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Deer Farming and Landscape Scale Management to Combat Habitat Degredation and Produce Sustainable Venison in the UK

Written by:

Geoffrey Guy FRGS NSch

April 2025

A NUFFIELD FARMING SCHOLARSHIPS REPORT

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"Leading positive change in agriculture. Inspiring passion and potential in people."

Title	Deer Farming and Landscape Scale Management to Combat Habitat Degradation and Produce Sustainable Venison in the UK
Scholar	Geoffrey Guy FRGS
Sponsor	John Oldacre Foundation
Objectives of Study Tour	• Investigate landscape scale management practices, specifically with regard to deer management. • Investigate routes into the human food chain for wild venison and the sustainable harvesting of wild venison.
Countries Visited	• Denmark • Finland • Sweden • UK • USA Additional video conferencing and correspondence also carried out with professionals from New Zealand, Japan, the UK and USA.
Messages	• A landscape scale approach is required to more effectively manage deer in the UK. • Better data on deer populations and movements is required to inform the approach to deer management and assist in management and cull planning to ensure deer are culled in a quantity, manner and location which addresses their impacts. • Wild venison could be taken better advantage of in the UK food chain. • Introducing new and younger deer stalkers/managers necessary as succession planning for management.

EXECUTIVE SUMMARY

Wild deer populations in the UK are at an all-time high, and the population is still growing. This growth is challenging to rural businesses, particularly forestry and arable agriculture, as well as being damaging to habitats, with knock on effects to other species. There are also increasing issues caused by deer on roads in urban areas.

While these challenges need to be faced, deer also present some unique opportunities. As game, they are a sought-after sporting quarry and venison is a premium product, so, is the overpopulation of wild deer a potentially underutilised source of sustainable venison?

Striking a balance between the management of deer populations, reduction of their negative impacts and maintaining a sustainable supply of deer as a sporting resource as well as a food source is the subject of this study and report. This was topical when the study was proposed in 2020 and the recent DEFRA consultation on deer management clearly recognises the issues caused by deer and seeks to review legislation and practice in an effort to manage the deer issue.

One particular challenge of getting any meaningful level of control on overpopulated deer is that deer are no respecter of man-made boundaries, unless those boundaries are enforced physically by fences etc. While deer may roam more or less freely, management activities are often restricted by those boundaries so, however effective the deer management is, in a given location a lack of deer management in neighbouring areas can undo good work done elsewhere.

A landscape scale management approach may be the answer and this study has researched deer management approaches around the world which could advise the kind of co-operative, landscape scale management that might be more impactful in the UK. Landscape scale management is a holistic approach to management which aims to reconcile the sometimes competing interests of economic and conservation activities over large areas.

One of the key findings of this study was the significance of local culture in advising and informing approaches to wildlife management. Being able to compare developing deer management policy in the UK with approaches from other countries, which seem to be shaped not only by culture but, particularly in the United States, by hard academic data related to deer populations, movements and habitat use has led to the following conclusions which will be presented in full in this report.

- The UK needs more concrete data on deer population, movements and land/habitat use to inform the creation of an effective deer management policy and cull plan.

- More OF THE RIGHT deer need to be culled in the UK to reduce negative impacts of overpopulation on habitats, road traffic collisions and rural economic activities. This could be achieved through a combination of measures including encouraging new entrants into recreational deer stalking.
- The UK could take advantage of the current legislative framework which makes the supply of wild venison into the human food chain relatively simple to create an outlet for venison produced by a higher level of culling.

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DISCLAIMER

The opinions expressed in this report are those of the author alone and not necessarily those of the Nuffield Farming Scholarships Trust, of the author's sponsor, or of any other sponsoring body.

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CHAPTER 1: INTRODUCTION

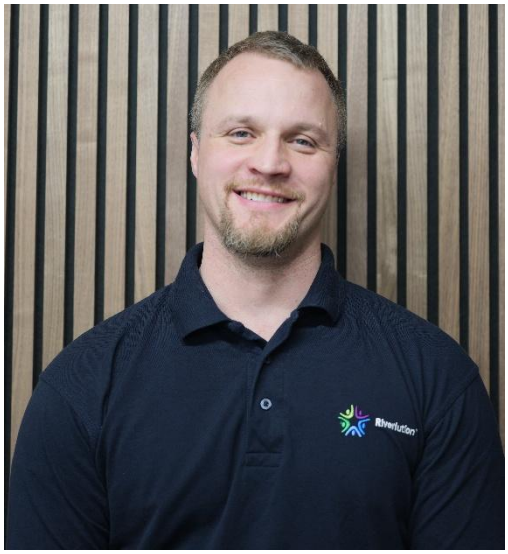


Figure 1: The author, Geoffrey Guy.

I have been fascinated by deer since watching the fallow deer at Gelli-Aur country park in South Wales as a child, later studying game and wildlife management at Sparsholt College in the early 2000s. Since then I have worked on deer farms in New Zealand, with invasive deer species in East Anglia and between 2011 and 2021 at further education colleges where I taught deer management.

This experience led me to determine, through a piece of research published in the Quarterly Journal of Forestry in 2015, that a lot of deer management was ineffective or at least less effective than it could be as it is often carried out on a smaller scale than is necessary to achieve conclusive results. The management of deer on small landholdings is ineffective in achieving broader deer management aims, particularly in relation to reducing their negative impacts.

It was with that experience in mind that I undertook my Nuffield Farming Scholarship to study deer management on a landscape scale and to learn from approaches to deer management from around the world.

What I found during these studies is described in the following report and has affected my opinions of 'landscape scale' management so profoundly that, while still involved in deer management, I have been inspired to take my career in a direction that allows me to work more effectively at a landscape scale. This includes attempting to address all sorts of management issues within landscapes scaled around river catchments and encompassing a broad spectrum of wildlife and environmental management issues and social factors.

CHAPTER 2: BACKGROUND TO MY STUDY SUBJECT

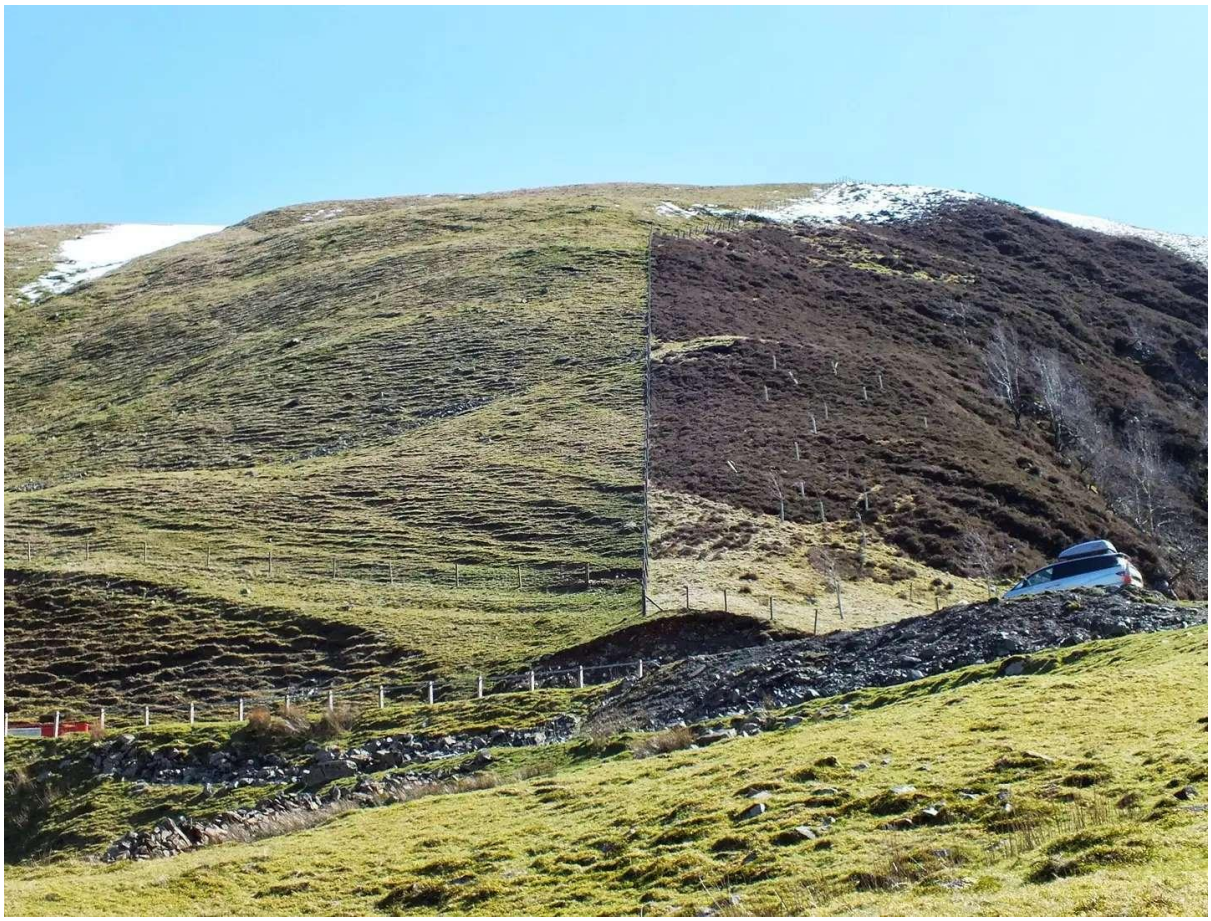


Figure 2: A view of grazing damage in the Southern Uplands of Scotland, contrasting against an area free of over grazing. A picture that made clear to me the impacts of deer, and other grazing herbivores, and at least in part inspired my Nuffield Farming Scholarship studies (photo courtesy of Richard Guy).

The United Kingdom is experiencing unprecedented challenges associated with its wild deer populations, which are now higher than at any time in over 1,000 years. Since the 1940s, deer numbers have risen by approximately 400%, from an estimated 450,000 to over two million today. This dramatic increase has led to significant impacts on both rural businesses and the natural environment. Deer cause an estimated £4.3 million in annual damage to cereal crops and can devalue timber by 30–50% through browsing and other impacts. In addition to economic losses, deer-vehicle collisions present serious risks, with between 40,000 and

74,000 incidents annually resulting in over 700 injuries, 10–20 human fatalities, and £17 million in vehicle damage.

Ecologically, the overpopulation of deer is degrading habitats across the UK, with around 420 square miles of Sites of Special Scientific Interest (SSSIs) in unfavourable condition due to deer impacts and a further 4% classified as "recovering" following the implementation of deer management plans. Combined with these ecological and economic pressures are the difficulties of managing a species that does not respect man-made boundaries, making localised management efforts less effective. While deer provide opportunities as a sporting resource and as a source of sustainable venison, striking a balance between these benefits and mitigating their negative impacts requires a more collaborative, landscape scale approach to management. This report explores how such an approach might address the challenges posed by growing deer populations, drawing on lessons from the UK and international case studies to develop strategies that balance ecological integrity with economic sustainability.

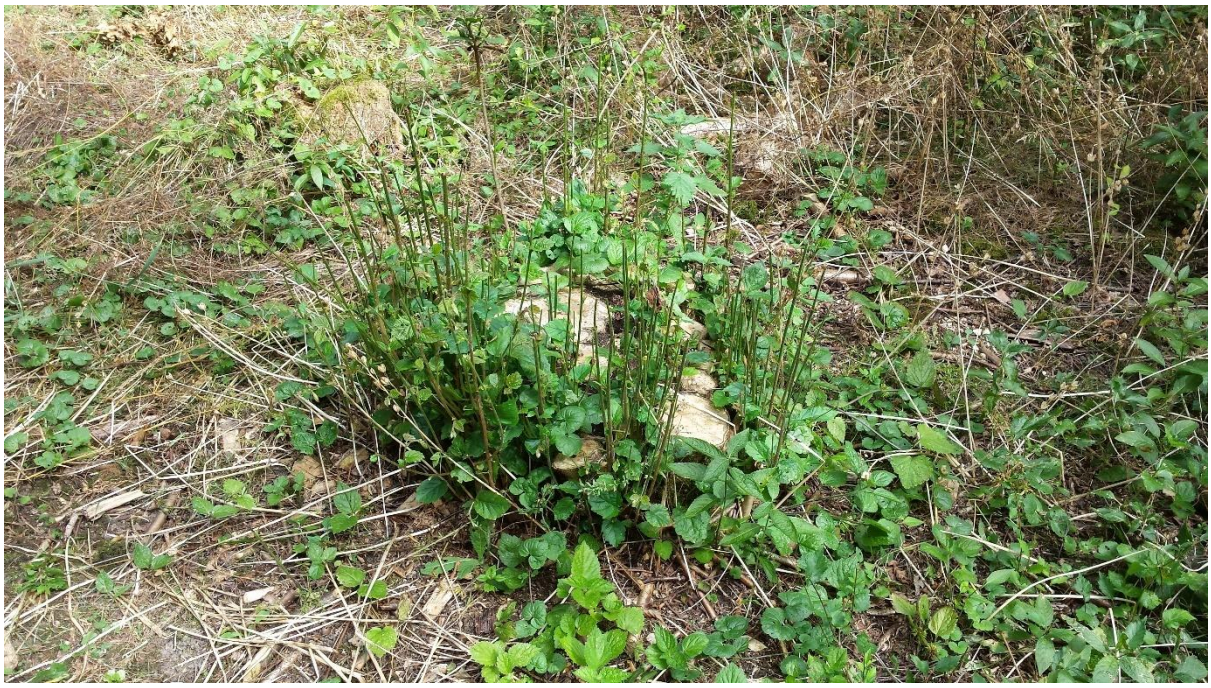


Figure 3: Complete destruction of a hazel coppice stool due to browsing by muntjac and roe deer in Cambridgeshire, this damage is representative of 100% of unprotected coppice stools in a semi natural ancient woodland designated a country wildlife site and which can't be productive as a working woodland or continue to support numerous significant plant, invertebrate and bird species which are reliant on healthy woodland structure, without effective management of deer. (Photo Courtesy of Richard Guy)

As the only regular predator of deer in the UK, humans haven't done a good job of keeping deer numbers in check and have created an abundance of food sources for them through agriculture, forestry and other activities.

In the UK it is typical for landowners to control the culling of deer, even if the deer management is sub-contracted or let to another party, landowners typically control the rights and access to culling on their own holdings. Although deer

management groups are becoming more common this is by no means the norm. This often means that deer management is carried out over relatively small areas meaning that even a strong approach can be completely ineffective because of boundary factors such as deer being harbored on neighboring land and either being inaccessible during culls or migrating in when a cull is completed and negating the effects of a cull or management plan.

To illustrate this, I conducted a study from 2008 to 2015, published in The Quarterly Journal of Forestry in 2015. The study concluded that during management activities to manage deer impacts in fragmented woodland nature reserves and country wildlife sites spread over a 3,500-acre arable estate in East Anglia, only 7.5% of deer culled were culled within the woodlands themselves. This research is still ongoing, and even with deliberate efforts such as cutting of rides (linear openings in a woodland which not only provide more diverse habitats for small birds, mammals and invertebrates but also provide clear openings where deer can be more easily shot) and erecting additional high seats (raised platforms from which deer can be safely shot), this had increased to 10.6% by 2022 but it is still clear that without culling on the surrounding arable land management objectives for the woodlands would not have been met.

It is for these reasons that I wanted to explore options for 'landscape scale' management of deer as a more effective approach to managing specific deer impacts as well as the general overpopulation and national impacts of deer on agriculture, forestry and other land-based enterprises.

With the potential for my investigations to indicate that a larger cull of deer is required in the UK, and data show a roughly 10% annual growth in demand for venison in the UK before the impact of COVID on the restaurant trade, there was also the opportunity to look at the production of venison as an additional element of my studies.

CHAPTER 2: MY STUDY TOUR

COVID: 'travel' via video conferencing

The COVID-19 pandemic affected everybody to some degree, interestingly enough there is plenty of anecdotal evidence and my own observations to indicate that it affected deer populations, too. Perhaps it was down to less 'recreational' stalking taking place or less disturbance in the countryside, but at least roe deer populations seem to have boomed in a number of areas and wildlife encroachment in urban and developed areas was certainly observed to have increased during and immediately after COVID lockdowns.

One of the clear impacts of COVID, in terms of my Nuffield studies, was that as a 2021 scholar it repeatedly delayed my planned study tour. That did cause a certain amount of frustration and disappointment but, in many respects, it actually meant that I could 'reach' further with my studies. Thanks to modern technology and video conferencing tools, I was still able to communicate and meet virtually with many people from around the world when travel in person was impossible and made some very interesting findings which caused my travel plans to evolve and ultimately allowed me to learn more than I might have if I had been able to go straight ahead with my travels in 2021.

Communication via email, phone and videoconferencing between March 2021 and April 2022 and continuing even after travel restrictions started to lift allowed me to gather information from the UK, New Zealand, Japan and the United States and to draw some helpful conclusions very early on in my studies, allowing me to re-focus my study slightly and get better 'value' from my travel budget. The key findings during the desk-based portion of my studies and through online 'travel' include the following.

New Zealand

New Zealand's only native mammals were marine species and a few bat species until the arrival of the Māori, who introduced dogs, pigs, and rats. European settlers later introduced various deer species, leading to severe ecological impacts. By the 1920s, deer populations were recognised as a major threat, prompting the government to employ cullers to control their numbers.

Efforts intensified, with cullers killing over 40,000 deer annually by the 1940s and over 50,000 by the 1950s. The 1956 Noxious Animals Act formalised the approach, and culling eventually shifted to private hunters and helicopter companies. Deer farming, legalised in 1969, provided an alternative, with thousands of deer captured for farming.

Figure 4: Yearling red deer, almost ready for slaughter on a deer farm in Northland, New Zealand (photo by the author)

Live capture for farming has since ceased in New Zealand now that the deer farming industry is firmly established and farmed venison is a significant export product for the nation. Addressing concerns over the quality of wild venison for export though New Zealand stopped exports in 2000. Similar concerns are evident in the UK where supermarkets hesitate to accept wild game due to lead contamination concerns; expanding domestic deer farming could reduce the reliance on imported New Zealand venison.

Today, private recreational hunting manages around 140,000 deer annually, but the overall population continues to grow. Red deer are the most numerous although other species, sika in particular, have created specific issues such as the significant degradation of native beech forests and massive deterioration in the condition of the deer in the Kaimanawa area.

Despite significant impacts from deer on New Zealand's 'billion trees' project, with 40-50% of planted trees lost to deer, there is limited funding for large-scale culling or monitoring by the Department of Conservation. Some propose redirecting climate-related funds toward deer management due to the carbon sequestration potential of trees.

Helicopter culling, effective in open upland areas, is now less viable in forested regions where nuisance deer behaviour is common, leaving management largely to recreational hunters and collaborations between farming and stalking groups.

This approach offers useful insights for the UK, where deer management groups are already showing some success.

These facts about the historical nuisance caused by deer and the resulting management strategies were made clear in discussions with staff from New Zealand's Department of Conservation, representatives of the Waikato Regional Council and professional wildlife managers and also gave insights into aspects of current and emerging deer management strategy.

Early conclusions and a slight change of focus

As well as conversations with deer management and conservation professionals in New Zealand, what became clear in conversations with UK deer farmers, including a fellow Nuffield Scholar Dan DeBaerdemaeker, was that capturing wild deer to supplement existing farmed deer herds would not be a viable solution. One of the key differentiators between wild and farmed deer, and the reason that farmed venison is often far more acceptable to supermarkets and other sellers, is consistency and quality, something that isn't always possible with wild deer and integrating deer of lower body weights into existing herds would not only be time-consuming in terms of raising the introduced wild stock to the necessary size and quality, but would also introduce unnecessary risk in terms of biosecurity. Additionally, conversations with those actively involved in deer management in New Zealand at the moment indicated that while deer farming may have played a part in historical reductions of deer impacts and certainly provided a safe and sustainable source of venison, it only temporarily reduced negative deer impacts as without sustained management efforts populations recover and impacts return. Add to this the fact that red deer would be the optimum species to incorporate into deer farms, with fallow and sika a possibility but as smaller animals less likely to be profitable, and it would still only address a part of the deer management issue. In reality live capture of deer would have an immeasurably small impact on wild deer populations and their long-term impacts in the UK.

Additionally, given estimated number of deer culled in the UK annually (based on conversations with deer management specialists at BASC, The British Association for Shooting and Conservation), any live capture scheme, unless adopted on a very large scale, would be dwarfed by current culling efforts. With live capture of deer for introduction to farms ruled out as a management strategy, to investigate further my study tour had to focus on effective methods of managing deer on the landscape scale. After my 'virtual travel' to New Zealand, I commenced that study with a more particular focus on co-operative deer management groups and collaboration between farmers, foresters and other land management professionals, organisations and agencies and how they can work together to achieve land scape scale management objectives for deer.

The Study Tour

The United Kingdom

While not a part of my study to which any funding was allocated, it was inevitable that my continued deer management work and other professional commitments throughout the period of my study would shape my conclusions. A census of deer numbers on land where I assist with deer management, as well as increased demand for additional culls on neighboring land combined with countless personal and anecdotal observations around the country, indicate that deer populations have increased over the last few years. Perhaps a reduced amount of recreational stalking during COVID contributed to this but it is also possible that milder weather has started contributing to survivability, decreased mortality, and therefore an increased population. Ironically, milder weather has been proving to be less beneficial to reindeer in Sweden as I discovered in discussion with reindeer herders in Jokkmokk, Sweden, who explained that shorter, cold seasons and depleted permanent summer snow banks have allowed parasite burdens to increase in the reindeer population as the cold weather is normally a significant factor in reducing parasite burdens.

During my scholarship, I made a point of visiting projects in the UK where specific efforts are being made to limit the nuisance impact of deer on conservation initiatives.

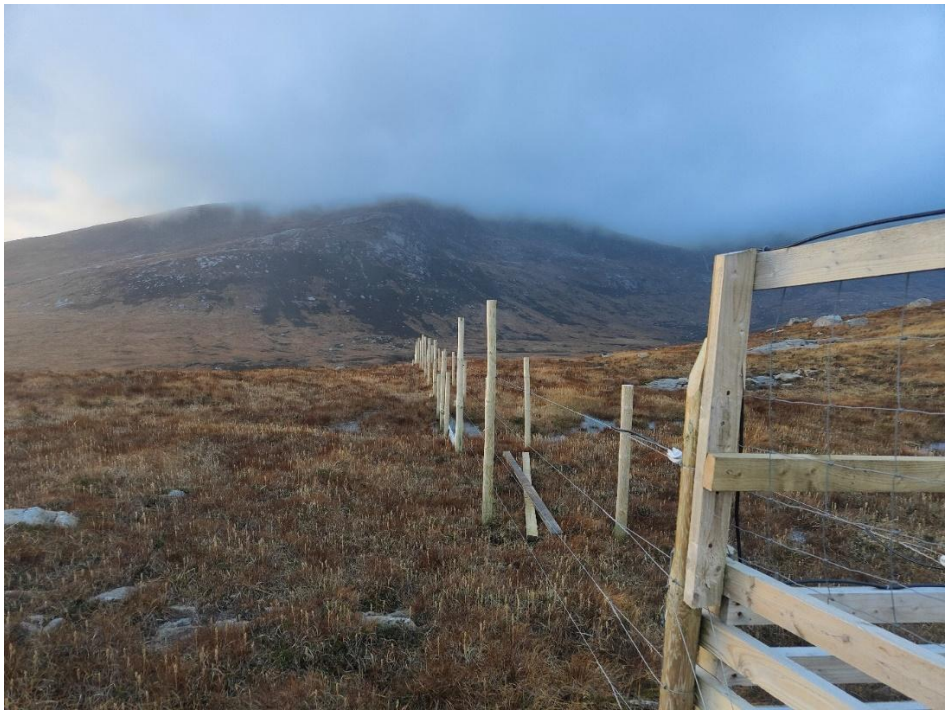


Figure 5: Deer exclusion fencing in Glen Rosa, Isle of Arran, to protect the re-establishment of trees from deer on a 32-hectare plot in the Glen which has been facilitated by grant funding and the work of The National Trust for Scotland.

Where funding allows it, and when the site in question is small enough, fencing (as pictured) may be an option to protect high value crops or conservation assets from deer, at least in the establishment phase. Often exclusion fencing is not a viable option though, as the cost of around £20 per meter to install adequate deer proof fencing, it simply won't be affordable for many, especially at a time when costs for farmers and other land managers are at an all-time high. Proper deer fencing is no doubt effective, but not totally impervious to deer, and could only be justified where funding is available and potential damage is incredibly costly. Fencing can rarely, if ever completely replace the need for culling, a fact reinforced by conversations with stalkers on the Isle of Arran, as the impacts of deer on crops, timber and habitat assets are not limited to fenced areas and an approach to management which combines measures to reduce impacts is essential.

What also became apparent is that in the UK, unlike some other countries, there isn't really anywhere that deer impacts are factored in and tolerated as part of a functioning ecosystem (outside of very specific instances of 'repurposed' farming estates integrating deer into a grazing system under the banner of 'rewilding' or dedicated deer parks, which I will touch on later in this report in reference to observations made in Denmark). This lack of tolerance would be understandable in New Zealand, where deer are not native, but seemed at odds with what I experienced in other countries where the impacts of native grazers might cause conflict on productive agricultural land but where there are areas where deer impacts are considered part of the ecosystem, such as in National Parks.

Figure 6: Grazing and browsing by deer and wild ponies tolerated as a natural process at the Oostvardersplassen nature reserve in Holland taken by the author during previous scholarly activity as an 'agricultural educator award' winner for the Farmers Club Charitable Trust.

This situation of deer impact, which is almost always negative where it occurs at any significant level, may be due to a number of reasons.

- The relatively intensive use of the British countryside, with farming, forestry, horticulture and other rural land uses dominating the landscape and no surviving 'wilderness' areas means that there really aren't any areas where deer aren't impacting land-based businesses or habitats of conservation significance.
- The fragmented nature of habitats in the British Isles, most easily demonstrated in lowland woodland settings. Where the size of woodlands is relatively small, damage can be disproportionately large due to even small numbers of deer.
- The need to almost always protect a crop or sensitive habitat resources from nuisance behavior compared to some other places where some damage can be tolerated as part of a functioning ecosystem or where scale can mitigate for some impacts, unlike in very fragmented habitats.

Southern and Central Sweden

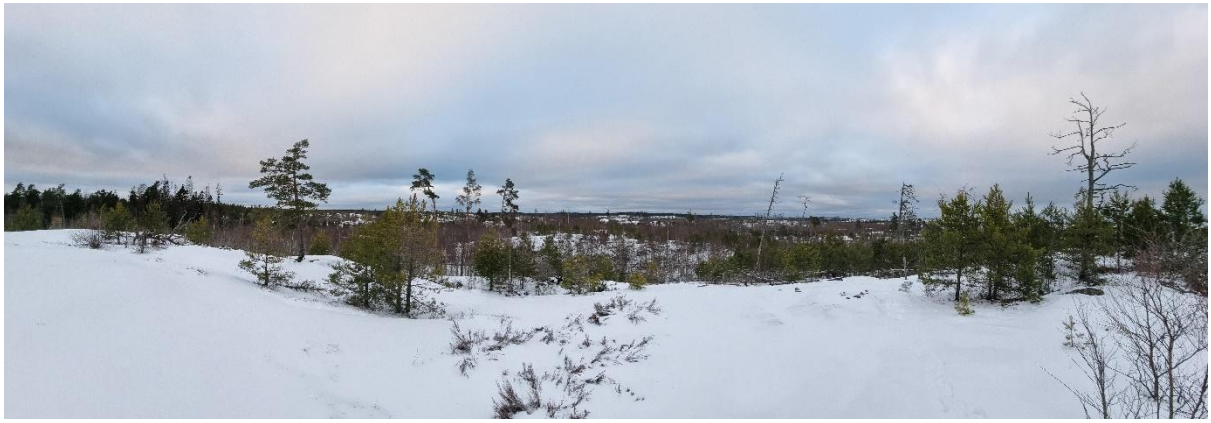


Figure 7: Tyresta National Park where wildlife impacts, including those of deer, are just part of the natural processes, and where in common with National Parks around the world with the notable exception of the UK, wildlife and habitats are not competing against the operation of land-based businesses.

I was able to visit Sweden a couple of times as part of my Nuffield Scholarship travels, to two very different parts of the country, and it was here that I first recognised that in the UK we don't have the same tolerance for the natural behavior of deer, except in the very limited cases stated above. In Sweden, while recreational hunting is a part of the culture and 'vilt vård', or game management, is an essential part of forestry and other land management practices, as well as part of reducing road traffic accidents associated with deer, there are also places where deer and other wildlife impacts are tolerated and expected. National Parks for example, where deer impacts as part of natural processes are tolerated, as is the

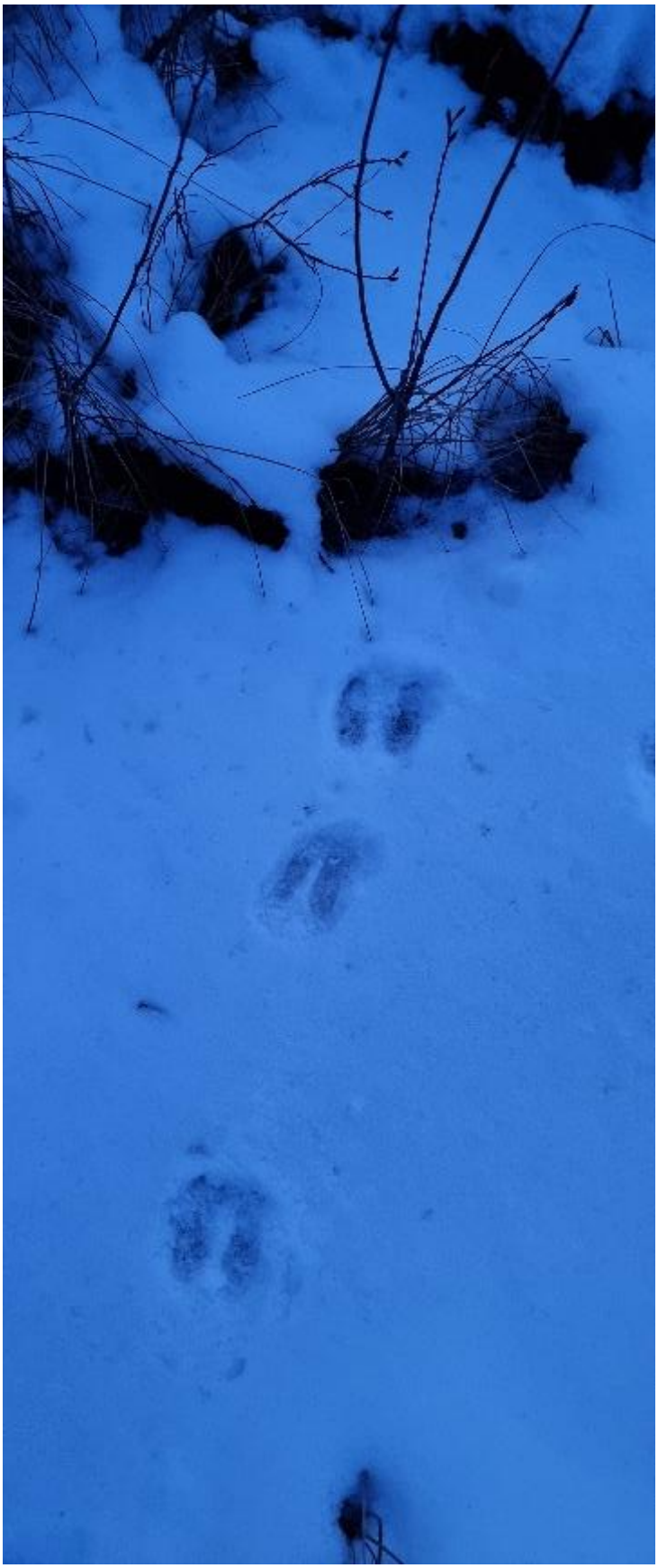


Figure 8: Tracking deer in Tyresta National Park

predation of those deer and other prey. This is evident in many Swedish National Parks which aim to protect remaining areas of wild or untouched ecosystem.

As mentioned previously, it is rare to find this tolerance in the UK. A 'National Park' is a designation applied by a government within the framework of that country's legislation but, as defined by UNESCO, the objectives of a national park might include the preservation of natural and cultural features for the enjoyment of present and future generations, conserving biodiversity, the protection of unique geological formations, hydrological features or habitats, maintaining ecological processes, promotion of sustainable land and resource management practices and providing opportunities for outdoor recreation, education, and scientific research.

In many other countries National Parks preserve 'wilderness areas', which we don't really have in the UK, so our National Parks largely protect cultural features including the rural businesses, farming practices and the landscape as it was as recently as the 1950s when our first National Parks were formed. This means that while deer might be an iconic part of some of our National Parks, and an important part of the rural

economy through commercial stalking, their behavior is generally considered a negative impact on forestry, agriculture and habitats. In National Parks in other countries, which are maintained as wilderness, this conflict is less significant: perhaps we need some areas in the UK like that?

With this difference in land designations in mind, it is worth considering a similarity in practice between the UK and the Nordic countries. There is also a strong tradition in Sweden as well as other Nordic countries of 'Jakt Lag' what we would call sporting syndicates. These groups hunt as teams over often fairly large tracts of ground, not limited to a single landowner or land holding. Where syndicates, or deer management groups can operate on this basis in the UK, across boundaries and guided by a robust deer management plan, the management can be far more effective and impactful.

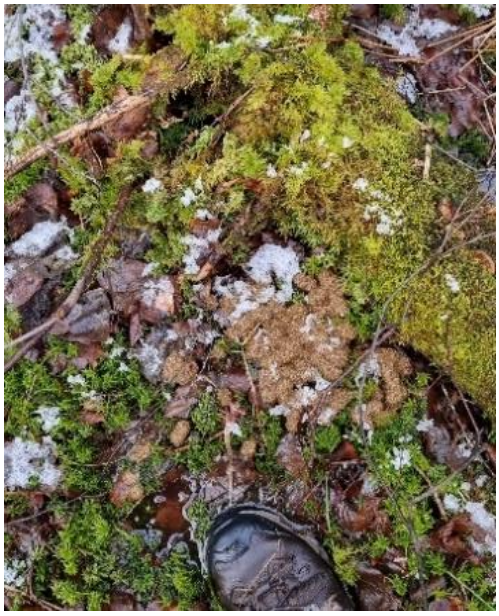


Figure 9: Observing elk (Alces alces) sign at Gallhålan nature reserve.

Denmark

In the UK, where deer parks have existed in some form since before the Norman Conquest, with the existence of 27 deer parks being recorded in the Doomsday Book, there are areas where deer damage is tolerated. In these parkland habitats grazing and browsing by deer may still have an impact but, while it might be disastrous in a small conservation coppice or financially damaging to a farmer or forester, in parks deer are part of the landscape which has been managed with them in mind and their behavior and impacts can be tolerated within reasonable limits.

This can be observed at Jægersborg Dyrehave a historic deer park and UNESCO heritage site near Copenhagen in Denmark. Higher levels of deer population can be observed there than might be tolerable in the open countryside, and they are culled, but what my visit there demonstrated was the importance of excluding deer completely from areas if the deer population can't be reduced to suitable densities to ensure

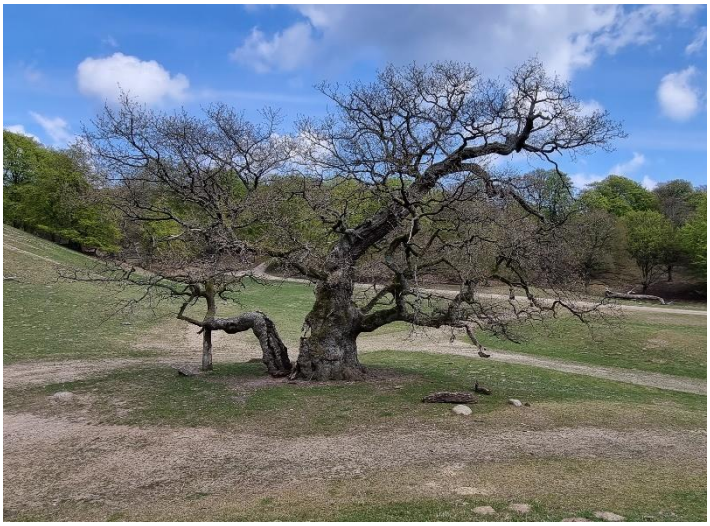


Figure 10: One of the ancient oak trees at Dyrehave.

woodland regeneration can occur and sensitive habitats can be protected.

One of the reasons that Dyrehave is a UNESCO heritage site is because of its ancient oak trees and, in the park where deer numbers are high, it is clear that the age structure of the woodlands is significantly impacted by their presence to the extent that there are very few young trees. Within the exclusion fences, regeneration of woodland can be clearly seen and shows a stark contrast with the grazed areas.

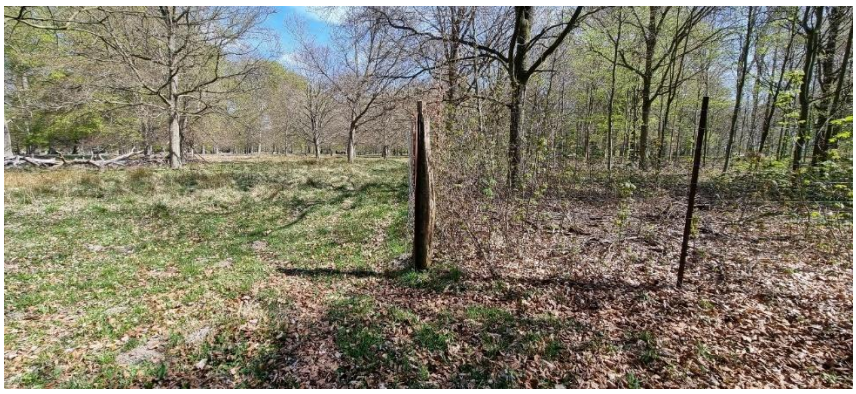


Figure 11: An exclusion plot (on the right of the image) at Dyrehave, showing significantly increased levels of woodland regeneration than on the left of the image where grazing continues.

Lapland (Sweden and Finland)

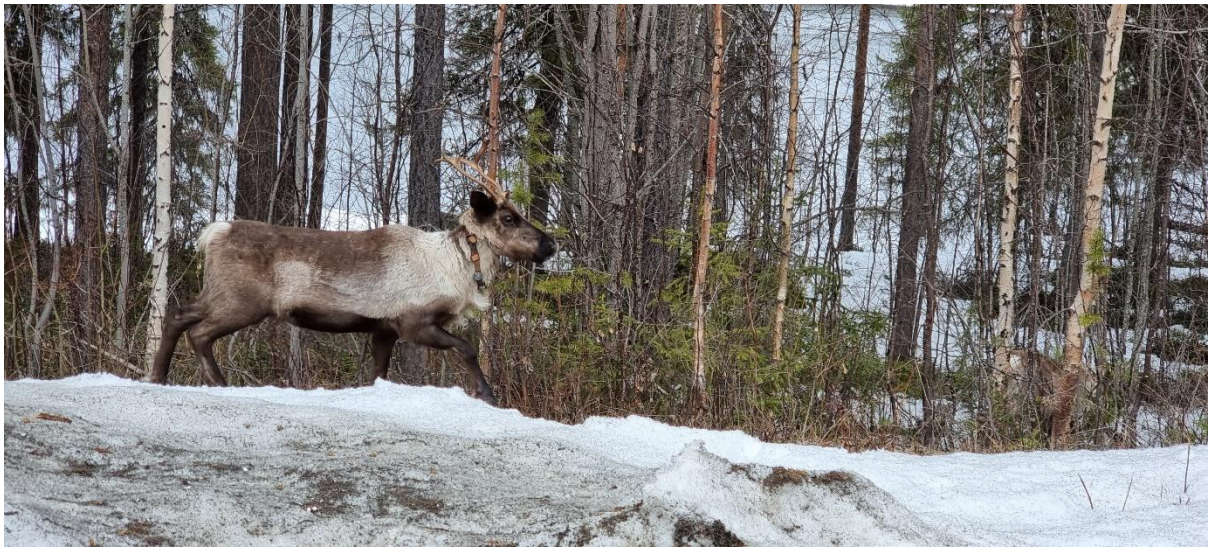


Figure 12: A Saami-owned reindeer in Swedish Lapland.

My exploration of deer management strategies extended into the Scandinavian region of Lapland, covering both Swedish and Finnish territories. This area is renowned for its indigenous Saami culture, which has a deep-rooted tradition of reindeer herding that spans centuries. The visits to Jokkmokk in Sweden and Rovaniemi in Finland provided profound insights into the sustainable practices and cultural dimensions of wildlife management. There is an interesting parallel

between management practices for the largely free ranging reindeer herds and the live capture of deer in New Zealand, which I wanted to explore alongside my main objective of looking into the cultural aspects of reindeer management and how it seemed to co-exist alongside other land-based enterprises quite happily. That was the management approach, not entirely dissimilar to upland sheep farming in the UK, of having fairly free-ranging herds of reindeer which would be periodically gathered in as the need required for medication, tagging/marking and eventual slaughter. Perhaps a management practice that could be applied in the UK to herding deer species such as red, which could be adopted to culling incredibly effectively, but which culturally would probably be distasteful to many in a culture distanced from that sort of practice.

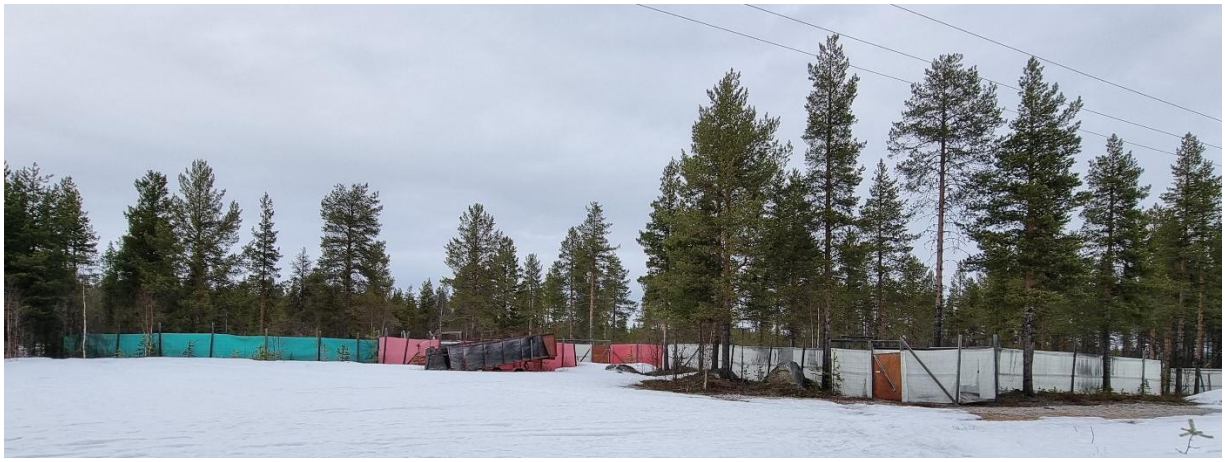


Figure 13: A 'stängsel' in Arctic Sweden, where free ranging reindeer are gathered for veterinary attention, capture for slaughter and other necessary management.

Reindeer herding in Jokkmokk, Sweden

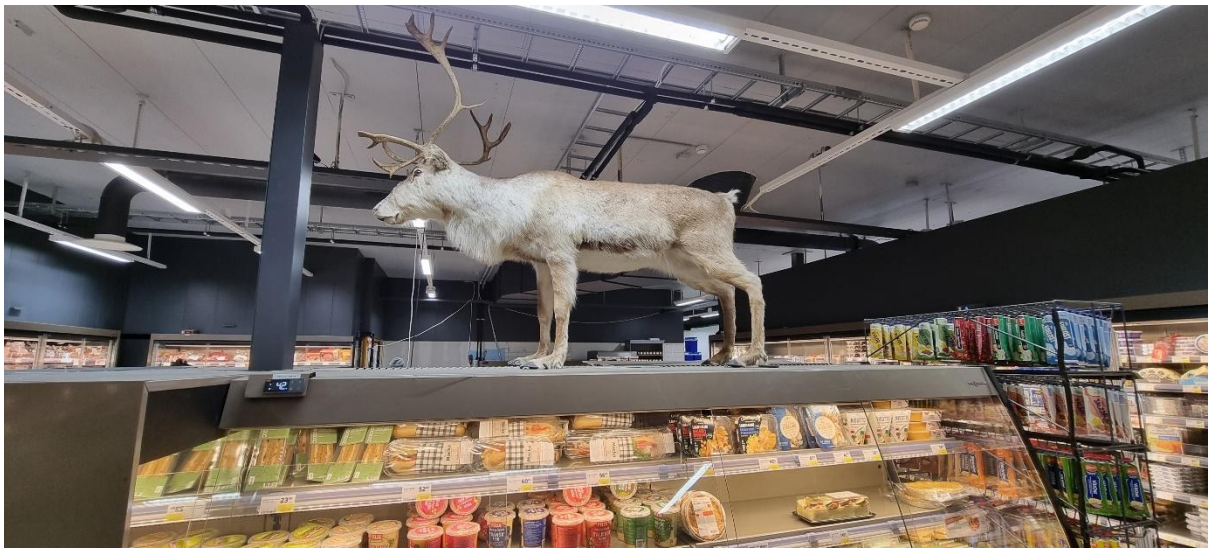


Figure 14: Reindeer are such a part of Swedish culture, especially in 'Norrland' that they are present at supermarkets in more ways than one.

Another benefit of the desk-based research I was able to carry out before conducting my study tour, was being able to find, thanks to the Royal Geographic Society's library, some relatively obscure papers on the impacts and conflicts caused by reindeer herding. These papers disabused me of the, perhaps slightly romantic, view I had of reindeer herding in Sweden carrying on without causing any major conflict or friction with other land-based enterprises. But this strengthened the value of the visits there knowing that, perhaps, similar issues observed in the UK have occurred there and if not solved have at least informed the legislation and management approaches which can be learned from. In Jokkmokk, the Saami people have developed a comprehensive system for managing reindeer populations that balances economic needs with ecological conservation. Reindeer herding is not merely an economic activity but a cultural identity that respects and preserves the natural movements and cycles of reindeer. The herders use a combination of traditional knowledge and modern technology, such as GPS tracking, to monitor herds and ensure their health and safety across vast landscapes. This system allows for sustainable grazing, which maintains the health of tundra ecosystems and prevents overgrazing. It was also interesting in conversation to learn of the impacts of climate change on reindeer herds, with shorter permanent snow seasons being linked to increased parasite burdens in the herds and increased reliance on medications.

Management methods in Rovaniemi, Finland

Rovaniemi showcases a slightly different approach to reindeer management, emphasising the integration of reindeer herding with other land uses such as forestry and tourism. The Finnish model focuses on conflict mitigation between herders and other stakeholders by delineating herding areas and migration corridors. This is complemented by government-supported programmes that provide financial compensation for losses due to predation or accidents, which is crucial for the economic stability of reindeer herding as a profession.

Both regions place a strong emphasis on maintaining the cultural heritage of the Saami people while adapting to contemporary environmental challenges. Climate change poses a significant threat to traditional reindeer herding practices, as changing weather patterns disrupt seasonal migrations and affect pasture availability. In response, Saami communities and local governments are collaborating on climate adaptation strategies that include habitat restoration and the creation of artificial feeding grounds to support reindeer during harsh winters.

The lessons from Lapland demonstrate the importance of cultural sensitivity and adaptability in wildlife management. The Saami have shown that it is possible to sustainably manage large herbivore populations through a deep understanding of both the ecology of the species and the cultural practices that have co-evolved with these animals.

The United States

In the United States, the management of large ungulates such as deer, elk, and moose falls under a combination of federal, state, and local regulations that aim to balance population control with ecological sustainability, public safety, and hunting interests. The legal framework governing their management is shaped by legislation such as the Lacey Act (1900), which restricts the illegal trade of wildlife across state lines, and the Pittman-Robertson Act (1937), which provides federal funding for state wildlife agencies through an excise tax on hunting equipment. Additionally, the Endangered Species Act (1973) offers protections where applicable, though deer, elk, and moose are generally not listed under this legislation at a federal level.

Hunting by private individuals is a key tool in managing populations, and each state has its own regulations regarding seasons, bag limits, and hunting methods. While federal lands such as national forests and the Bureau of Land Management (BLM) permits hunting under regulated conditions, National Parks typically prohibit it unless exceptions are granted for population control. Many states also implement special measures, such as extended seasons or culling programmes, in urban and suburban areas where traditional hunting may not be feasible. In **some** cases, landowners are allowed to control populations on private property if deer, elk, or moose are causing damage to crops or posing a safety hazard, but this varies from state to state and in some place management of nuisance deer is not allowed by landowners as the wildlife are considered 'public' property or a public resource.

The specifics of deer, elk, and moose management vary widely by state and some of these variations in terms of impact and management strategy were encountered on my studies.

Colorado

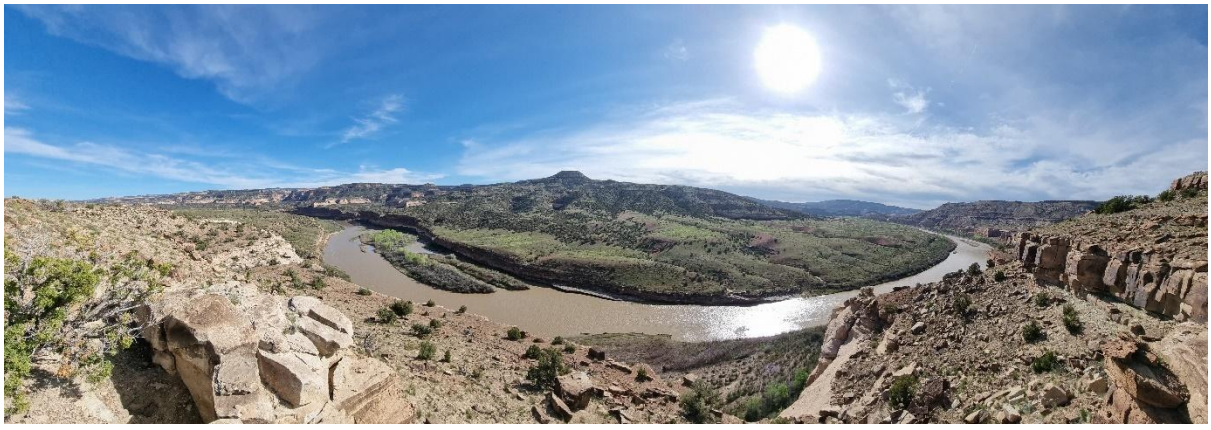
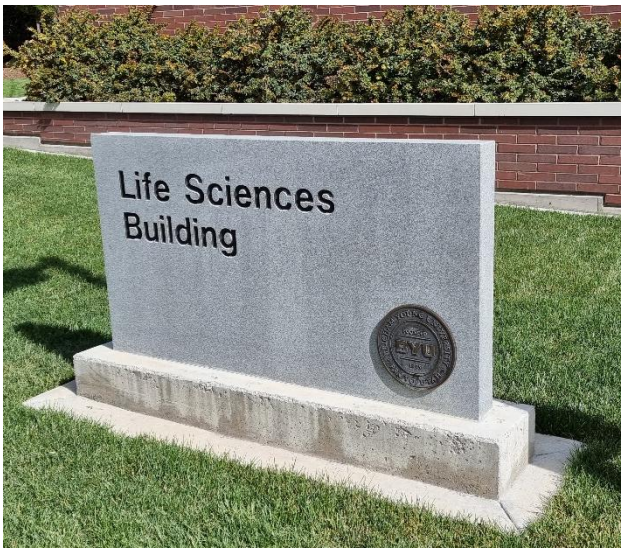


Figure 15: Views of the Colorado River in the 'Black Ridge Canyons Wilderness' and a very different landscape than that which I am familiar with.

In Colorado, the study examined the impact of a dynamic wildlife management system on deer populations and their interactions with both urban and rural

landscapes. This region demonstrated effective use of public-private partnerships in managing deer herds. Innovative strategies like controlled urban deer culling and the promotion of natural predator populations have shown promising results in managing deer impacts on local ecosystems.

Utah



I had the opportunity to meet with deer management specialists and professors from Brigham Young University (BYU) to discuss strategies for data collection and gain a deeper understanding of the Cooperative Wildlife Management Unit (CWMU) programme. These discussions provided valuable insights into the methodologies used to monitor deer populations, assess habitat conditions, and evaluate the effectiveness of different management strategies. The experts emphasised the importance of using a combination of remote sensing, GPS collar tracking, camera traps, and hunter harvest data to build a comprehensive picture of deer movement patterns, population densities, and habitat use. This data-driven approach is crucial for informing adaptive management strategies that ensure sustainable deer populations while minimising conflicts with human activities.

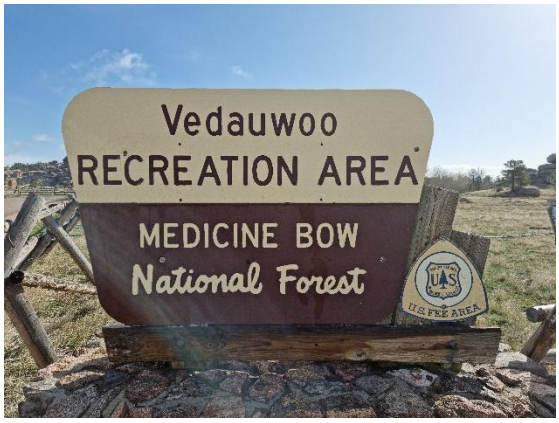
A key focus of the discussions was the CWMU program, a state-regulated initiative designed to enhance wildlife management on private lands while providing opportunities for both public and private hunting. In states like Utah, where much of the land is privately owned, CWMUs create a framework that allows landowners to work with state wildlife agencies to manage deer populations effectively. These units enable landowners to implement habitat improvements, regulate hunting pressure, and contribute to overall conservation goals, while also benefiting financially from controlled hunting access. In return for participating in the programme, landowners are required to allocate a portion of hunting permits to the general public, ensuring that wildlife remains a shared resource rather than an exclusively private commodity.

The effectiveness of CWMUs has been widely debated, but studies indicate that they can lead to improved wildlife habitat, more balanced population structures, and increased hunting opportunities. By incentivising habitat conservation and providing regulated hunting access, CWMUs help mitigate issues such as overpopulation, habitat degradation, and agricultural damage caused by excessive

deer numbers. However, concerns remain regarding the equitable distribution of hunting opportunities and the potential for privatisation of wildlife, which is traditionally held in public trust under the North American Model of Wildlife Conservation.

Overall, the discussions with BYU researchers reinforced the importance of integrating scientific research with practical management solutions. The CWMU programme serves as a useful case study of how collaborative management between private landowners and state agencies can enhance conservation outcomes while balancing economic and recreational interests. Further research and continued monitoring will be necessary to assess long-term trends and address any emerging challenges in the programme's implementation.

Wyoming



Wyoming's approach is unique in its emphasis on community involvement and education. By engaging local communities in deer management efforts, the state has improved compliance with wildlife regulations and increased public support for management measures. The integrated management plan includes habitat restoration projects that ensure the sustainability of both deer populations and the natural landscapes they inhabit. Yellowstone National Park, with its well-publicised rewilding of wolves, falls within Montana's state boundaries and offers interesting examples of how predator re-introduction can assist in deer management efforts. Although this style of management approach offers no utility in terms of venison production, it is a contentious issue and which has caused significant disagreement in communities affected by wolf reintroduction, where culturally they have been considered agricultural pests for several generations.

It is also my opinion that predator re-introductions aren't likely to be significantly useful in addressing deer management issues in the UK where sufficient 'wilderness' does not exist to support conflict free re-introduction and where climate change and significant loss of suitable habitat and biodiversity has rendered the majority of the UK entirely alien to most large predators, making re-introductions as much of a welfare issue for reintroduced wildlife as livestock.

CHAPTER 3: SUMMARY OF FINDINGS

The study identified common themes and innovative approaches to deer management from around the world, enhanced by empirical data and contextual insights. Key findings include:

Collaborative management is essential

Approaches like Sweden's Jakt Lag and Utah's Cooperative Wildlife Management Units (CWMUs) showcase the success of cross-boundary collaboration in deer management. These systems emphasise shared responsibility among landowners, hunters, and agencies, ensuring landscape scale impacts beyond individual property boundaries.

Data from the UK corroborates this need, with only 10.2% of deer culled in woodlands, highlighting the importance of collaboration and a landscape scale approach for effective management.

The role of data in decision-making

Effective deer management relies on robust data collection. Utah uses GPS tracking and population studies to inform cull planning and mitigate conflicts like road traffic collisions (RTCs).

The UK could adopt similar practices to address the 40,000–74,000 annual deer-vehicle collisions, which cause 700+ injuries, 10–20 fatalities, and £17 million in vehicle damage annually

Habitat protection and integration

Sweden and Denmark demonstrate the importance of integrating deer impacts into land management. Exclusion fencing in Denmark has proven effective in promoting woodland regeneration, as evidenced by clear contrasts between grazed and fenced areas.

Roadside fencing in southern Sweden reduced elk crossings by 67–89%, suggesting that targeted fencing in high-priority UK areas could similarly reduce RTCs while aiding deer control.

Sustainable economic integration

Roughly one-third of venison consumed in the UK is imported, predominantly from New Zealand, while a similar proportion of UK wild-shot venison is exported.

This imbalance highlights opportunities to better integrate wild venison into the UK's food chain, particularly as the domestic retail market grew by 10.9% in 2019 alone.

Recruiting and retaining deer managers

Experiences from Wyoming and Sweden underline the importance of engaging younger and more diverse participants in deer management roles. These efforts address succession challenges and build long-term capacity for population control.

The UK's aging demographic of both professional and recreational deer stalkers necessitates targeted recruitment and training initiatives. Crucially training initiatives and engagement strategies which are not elitist or which price people out of the industry/hobby.

Adaptation to environmental and cultural contexts

Climate change is altering deer behaviour and population dynamics. In Sweden, milder winters have increased deer survivability, amplifying ecological pressures. Similarly, in Lapland, climate variability affects reindeer herding, showcasing the need for adaptive management strategies.

Cultural practices, such as those of the Sámi people, highlight the value of integrating traditional knowledge with modern techniques for managing large herbivores sustainably.

Supporting data and insights

Economic and habitat impacts: UK deer damage costs forestry 30–50% of timber value, while 4% of Sites of Special Scientific Interest (SSSIs) are in unfavourable condition due to deer impacts.

Culling inefficiencies: Research from 2008–2015 shows only 7.5% of deer were culled within woodlands, underscoring the limitations of isolated management approaches.

These findings emphasise the universal need for collaboration, data-driven strategies, sustainable economic integration, and adaptability to local and environmental contexts in achieving effective deer management.

CHAPTER 4: RECOMMENDATIONS

In conducting this study it became clear to me that one of the biggest factors in developing wildlife management practices around the world is culture and that the culture of a country, or even a region, will impact policy, legislation and approach to deer management as well as other issues. So, while I have learned many things which I will without a doubt try to apply to my own deer management practice and would advocate for their application more broadly, the fact of different legislative frameworks, local professional and cultural preferences means that not everything I have learned is appropriate for adoption, or could be adopted without modification, and, of course, in some cases it's been clear that our approach the UK is already adequate or superior than some practices elsewhere.

After this study I would advocate for a more integrated, data-driven approach to deer management in the UK, though. This could include:

1. Expanding domestic deer farming could reduce the reliance on imported New Zealand venison.

2. Enhancing data collection: Building a comprehensive database on deer populations, using where applicable appropriate technologies such as large-scale GPS tagging, drone technology etc to help monitor and map their impacts, similar to the model used in Utah, to inform management decisions and build a landscape scale strategy. Without a doubt, increased culling is necessary in the UK but this should be driven by good data

3. Community engagement and education: Follow Wyoming's example to enhance public participation and support for deer management initiatives. A further related recommendation is that specific effort is made to encourage new entrants into recreational deer stalking, as just with most of the land-based sector, professional and recreational stalkers are an ageing demographic.

4; Adoption of integrated management practices: go beyond simple 'deer management groups' by combining various management strategies, as seen in Colorado, to address the multifaceted challenges posed by deer overpopulation.

5. Promoting domestic venison supply: Leveraging the existing legislative framework that facilitates the integration of wild venison into the human food chain, the report suggests creating an outlet for venison produced through increased culling. This strategic shift could potentially reduce reliance on imports of farmed venison, with careful consideration to prevent unintended consequences on the domestic deer farming industry.

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A final acknowledgement is due to all the information that DIDN'T make it into this report. It's impossible to fit the findings of months of desk-based study and 'virtual' meetings during COVID lockdowns, hours of conversations, thousands of miles traveled by plane, train, bus, boat, car, foot and even bicycle into a single 5,000-word report, but I have at least tried to fit in all the most important lessons I learned.

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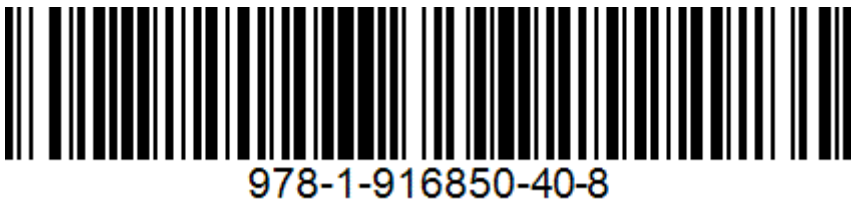

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