting of introduced species that have not been assigned 'game' status beyond ensuring that hunters have legal access to the land on which they are hunting. In contrast, the hunting of native animals has been either prohibited or strictly regulated across the country, even though a few species of kangaroos and wallabies support substantial, but highly regulated, commercial hunting industries (Croft and Witte 2021).

Recreational hunting has long been a popular pastime. Nearly 25 years ago, Bauer and Giles (2002) estimated that four percent of the Australian population had participated in some type of hunting. Even earlier work by Cause (1990, cited in Cause 1995) estimated that, at the time, there were around 17,500 deer hunters, even though opportunities for hunting at the time were limited because of the relatively small number (and sizes) of the deer population (see McLeod 2009; Moriarty 2004). Based on the findings of an important national survey of over 7000 recreational hunters, Finch et al. (2014) estimated that there were likely to be around 300,000 recreational hunters across Australia, most of whom are male, aged between 31 and 60 years, who collectively spend more than 1 billion AUD on

hunting each year. Around one-third of all Australian recreational hunters were reported to reside in the state of Victoria.

2.1. Species

There are over 25 different species that are legal to hunt in Australia (SSAA 2022). Legally huntable species include feral pigs and foxes, with one study of licensed large game hunters by Kroezen (2005; cited by Woods and Kerr 2010) reporting that the most hunted species in the state of New South Wales at the time was feral pig (42%), along with deer and goat (both 23%). These are identified as invasive species or animals that have been introduced to an area that are capable of doing irreparable damage to the environment and ecosystem. In Victoria, which has some of the most stringent wildlife protection controls in Australia (see https://www.gma.vic.gov.au/Laws,-Policies-and-Strategies; Appendix A (accessed on 26 May 2025), specific regulations exist to control the hunting of native species of bird (primarily ducks and quail), as well as introduced species (deer and some non-indigenous game birds that have been declared to be 'game'), although the hunting of other non-native, introduced species (such as foxes, pigs, and rabbits) is unlicensed (Woods and Kerr 2010). Regulated recreational hunting thus applies to stubble quail (a native ground-dwelling grassland bird), eight species of native ducks (noting that one, the blue-winged shoveler, has a year-round closed season), and six species of introduced deer (although some introduced ground-dwelling gamebirds can also be hunted if they are raised and then released specifically for hunting on privately owned land).[1] Thus, in Victoria, recreational hunting obscures the distinction that is often made between "wildlife management" and "pest control" (Nurse and Wyatt 2020, p. 54).

The Victorian state government has, since 2009, commissioned regular telephone surveys of randomly selected licensed hunters who hunt game deer, ducks, and/or stubble quail. The surveys provide us with useful estimates of the total harvest and of the time spent hunting, which are used to monitor resource use and inform other regulatory actions (see Moloney and Powell 2019; Moloney and Hampton 2020). In the most recent published report, for example, hunters provided information about the extent of their hunting efforts and the number of animals harvested, with their answers then used to develop metrics of activity as well as hunter success and efficiency (Moloney et al. 2022). Over the eleven-year period for which data are available, the annual deer harvest (all species) is reported to have increased rapidly (at an average of 17% per year), with increased numbers of deer hunters also reported (up by 8%). These increases are likely to be closely linked to a growth in introduced deer populations, with estimates suggesting a 10-fold increase in 20 years, with numbers nationally of between 1 and 2 million animals and posing a major environmental and agricultural threat (see https://feraldeerplan.org.au/ accessed on 26 May 2025). In contrast, hunter numbers for ducks and stubble quail were unchanged, and this appears to be unrelated to either environmental changes or to regulation (although a reduced daily bag limit was introduced in five of the eleven seasons due to dry conditions that limited the amount of habitat, limited breeding, and led to smaller numbers). The number of ducks harvested was, however, undoubtedly affected by the El Niño–Southern Oscillation, as was the annual stubble quail harvest, given the exceptionally large number of birds harvested after the La Niña season; see (Moloney et al. 2022). Survey data of this type are thus important when identifying appropriate game management responses, as well as to highlight differences that arise when considering the illegal hunting of different species.

2.2. Regulatory Framework

Regulation is the process by which government creates and enforces rules to manage risk, influence behavior, and protect the community. These are imposed (i.e., individuals

and groups have no discretion about whether to comply) and, in essence, are the powers that government can employ to make sure that individuals and organizations behave in ways that are consistent with the legislation, as well as to ensure fairness, safety, and compliance with societal and behavioral norms.

There are several laws that underpin the regulatory framework for the protection of wildlife in Victoria[2] and led to the establishment of the Game Management Authority (the GMA) to promote sustainability and responsibility in game hunting across the state. Their website (https://www.gma.vic.gov.au/, accessed on 26 May 2025) tells us that it aims to achieve this by "monitoring, conducting research, and analysing the environmental, social and economic impacts of game hunting and game management"—and by making recommendations to the government in relation to game hunting, game management, and pest control. Key functions include the issuing of licenses (some licence endorsements require the hunter to pass a test); the management of open and closed seasons for game species; enforcing game hunting laws and acting against those who do not hunt legally; and educating and informing hunters on how to hunt legally, sustainably, and responsibly. More specific functions include providing advice to government on declaring public land open or closed to game hunting, the setting of open and closed seasons and bag limits, and the management of public and private land as it relates to game and their habitats. A distinctive element of GMA's regulatory environment is that it also has responsibility for regulating protest action against recreational hunting, given that one of the public safety offences in the Wildlife Act relates to interfering with, hindering, harassing or obstructing hunting. Here, the regulatory goals are not concerned with hunting activity per se but rather with managing potentially hazardous interactions between hunters and protestors. However, it is important to note that the GMA does not have responsibility for the hunting of pest animals, which does not require a license.

When an offence is detected, game officers have broad investigative powers that can result in the issuing of verbal and official warnings, an infringement or banning notice, the cancellation of game and firearm licenses and criminal prosecution, and to cancel or suspend a license or permit, as well as apply to have a firearms license canceled (see GMA 2025). Failure to comply with a lawful request from a game officer or the commission of any offence may also result in arrest and attendance at a police station; a charge and summons to appear before a court; being placed under bail conditions; and/or seizure of vehicles, vessels, and any equipment. Serious matters may be prosecuted in court, although the issuing of infringement notices and/or applying for civil penalty orders or injunctions are the most common regulatory responses. In practice though, enforcement relies mainly on the use of infringement notices (formal notification issued for a breach, with the option of paying a fine instead of facing court proceedings). In the most recent (2022/23) year, there were 46 such notices issued, with a further 22 banning notices (used mainly to prevent protesters from interfering with or obstructing hunting activity). These included offences of illegal spotlighting (possession and use), firearms matters, hunting from a vehicle, hunting in prohibited areas, and using prohibited hound breeds. Matters dealt with in court are rare (there were only 10 in 2022/23) inn the context of the 58,000 licensed hunters in the state.

3. Theorizing the Criminology of Recreational Hunting

In seeking to apply a criminological lens to illegal recreational hunting in Victoria, it is important to recognize that hunting is a regulated recreational activity akin to other legal but regulated recreational activities such as fishing, flying, and boating. All involve activities in the public sphere that are subject to state licensing and restrictions on the sites, times, and equipment that can be used—and where penalties apply to breaches of licensing or other regulatory requirements. Breaches of these regulations constitute crimes, and the

penalties for significant breaches may be serious. However, the key points to make here are that recreational hunting is not an inherently criminal activity, that enforced regulatory breaches are rare, and that traditional criminological forms of analysis may risk over-emphasizing the forms of criminality involved and simply encouraging the application of coercive methods of control (see Cooke et al. 2013). It has been argued by (Viollaz et al. 2022) that these distinctive features speak to the need to identify criminological approaches that can support crime prevention. This includes discouraging the decision to offend through escalation by implementing a range of measures that increase the costs (and reduce the benefits) of criminal behavior in a specific cultural and geographic context. We currently know relatively little, however, about the motivations of game hunters (and others) who breach Victorian wildlife, game, and animal welfare laws or, indeed, the extent to which education, penalties, or deterrence measures are likely to successfully reduce hunting infringements and/or the rate of repeat offending. In fact, most of the available research is from North America and Europe (especially Scandinavia), where different considerations apply. For example, and as discussed above, recreational hunting in Australia involves distinctions between wholly protected, regulated, and unprotected target species that may differ to those found in Europe and North America, where regulation is primarily concerned with the protection of game species from excessive hunting pressure. Unlike North America, gun ownership in Australia is subject to stringent controls, and persons seeking a firearms license must state a 'genuine reason' for requiring a firearm. The types of behavior being regulated may also diverge from those often considered in the international literature, which often focuses on the exploitation of threatened species (the trade in rhinoceros' horn is a paradigmatic example) and may be exclusively motivated by profit and directly or indirectly tied up with transnational organized crime (including by the same organized crime groups involved with drug and human trading). None of these features apply to illegal recreational hunting in Victoria, where the target species are not under any significant ecological threat (except for some protected duck species), the profits are marginal, and there is no discernible involvement from organized crime. The literature on 'poaching' has greater relevance here perhaps, given that the target species are often not abundant, that at least some of the motivation is likely to be instrumental (i.e., hunting game for food), and because there is quasi-political context that is also considered. There are, for example, unique harms that need to be identified and mitigated or prevented that arise from protesting that aims to disrupt recreational hunting, even when the hunting is legal.

Research that has explored the motivations for recreational hunting, both legal and illegal, has nonetheless been the subject of a systematic search of current research databases by Harkness and Mulrooney (2022). This, along with the findings of other narrative searches (e.g., Green et al. 2006), suggests that, for many hunters, the main motivational goals will be to 'harvest an animal for meat', 'to spend time outdoors', or 'to spend time with friends and family' (some of the most relevant studies are summarized in Table 1). Smith et al. (2023), however, note that hunters will often be motivated to achieve multiple goals and that the significance of each will vary between individuals. For example, some of the grey literature has considered motivations for hunting as part of broader investigations into economic impacts of hunting as well as in relation to physical health and wellbeing benefits (e.g., RMCG 2019; 2020).

What emerges from this literature then is the understanding that motivations for recreational hunting will often be a function of the type of hunting used, the place and time where it occurs, and/or the gender of the hunter. For example, we can expect illegal hunting for commercial gain (poaching) to be driven by quite different motivations than illegal hunting that is purely recreational. It follows that methods of prevention that are

welcomed by some cohorts of hunters may not be viewed as favorably by others (e.g., firearm licensing, bag limits, and hunting seasons; see RSPCA 2025); there have been suggestions, for example, that women hunt more to obtain meat, and men hunt for sport (e.g., Gigliotti and Metcalf 2016).

Table 1. Illustrative literature of hunting motivation (presented in chronological order).

Authors	Key Observations
Decker and Connelly (1989)	Specific reasons for recreational deer hunting were related to three primary motivational orientations: achievement (attainment of a particular goal, which may be harvesting an animal for meat, a trophy, or a display of skill), affiliative (participating in hunting with the primary purpose of fostering personal relationships with friends, family, or hunting companions), and appreciative (a desire to be outdoors, escape everyday stress, or to relax).
Stedman and Heberlein (1997)	Identify that animal interaction motives are the most crucial in understanding hunter behavior. They argue that the purely hunter-based motivations can be achieved by taking part in many other activities, whereas motivations involving encounters with animals, such as taking shots at deer, are unique to hunting. Their study explains the importance of excitement as a physiological response in hunters, manifested as an elevated heart rate upon seeing a deer (often followed by taking a shot at a deer). This physiological response is suggestive of an emotional component to hunting.
Gigliotti (2000)	Split achievement motivation into meat and trophy motivations, appreciative into nature and solitude motivations, retained affiliation as social motivation, and added exercise and the physiological effects of excitement (e.g., increased heart rate).
Woods and Kerr (2010)	Nature (e.g., valuing being in the outdoors and the beauty of nature), social (e.g., valuing time spent with friends and family), excitement, and meat acquisition ranked as the highest motivations.
Finch et al. (2014)	Of a sample of over 7000 Australian recreational hunters, most selected pest control followed by recreation and hunting for meat as their primary motivation. Finch et al. noted that the motivation by many Australian hunters to assist landholders and control pests is not recorded in other studies.
Black et al. (2018)	In this study of motivations and satisfaction of North Dakota deer hunters, the authors identified eight factors that hunters valued highly, noting that while much of the popular hunting literature places much emphasis on trophies, collecting a trophy is not a primary motivation for most hunters. The eight factors they identified were the following: Meat (valuing bringing home meat for food); Trophy (valuing demonstrating hunting skills or accomplishment (e.g., harvesting a big buck)); Nature (valuing being in the outdoors and the beauty of nature); Excitement (valuing the exhilaration that comes with hunting (e.g., the feeling one gets when one sees a deer)); Social (valuing time spent with family and friends); Skills (valuing the ability to use certain equipment to stalk and harvest a deer); Challenge (valuing the challenge of hunting, tracking, and harvesting a deer); and Solitude (valuing the time spent alone when hunting).

The importance of some of human dimensions of environmental management has been increasingly recognized in recent years. Attention has moved, for example, to working to provide hunters with experiences that are more satisfying as they strive to achieve their motivational goals. While 'hunter satisfaction' was originally viewed mainly in terms of the success of the hunt (based on the belief that people participated in hunting to gather food), wildlife agencies are now viewing 'success' in relation to the quality of the recreational experience. Hunters have also come to be regarded as important stakeholders in wildlife management efforts and so understanding their motivation and how this influences behavior has come to be integral to the development of many wildlife management programs. Factors known to influence hunter satisfaction include harvest

success and related variables (wildlife density, numbers of animals sighted, the quality of wildlife, the number of people hunting and perceptions of crowding, regulatory restrictions, enjoyment of nature, and time with friends and family when hunting; Prem Bhandari et al. 2006; Woods and Kerr 2010). Thus, a range of factors are thought to be important, including those that are biological (e.g., population numbers and harvest success) and human (e.g., perceptions of how crowded hunting spaces are), and there are likely to be complex interrelationships between these variables (see Heberlein and Kuentzel 2002). For example, regulation may affect hunter and/or game density, which in turn influences some of the more social components of hunting satisfaction, as well as opportunities for hunting success. It has also been noted that an individual's motivations to hunt can change over time—hunters are thought to often be more interested in the harvest in the early stages of their hunting careers but become more socially motivated as they age (Wentz and Seng 2000).

4. Understanding the Drivers of Illegal Hunting

Two main frameworks have been developed to understand hunting that is *illegal*. The first, drawing upon ecological theory, aims to understand how personal motivations to offend interact with both situational and environmental factors, as well as with the broader social context. The second applies the Theory of Planned Behavior (Ajzen 1985) to conceptualize how personal beliefs and wider social norms influence the intention to behave in certain ways. The two approaches are, of course, not incompatible with the work of Zyambo et al. (2022), illustrating how they might be integrated, albeit when applying them to a different context (in their study, local hunters in Africa were viewed to be influenced by direct drivers of illicit hunting, such as economic gain, but who also hunted within the context of a wider social system). Carter et al.'s (2017) social–ecological system framework for understanding the poaching of large carnivores also identifies key linkages between people, animals, and the settings in which they live, and it is particularly helpful. Variables implicated at the innermost levels of Carter et al.'s model are closest to the act of illegal killing and reflect the characteristics (e.g., lack of patrols) immediately affecting the *opportunity* for poaching at a given place and time. Factors interpreted at the intermediate levels are those that relate to the direct *motivation* to poach or that increase the vulnerability of a species to poaching. Finally, more distal factors are included that reflect the *social and ecological context* in which interactions take place between wildlife and communities.

Newth et al. (2022) have applied a widely used social psychological model, the Theory of Planned Behavior (Ajzen 1985), to illegal bird hunting (the Bewick swan, *Cygnus columbianus bewickii*, a protected species), although this theory can also predict the intention to hunt illegally in a range of contexts (Fairbrass et al. 2016; Marchini and Macdonald 2012; Rossi and Armstrong 1999). It proposes, in brief, that beliefs (attitude, subjective norms, and perceived control) are important drivers of both intentions and behavior, with 'behavioral intentions' being the most proximal determinant of all behavior that is social. Thus, it is the norms, beliefs, and values that are held toward illegal hunting that largely determine intentional illegal hunting. Behavioral intentions are proposed to be determined by the attitude toward the behavior, the perception of social expectations, and the perceived capability to perform the behavior. For example, Newth and colleagues reported that hunters are more likely to intend to hunt illicitly when they hold a negative attitude toward the regulations and laws designed to protect wildlife. Those with more positive or neutral attitudes toward regulation were more likely to intend to hunt legally and viewed their behavior as socially acceptable. Those who agreed that 'there are no practical barriers preventing them from hunting' were also more likely to intend to hunt illegally. There was also a significant relationship between intention to hunt illegally and past hunting behavior.

4.1. Motivations to Hunt Illegally

Beyond these theoretical models, categorizing different types of illegal hunting into crime typologies is one way to understand motivations, including what Von Essen and Nurse (2017) refer to as 'livelihood crimes' (these are driven by economic factors), 'folk crimes' (that are relatively frequent but considered insignificant or not causing harm and are not seen as immoral), and 'sociopolitical crimes' (that relate to a wider disillusionment with the sociopolitical context, such as a perceived unfairness about restrictions on freedom that then result in illegal behavior as a form of defiance).

Another typology that has attracted some interest is that proposed by Blevins and Edwards (2009). This identifies four 'types' of illegal hunter: (a) the 'back door' wildlife criminal (who hunts illegally on their own property but is unlicensed and hunts out of season or uses methods that are not permitted); (b) the 'opportunist' wildlife criminal, who regularly offends and takes more than the legal limit if the opportunity is available; (c) the 'habitual or chronic' wildlife offender who may participate in a wide range of wildlife crimes or specialize (e.g., hunting for endangered species) and who may become very skillful as they get better through experience; and (d) 'trophy poachers', whose sole motivation is to obtain animals that can be used as trophies. Since trophy animals are often difficult to take legally during hunting seasons, they may be more likely to be hunted using illegal methods (e.g., spotlighting, trespassing, and with weapons that are not legal). To this end, Eliason (2008) also identifies the offender who 'mixes up his [sic] schedule' and 'the quiet poacher'. Brymer (1991) further identifies 'local rural' hunters, 'tourist' hunters, 'trophy' hunters, and 'market poachers' as possible categories based on geography as well as motivations and modus operandi.

The findings of empirical studies that have examined hunter motivations clearly suggest that individuals perpetrate wildlife crimes for multiple reasons. Von Essen et al. (2014), for example, have drawn on Muth and Bowe's (1998) list of drivers for *illegal hunting* that includes recreational satisfaction, thrill killing, trophy poaching, gamesmanship, protection of self and property, commercial gain, household consumption, poaching as rebellion, poaching as a traditional right, and disagreement with game and wildlife regulations. Others have made a link between illegal hunting, animal cruelty, and personality traits (Kavanagh et al. 2013). For Essen and colleagues though, it is economically motivated poaching (for either financial gain or personal consumption) that has been the focus of enquiry in much of the illicit hunting motivations research. Although such motives seem to be of only marginal relevance in Australia, the range of other motivations also identified may nonetheless be relevant.

4.2. A Crime Prevention Perspective on the Regulation of Illegal Recreational Hunting in Victoria

Given that different motivations will underpin illegal hunting, the criminological research tells us that simple regulatory responses (such as increasing punishments) will be unlikely to result in substantially higher rates of compliance. The socioecological system framework of Carter et al. (2017), for example, clearly highlights the need to understand the interactions that occur between species vulnerability and human motivation to hunt illegally if the most effective crime prevention methods are to be implemented. The factors at the inner level of this framework align well with the situational elements of the national crime prevention framework. They can, for example, be used to identify how to reduce opportunities (e.g., where and when patrols by game officers will be optimally successful). The second level factors point to a need for a broader suite of conservation interventions that include educational programs to inform hunters about local regulations, with the outer levels identifying the need to consider social norms and the political landscape, as well as issues relating to the broader wildlife population and community ecology. The work of

Newth et al. (2022) also suggests that prevention strategies should be based on a careful analysis of what each individual views as the motives for their offending, the costs and benefits of breaching regulations, and the broader sociopolitical and cultural context in which the illicit hunting occurs. This is based on applying the Theory of Planned Behavior (see above), which suggests that it is the beliefs, norms, and values toward illegal hunting that will largely determine whether the hunter is compliant. There is also a need to consider the type of offence committed rather than to simply assume that the same processes and motivations will underpin all illegal behavior. This will require reviewing administrative data to establish the frequency of violations (e.g., opportunistic or one-time, occasional, chronic, etc.), as well as the degree of premeditation and organization involved.

4.3. Situational Crime Prevention

The Victorian regulatory approach of the GMA can be assessed against the Australian National Crime Prevention Framework[3], which outlines a range of general strategies to reduce the probability of crime and to reduce the harm to individuals and to the community. These include, for example, measures to change the physical environment such that opportunities for crime to occur are limited (i.e., environmental prevention by targeting high-risk settings or reducing opportunities for crime), as well as those that seek to influence the underlying social and economic causes of crime and thereby limit the number of people who might be motivated to offend (i.e., social and structural approaches). In addition, a range of intervention programs can be made available that reduce the risk of known 'offenders' committing further offences (i.e., rehabilitation). Nonetheless, there has been a tendency in wildlife regulation worldwide to focus on the use of punishment and deterrence, such as by increasing fines and sentences handed down for proven crimes (Nurse 2012).

Situational crime prevention approaches (Clarke 1997) are likely to be particularly important to the work of the GMA in Victoria, as they focus attention on the places where illegal hunting occurs and aim to forestall the occurrence of the crime by reducing opportunities to offend. A key goal here is to make criminal action less attractive to hunters by increasing the effort needed to commit a crime and to increase the risk of apprehension (Table 2).

Table 2. Situational crime prevention approaches and examples relating to the regulation of illicit hunting.

Key Approach	Description
Target hardening	Reducing access or excluding potential offender from certain locations.
Controlling facilitators	Licensing and firearms control.
Exit/entry screening	Detecting those who do not meet requirements.
Formal and informal surveillance	Increasing the visibility of illegal behavior.
Reducing temptation	Using warnings.

Delpech et al. (2021) have published a systematic review of the research examining how a situational crime prevention approach might be applied to prevent wildlife crime, drawing on the work of Lemieux (2014). They identify five different areas of activity to prevent crime, with examples of activities in each. The first of these involves *increasing the effort* to hunt illegally by hardening targets (e.g., GPS collars on vulnerable animals), controlling access to facilities (e.g., fences), screening exits (e.g., sniffer dogs at airports), deflecting offenders (e.g., checkpoints along protected areas), and controlling tools/weapons (e.g., limit sales of traps/nets). The second involves *increasing the risks*

by extending guardianship (e.g., gunshot detectors), assisting natural surveillance (e.g., rewarding informants), reducing anonymity (e.g., number plate recognition), utilizing place managers (e.g., encourage reporting), and strengthening formal surveillance (e.g., ranger patrols). The third element of the approach is to *reduce the rewards*. This can be achieved by concealing targets (e.g., translocate animals away from public areas), removing targets (e.g., dehorning), identifying property (e.g., microchips for legal hunted animal), disrupting markets (e.g., ban trade), and denying benefits (e.g., add dye to horns). The fourth component is *reducing provocations*, which can be achieved by reducing frustrations and stress about regulation (e.g., community outreach), avoiding disputes (e.g., physical barriers), reducing emotional arousal (e.g., provide alternative sources of income/protein), neutralizing peer pressure (e.g., conservation education), and discouraging imitation (e.g., forbid profit sharing with poachers). And finally, *removing excuses* by setting rules (e.g., agreements about wildlife use), posting instructions (e.g., signage), alerting conscience (e.g., allow regulated hunting), and controlling the use of drugs and alcohol (e.g., substance use programs). Nonetheless, Delpech et al. (2021) note that there is still very little research on what works to prevent wildlife crime and that more empirical evidence is needed about the impact of different approaches. They also identify challenges in securing funding for some preventative programs, such as those involving community outreach and increasing the number of patrols.

From a broader criminological perspective, any comprehensive crime prevention strategy should also draw upon the principle of *progressive universalism* (see Tamatea et al. 2023). This is when prevention activities and programs are made available to everyone (universal prevention), with more intensive services made available to those who are thought to be at risk of behaving illegally (secondary prevention) and specialist programs for those who have been detected (tertiary prevention). A key tenet of progressive universalism is that intervention is required *at every level of prevention*. From this perspective, a prevention strategy should involve a suite of actions that affect all stakeholders to reduce those risk factors that result in illegal hunting; interventions that are aimed at those 'at risk' to prevent illegal hunting from developing or perhaps escalating; and interventions for those who have been found to have already committed offences.

Universal (*or primary*) *prevention* initiatives target whole populations or places. They aim to prevent a problem from developing. They are also concerned with screening the whole population in ways that can inform secondary prevention efforts. At this level of prevention, the focus of activity to improve recreational hunting compliance should be on community and hunter awareness and education. Challenges arise in implementing universal prevention initiatives successfully, unless a broad strategy is adopted that relates to communication/marketing (e.g., using media to promote prevention), guidelines (e.g., documents that describe appropriate practice), fiscal (e.g., reducing the financial cost of legal hunting and/or increasing those of illegal hunting), regulation (establishing rules or principles to govern behavior), legislation (the passing of laws), environmental/social planning (to control the physical or social environment), and service provision (direct service delivery). Crime prevention at the universal level directs attention to the importance of community attitudes and the political landscape in which hunting takes place (see Lord and Winter's (2023) discussion of the different ethical positions held by key stakeholders about the hunting of ducks in Victoria). It is, for example, widely accepted that authorities find regulation easier and more effective when there is a widespread acceptance of their legitimacy or what is sometimes called their 'entitlement to rule'. A key determinant of compliance with the law is the belief that authorities are appropriate, proper, and just—when they are viewed as legitimate, people are personally obligated to defer to those authorities, institutions, and social arrangements.

According to Tyler (2023), this can be assessed using three indicators: the perceived obligation to defer to decisions and obey rules and laws; expressions of trust and confidence in legal authorities and normative alignment; or the degree to which people believe that the authorities share the values of the people in the community. Blader and Tyler (2003) further propose that views about the justice of regulation will also reflect four aspects of procedures: *Voice*, or the degree to which people are allowed to present their evidence, state their case, and explain their views; *Neutrality*, which refers to the existence of transparent procedures that make clear that decisions are made in fact-based, unbiased ways that lead to the consistent application of rules; *Treatment with dignity and respect* as a person and a member of the community; and whether people believe that the *authorities are sincerely acting* out of a benevolent desire to do what is best for the people or community involved. This work is highlighted here, given the illegal hunting research of Von Essen et al. (2014), which highlights the possibility that many people will intentionally not adhere to hunting regulations as some form of protest against the perceived illegitimacy of regulation. Repeat illegal hunters have also been reported to view punishment as a confirmation of how much society misunderstands their cultural identity (Nurse 2011).

Secondary prevention targets at-risk individuals, groups, or places. Its purpose is to prevent or to at least slow down the transition from 'risk' to 'manifest problem'. The analysis of infringement data is helpful here, as it identifies those geographic areas where offending is likely to occur, as well as the nature of the infringement and risk of repeated offending. *Tertiary prevention* focuses effort on those individuals or places that have been identified as having already developed a given problem and aims to ameliorate associated harms and prevent repetition. Here, it is helpful to consider how crime prevention activities align with the overarching philosophy of the Australian criminal justice system that can be both retrospective (e.g., punishment) and prospective (e.g., see Warner et al. 2017). The system is predicated on the idea that offenders should be subject to penalties that are proportionate to the crime and that punishment will prevent them from committing future crimes if they believe they will be apprehended and punished. Although custodial sentences are rarely handed down to wildlife offenders, some form of incapacitation can occur in the form of withdrawing hunting privileges or removing weapons or vehicles. For individual hunters who are known to regularly breach regulations, engaging them in any behavior change activities is only possible when the perceived benefits of offending outweigh the perceived costs and/or they are persuaded that their illegal behavior is problematic.

4.4. Community Building and Engagement

In terms of opportunities that may exist to improve the outcomes of regulatory efforts in Victoria, it is useful to reflect on the importance of activities that build trust, foster support for conservation, address the reasons surrounding any antipathy toward regulation, and strengthen perceived confidence in the activities of the regulatory body. This, in turn, can be expected to increase perceived behavioral control as well as leverage social pressure to not behave illegally. One specific idea here, that has been described as under-utilized in the context of wildlife crime (UNODC 2020), is that of 'informal guardianship' to support the more formalized crime prevention efforts of the GMA (Table 3). For Viollaz et al. (2022), a range of informal methods can be combined with more formal measures to protect game, incentivize conservation efforts, and overcome some of the limitations of more formal approaches to detection and enforcement. They see this as a proactive approach that is especially important for illegal practices that have proved difficult to control through formal methods alone.

Table 3. Types of capable guardians (adapted from Viollaz et al. 2022).

Type *	Definition	Benefits
Formal	Representatives of the state (e.g., police or rangers) with official enforcement powers	Power to enforce legal sanctions. Professionally trained in crime detection/prevention.
Informal	Non-professionalized (e.g., community-based) protectors of targets such as wildlife	Can amplify and complement the reach of formal guardians. Valuable where law enforcement density is lower or where game ranger motivation and/or capacity is limited. Can supervise and protect potential targets during the course of their routine activities.

* A person cannot act both informally and formally at the same time.

A capable guardian is any person or thing that behaves in a way that discourages or deters criminal behavior, with a focus on people (i.e., what is called 'human guardianship') rather than relying on the protection provided by technology, such as electronic surveillance (see Hollis-Peel et al. 2013). It is argued, for example, that the mere presence of a capable guardian will discourage crime (Felson and Eckert 2016). In practice then, the prevention of illegal recreational hunting can be strengthened by increasing the incentives for informal guardianship (e.g., providing opportunities for members of the community to learn about environmental protection, involving them in responding to crimes, and promoting community norms aligned with compliance), as well through the more usual situational prevention methods (involving increasing the risk, removing excuses, and reducing the rewards of offending).

5. Discussion

Any approach to limit illegal recreational hunting will need to be developed following careful consideration of the local context in which it occurs. This includes the statutory powers that are in place, as well as specific types of behavior that attract the most concern. Current approaches adopted by regulatory authorities often rely on compliance and law enforcement principles. These provide a range of options intended to respond to illegal behavior in ways that are both targeted and proportionate (i.e., to the seriousness of the problem, the level of harm, risk of harm, likelihood of non-compliance, and the culpability of the offender). Criminological approaches such as those that draw on the principles of situational crime prevention highlight the need to draw upon a wide range of strategies that are both reactive and proactive, as well as embedded in local communities. This is important, given the breadth of the problem and the considerable logistical challenges that are involved in policing large geographical areas. While regulatory authorities, such as the Game Management Authority in Victoria, Australia, do attempt to implement strategies that are more proactive (e.g., through the of use digital, telephone, and face-to-face media to let regulated persons know about their responsibilities and rights to support voluntary compliance), resources are limited, and they rely somewhat on what might conceivably be described as a 'fortress' model, in which the focus is on creating protected areas and prohibiting their use or evicting those who transgress rather than prioritizing measures that address the underlying motivations to hunt illegally. At the same time, however, other approaches such as mandatory testing for certain game licenses remain an important part of the strategy (this relates to identification skills of duck hunters as a prerequisite to obtaining a licence, and similarly, a knowledge test for hound hunters of sambar deer who are tested on their knowledge of the laws, good hunting practise, safety and ethics). In 2025, for example, a mandatory knowledge test was introduced for game bird hunters.

This review highlights some of the additional possibilities that exist for implementing effective crime prevention strategies, even though it has been argued that most of the suggested activities are already covered in contemporary models for environmental regulation (e.g., Huisman and van Erp 2013). Nonetheless, it seems clear that any comprehensive strategy to improve levels of compliance with current regulations should draw upon the situational crime prevention approach, as well as adhere to the principle of progressive universalism and, in particular, to attend closely to building strong collaborative relationships with local communities (the idea of informal capable guardians).

At the same time, there is clearly a need to support more research into the drivers of illegal hunting and those measures that can be empirically shown to be the most effective. An obvious limitation of the current evidence base is that much of the available research has been conducted in hunting contexts that differ greatly from those in Australia, and so questions arise about both the relevance and the transportability of any findings or conclusions. This means that local research with stakeholder groups is needed before the most effective prevention strategies can be implemented in a context in which only a small proportion of wildlife crimes will ever be detected (see Blevins and Edwards 2009). It is not currently possible to identify a 'typical' perpetrator or pattern of offending for illegal hunting, and as such, simple solutions to the problems of breaching hunting regulations are likely to be hard to find. There is even disagreement over whether those who hunt in ways that are in breach of local regulations should be considered as generally law-abiding citizens or whether their behavior is linked to a range of different criminal behaviors. Illegal hunters are sometimes fully cognizant of regulations but also only appear to adhere to them when law enforcement is present (Jacoby 2001). At the same time, a lack of knowledge may also be employed as a conscious defense strategy adopted by some offenders who are going through the indictment process (see Filteau 2012; Nurse 2011). What is clear then, however, is that the same offenders can adopt different behaviors over time, in different contexts, and that a wide range of both wildlife targets and types of offence constitute the problem that regulators are trying to solve (see Von Essen et al. 2014). Once again, this means that simple isolated prevention activities are unlikely to be impactful, and a regulatory response that adopts a broad range of approaches is needed. Situational crime prevention models do appear to have value in this respect.

A particular issue in the context of Victoria is addressing the complexity that arises when a regulatory agency has responsibility for both the primary activity and protest actions against the same activity (see Hessler 1997; Holmes 2007; Von Essen et al. 2015). In this circumstance, the comparable regulatory domains lie in areas like street protests and industrial actions, while the regulatory issues and challenges that arise in relation to recreational hunting are typically more comparable with those involved in the regulation of driving, workplace safety, and recreational watercraft. For example, coercive powers that rely on the monitoring and investigation of behavior can be employed to check compliance where a civil penalty or offence applies. An authorized person who exercises these powers can gather information and evidence in the case of any breach.

What we would suggest then, based on our reading of this literature, is that prevention strategies should be framed around a broad crime prevention approach but be derived from local evidence about the nature and circumstances of illegal hunting activity, the motivations of those who hunt illegally, and an approach to educating both the hunting community and the wider public about the need for—and the role of—regulation. Indeed, the importance of understanding the nature of the relationships that exist between both legal and illegalhunters and the wider community cannot be understated. It speaks to the core question of the legal legitimacy of hunting that we consider to be a crucial determinant of the effectiveness of crime prevention strategies. An important first step toward this, however,

will be to conduct an analysis of available administrative data about infringements. This can be used to identify risk and protective factors according to person, time, and place, as well as to inform targeted strategies to reduce the opportunities for illegal hunting to occur. In other words, this process might start by systematically collecting information about the size, scope, characteristics, and consequences of the problem of illicit recreational hunting. These are what Carter et al. (2017) call 'vulnerability factors' and can help to identify higher-risk cohorts (by age, gender, location, culture, etc.) to assist with efforts to target prevention activities in the most effective ways and places. A next step would be to build on work already underway in Victoria to document the wider social context for different types of hunting (e.g., community attitudes and norms and firearm licensing and availability) and how these impact the intention to hunt illegally. Examining the beliefs, values, and perceived risks and benefits of those known to hunt illegally and/or those who have insight into those who do is also likely to be important in this respect. This can be achieved by asking hunters about the causes and correlates of illicit behavior, when risk increases or decreases, and how key risk factors can be modified. These data can then be used to guide the selection of a suite of activities and interventions that can be implemented and evaluated.

Conflicts of Interest: The authors declare no conflicts of interest. The views expressed in this article are those of the authors and do not necessarily reflect those of any organization or agency.

Appendix A

Table A1. Legal game hunting in Victoria, Australia (adapted from https://www.gma.vic.gov.au/Laws,-Policies-and-Strategies (accessed on 26 May 2025) and Moloney and Hampton 2020).

Species	Regulation (see Moloney and Hampton 2020)
Deer: sambar (*Cervus unicolor*); fallow (*Dama dama*); red (*Cervus elaphus*); hog (*Axis porcinus*); chital (*Axis axis*); and rusa (*Rusa timorensis*). However, there are no wild populations of chital and rusa deer now present in Victoria. The most harvested deer species in Victoria is sambar, accounting for at least 70% of the deer harvest each year.	There are no bag limits, and deer can be hunted year-round under license. Hog deer can only be hunted during April, and only one male and one female may be taken by each hunter during the regulated season. Limited balloting allows selected hunters to take small numbers outside the April season. Restrictions on red deer hunting were removed in 2012, extending what was a 2-month season to year-round, but red deer typically account for less than 2% of the total deer harvest.
Native wildfowl: This relates to eight declared game species of duck: Pacific black duck (*Anas superciliosa*); Australian wood duck (*Chenonetta jubata*); Australian shelduck (*Tadorna tadornoides*); grey teal (*Anas gracilis*); chestnut teal (*Anas castanea*); pink-eared duck (*Malacorhynchus membranaceus*); hardhead (*Aythya australis*); and blue-winged shoveler (*Anas rhynchotis*).	Hunting occurs in a prescribed season, autumn, with season length (usually 12 weeks) and daily bag limits (normally 10 birds per day) depending on environmental conditions. Since 2016, hunting the blue-winged shoveler has been prohibited due to low abundance. Those who are legally permitted to hunt ducks are automatically endorsed to hunt stubble quail.
Stubble quail (*Coturnix pectoralis*).	This occurs in autumn (April–June), with a daily bag limit of 20 birds applying.

Notes

[1]   Other introduced mammalian species, feral goats (*Capra hircus*), feral pigs (*Sus scrofa*), European rabbits (*Oryctolagus cuniculus*), hares (*Lepus europaeus*), and red foxes (*Vulpes vulpes*), are also hunted but considered to be 'pests'; there are few regulatory controls over when, how, and how many of these species may be hunted.In addition, some introduced species such as feral horses and domestic cats are regarded as pests but can only be hunted as part of an accredited control program.

[2]   The Game Management Authority Act 2014 (No. 24 of 2014, incorporating changes as of 1 June 2020) introduced amendments to the Wildlife Act 1975 to enable the regulatory body to perform or exercise regulatory functions or powers (and to amend the Conservation, Forests, and Lands Act 1987, the Wildlife Act 1975, and other relevant Acts).

[3]   The NCPF was developed by the Australian Institute of Criminology to outline effective crime prevention approaches. It also describes a range of possible roles and functions for state/territory and national governments for the effective delivery of crime prevention activity in Australia. See https://www.aic.gov.au/sites/default/files/2020-05/national-crime-prevention-framework.pdf (accessed on 8 April 2025).

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