



When it comes to climate change, the deer sector can be a major part of the solution.

Photo: Neil McIntyre



Richard Cooke, Chairman
Association of Deer Management Groups

Both the SNH and Deer Working Group (DWG) reports to the Scottish Government in 2019 and earlier this year make much

of the climate change priority as a major factor in future deer management. There is an implication that, if woodland expansion targets are to be achieved and peatland projects completed without risk, further reductions in deer numbers will be required. We question that as a generality while agreeing that compensatory reductions are appropriate where the deer range is reduced by a change in land use.

Climate change measures align with longer established environmental objectives but other public interest aspects, economic and social, appear in the DWG report to have slipped down the scale of priorities.

'Sustainable deer management' (which took these factors into account) has now become 'effective deer management' where reducing the impact of deer is all that counts, no matter the positive benefits that deer generate.

This is not acceptable and ADMG will be making this clear in ongoing discussions with Ministers, the Scottish Government, and its agencies.

That being said and, as set out in ADMG's recent policy paper *Rising to the Challenge*, published in advance of both of the Government reports, DMGs - which include the owners and managers of much of the land most suitable for woodland and forestry expansion as well as the majority of Scotland's peatlands - are uniquely placed to play a leading role in contributing to this vital area of Government policy, and its ambitious carbon net zero target.

Owners and land managers are needed on side not just to manage deer but to recover peatland, restore native woodland, and a host of other actions to mitigate climate change.

Many have already embarked on projects to combat climate change - many before the Scottish Government announced the *climate emergency*. Funding has been committed by Government, and there is an opportunity for deer managers not only to contribute to the public interest in a substantive way but also to enhance the landscape at relatively modest net cost. Importantly, the deer sector is a major part of the solution, and we need to say so.

The purpose of this edition of Scope is to demonstrate what many of our members are already doing, show that we understand the issues, and that we are engaging with those with professional expertise to deliver solutions.



REGIONAL LAND USE PARTNERSHIPS

Photo: Dick Playfair



Bob McIntosh,
Tenant Farming Commissioner, Scotland

The pattern of land use that we see in Scotland has emerged as a result of a number of influences. The physical nature

of the land puts constraints on what it can be used for, Government laws and regulations have an influence as does the intent behind Government incentive schemes and grants and last, but not least, is the influence of the management objectives of the owner. The end result is often satisfactory but we are seeing increasing conflict between different land use options and resolving these conflicts is not helped by the plethora of land-related Government policies, strategies, schemes and support mechanisms that have an influence on land use but which are poorly coordinated, often single use focussed and often in direct conflict with each other.

The recent heightened interest in the impacts of land management practices on the carbon balance has renewed the debate about the merits of a Land Use Framework within which a more integrated approach can be taken to land use planning. The Government already has a national Land Use Strategy in place but this is a high level document which sets out some guiding principles, it was always recognised that, to be really useful, there was a need for some form of regional strategy or framework which had stakeholder support and which gave clearer guidance, both to land managers formulating land management plans and to those within Government and its agencies who design and administer the regulations and incentives affecting the land management sector.

With this in mind, the Scottish Government has asked the Scottish Land Commission to advise on the establishment of regional land use partnerships to maximise the potential of Scotland's land in taking action on climate change. The Land Commission intends to report to Ministers with proposals in mid 2020 and is publishing a scoping paper seeking views and engagement. The Scottish Government funded two pilot schemes a few years ago in the Aberdeenshire and Scottish Borders local authority areas

and it was clear from that exercise that there is a great deal of goodwill towards the principle of a regional approach to land use planning but a recognition of the complexity of the task. Defining the regional boundaries is the first issue. Using local authority areas provides a clear boundary and an administrative authority to oversee the work but there are arguments in favour of using more logical geophysical boundaries such as river catchments. The whole process has to be funded and overseen by people with a good understanding of rural land use issues, and mechanisms have to be developed to ensure full engagement with all appropriate stakeholders and effective resolution of conflicts. The approach has to be flexible enough to cope with the ever-changing views on policy priorities and the economics of land management activities while providing enough direction to provide a clear steer to land owners. Not an easy balance to achieve.

Those involved in producing Deer Management Plans over the past few years will be well aware of the need for those plans to embrace such issues as habitat impact, peatland restoration, native woodland regeneration and woodland expansion. In effect therefore, they are becoming more like land management plans than just deer management plans and this is undoubtedly the future. Land owners and managers must increasingly adopt an approach which seeks to integrate a range of management objectives which deliver for both public and private interests and a holistic land management plan is the best way to achieve this.

The development of Regional Land Use Partnerships has the potential to provide a useful forum within which the many and diverse views about how our land should be used can come together to agree a land use framework within which individual land managers can draw up their own land management plans. Achieving consensus will not be easy and can only happen if there is effective involvement by, and engagement with, all interested parties and a willingness to set aside sectoral interests in favour of an integrated approach which recognises the legitimacy of a wide range of land use practices.

Bob McIntosh is Scotland's Tenant Farming Commissioner and a member of the ADMG Executive Committee



Photo: Ed Bewsher

Moving to non-lead ammunition for UK deer management



Ed Bewsher,
Edinburgh Rifles and Sporting Goods

The venison and wider shooting industries are coming under increasing pressure for, among other things, their continued use of lead ammunition. Retail outlets for game are also changing as supermarkets drop lead shot game from their shelves. The future is going to be non-lead whether we like it or not. But why shouldn't we like it? It's not all doom and gloom.

Non-lead, single metal, monolithic 'solid' bullets have been in use for decades in numerous hunting applications especially in Africa. The USP of the monolithic is its ability to perform and exit the carcass with up to 100% of its original mass leaving no metal in the meat and a cleaner carcass.

Whilst our non-lead pressure is predominantly borne out of a need for metal-free meat and environmental goals, the use of monolithics in African hunting has been driven by the increased penetration of a monolithic bullet and the terminal characteristics this brings on thicker skinned African game.

Ironically it is this higher penetration capability when combined with the UK's thinner-skinned deer species that has potentially been the source of some of the negative observations as their use became more widespread. Early monolithics in the UK have a very poor reputation. Failure to expand, poor accuracy and copper fouling in the barrels have all been quoted by UK users.

However, any bullet of any construction can fail and produce sub-optimal performance under the wrong conditions. That is not purely a material issue. Not all bullets are appropriate for every application and sub-optimal terminal performance of a bullet is a combination of a much wider number of variables. The evolution of the monolithic non-lead bullet for game has come a long way since its introduction.

Excessive copper fouling in the barrels has been resolved, firstly with the use of lubricant coatings, and then with the

use of removed material bands in the bullet shank to reduce pressure and latterly bands in relief which reduce pressure even more, also leading to significantly increased velocity.

Expansion issues have been resolved with increasingly complex hollow point designs and the development of ammunition utilising higher muzzle velocity or lighter for calibre bullet choice. The construction material varies from pure copper to alloys of copper and zinc with varying degrees of hardness.

Brands now available in the UK for the deerstalker include a wide range of bullet weights for any particular calibre and an even wider range of bullet styles for the expected range and quarry they are likely to encounter.

The traditional advice of dropping down a weight class to increase velocity is negated by advancements in design and more reliable expansion at lower terminal velocities of some designs.

Recent volume field tests run by a major UK forestry organisation have unequivocally demonstrated the terminal effectiveness of some non-lead brands on a range of UK species and environments. There are, however, some notable examples which design tweaks will not change.

The Deer Act precludes .243 bullets under 100gr for use on red deer in Scotland. In a standard twist .243 barrel a 100gr non-lead monolithic will not stabilise to allow it to be accurate (the material is less dense, and bullets of the same weight are longer requiring faster twist barrels). However, an 80gr bullet will attain similar terminal energy and be equally, if not more, effective than a 100gr lead bullet.

Unfortunately, as .243 calibre rifles are extremely common in Scotland this will require either a change of rifle or a change of law to allow deer-legal non-lead bullets to be used.

There are effective and accurate non-lead alternatives for every calibre and cartridge out there. We just need to "bite the bullet" and try them!

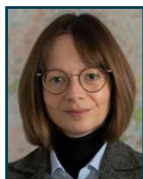


Photo: Jahama Highland Estates

Natural Capital

Understanding Natural Capital is becoming increasingly important – what it is, the many forms it takes, how to evaluate and assess it, and why. ADMG asked two experts in the field to expand on these points and the application of assessing Natural Capital at business, individual land holding and landscape scale.

Natural Capital



Julia Stoddart
MRICS

If you are engaged in land and wildlife management, it is likely that you have heard about natural capital (NC). A broad subject in which Governments and the public are increasingly interested, NC is generally defined as the earth's stock of natural assets: soil, water and forests, for example. Directly linked to NC are public goods such as food, recreation opportunities, freshwater supplies and biodiversity. Land managers expect the provision of these services to be the focus of the post-Brexit rural payments regime.

The term 'natural capital' attempts to capture natural resource externalities that are not traditionally represented in our economy.

The water storage benefits of peatland, for example, may be objectively understood by those familiar with the subject, but the monetary value of well-managed peat

for public water supply or catchment quality is unlikely to be reflected in a landowner's accounts; it is one of many financially invisible assets in our sector.

The benefits provided by well-managed NC are wide-ranging, from intangible assets such as culture and wellbeing to more quantifiable NC-derived services such as climate regulation, water storage and provision of food. The core message is that until NC is properly costed in the context of human activity, the environment cannot be effectively conserved or enhanced. By placing a capital value on our natural assets, and then deriving a quantifiable provisioning value from the services that those assets provide, we become better placed to embed best practice management in all our land-based activities.

While valuation of NC may appear to be an overwhelming subject to consider, research on valuation methods has been ongoing for several years including involvement from the RICS. Methodologies are becoming progressively refined in parallel with the need for landowners and managers to access NC data to inform management decisions.

Charles Cowap MRICS FAIV is a rural chartered surveyor and registered valuer, and a key figure in the field of NC valuation. Charles provides a compelling summary of why our sector should be interested in carrying out NC valuations:

"Landowners and managers need more than ever to take careful stock of their natural capital assets. Economically and politically it is vital that land managers can demonstrate the value of what they are doing."

"A careful appraisal of existing and potential natural assets, using the natural capital approach, offers one of the best opportunities to explain, justify and value land management activities. It can also offer a deep insight into new opportunities and approaches."

This explanation is especially relevant to deer management. As native mammal species, red and roe deer are an important component of NC; we derive the traditional services of food and recreation from deer, as well as the intangible benefits associated with their iconic presence in the landscape. Obvious NC interests that may compete with maintenance of deer populations include afforestation, native woodland regeneration and peatland restoration, and we are all familiar with the associated challenges of trying to achieve balance.

Taking a single interest management approach creates a range of consequences for other interests, not all of

which will be fully understood; a decision taken via a NC approach is more likely to be genuinely sustainable.

Including deer within a natural capital valuation provides a greater understanding of their whole worth, rather than focusing just on their traditional value as sporting quarry and venison or their perceived impact on other management objectives. Possessing a full asset value picture allows land management decisions to be genuinely well informed and opens up additional funding sources for landowners via external NC investment potential.

Jahama Highland Estates has instructed a full NC valuation of its 114,000 acres, placing the NC approach at the heart of our Estate Vision. Informed by our NC data, we will apply equity of focus across the three pillars of sustainability; our strategy is to optimise traditional estate management enterprises and mix these with new opportunities, considering no single issue in isolation. As part of the global GFG Alliance, we are uniquely well placed to adopt this approach at landscape-scale.

We welcome interest from other landowners, managers and communities and are currently booking stakeholder presentations of our Vision and Strategy.

Julia Soddart MRICS is Chief Operating Officer of Jahama Highland Estates

Carbon Sequestration

The GFG Alliance, an international grouping of businesses founded by the Gupta family, has set a carbon-neutral target of 2030. As champions of sustainable industry, GFG combines industrial, financial and natural resources in a collaborative and innovative approach to transform businesses, communities and the economy.

Carbon calculations are a significant component part of NC valuations, and the sequestration of carbon is a key focus of sustainable business.

Competent management of peatland – the largest and most efficient terrestrial carbon store – is essential for carbon sequestration, and we have ample opportunity for this in Scotland.

Restoration and management of peat is a vital part of tackling the climate emergency, since the carbon storage

function of peat is substantial when it is in good condition. Most readers will be familiar with Peatland ACTION (featured on pages 8-9), which provides advice and support for peatland restoration.

Additional approaches to carbon sequestration include management of different soil types to improve organic matter content; permanent pasture, extensive grazing and no or minimum tillage of arable land all have important roles to play here.

Further, growing trees is a well-publicised contribution to carbon sequestration, though caveated by 'the right tree in the right place' and the wider consequences of land use change especially in the uplands.

Julia Stoddart MRICS

NATURAL CAPITAL ACCOUNTING APPROACHES

Photo: Dick Playfair

In response to new environmental policy challenges



Dr Paola Ovando Pol
The James Hutton Institute

Land managers in Scotland and across the UK are facing the uncertainties of post-Brexit farming and food policies, and agricultural support schemes are moving towards 'public goods' provision. For instance, managing farmland, woodland, water and livestock to enhance or protect natural resources, deliver ecosystems services (eg carbon sequestration, flood mitigation, recreation, education, or cultural heritage values) and mitigate or adapt to climate change are key in the recently relaunched Agricultural Bill outlining payments for public goods in England¹.

In addition, the global climate change emergency declared in May 2019 by the Scottish Government calls for a net-zero greenhouse gas (GHG) emissions target by 2045 for the agriculture and land related sectors. In this policy context, aspirations such as net-zero agriculture and public goods enhancement are likely to be significant drivers of future public and private funding opportunities for sustainable land management across the UK.

Natural capital – the stock of natural resources such as water, soil, air, minerals, and all living things – is increasingly acknowledged as core to these environmental aspirations. Farming and land management are particularly reliant on natural capital to provide goods and services that can be turned into a variety of benefits to people, such as food, fibre, natural flood defences, recreation or for aesthetic value. Intensified agricultural production systems coupled with failure to account for impacts on natural capital in the past have led to the depletion and degradation of natural capital stocks².

Natural capital accounting in Scotland: an overview

Natural capital accounting is now widely used as a descriptor of activities not only to document and construct better recording of natural assets for policy, but also for decision making. Not surprisingly, both private and public sectors have been exploring the ways natural capital can be appraised and integrated into decision-making. Diverse natural capital initiatives – and a mini industry of natural capital studies – have emerged over the last few decades, resulting in a wide variety of reports, tools, methods and frameworks. But today we can single out two main types of natural capital accounting, one relating to national accounting statistics (eg Scottish Ecosystem Service Accounts³), and the other to businesses and corporations.

The business approach is typified by the Natural Capital Protocol, developed by the Natural Capital Coalition. The Protocol provides a standardised set of rules for helping business to identify, measure and value their impacts and dependencies on natural capital, and also risks and opportunities. A first world-wide trial of this framework was applied to land-based businesses involving three tenant farms on the Glenlivet Estate, Moray, part of Crown Estate Scotland^{4,5}. These trials assessed natural capital impacts and dependencies of farm enterprises in mainly qualitative terms, but also offered monetary valuations of impacts of natural capital restoration projects (eg peatland restoration, soil improvement etc).

Large corporate landowners and land managers in the UK are using the Corporate Natural Capital Account framework which develops balance sheets that illustrate the value of natural assets and the ongoing costs of maintaining natural capital (liabilities). Once drawn up, these reflect both the internal economic benefit of natural capital to the respective organisations (financial accounts based on market prices), and the value of non-market benefits (or disbenefits) produced by the activities of the organisation on natural capital. This framework has been recently tested to value the benefits from land owned or primarily managed by Scottish Natural Heritage. The pilot study covers about 56,000 hectares of mostly National Nature Reserve land in Scotland⁶, and indicates annual benefits estimated at £28 million, which are largely associated with the provision of public goods (eg recreation and climate mitigation).

Integrating natural capital thinking into land management strategies

Natural capital approaches such as the Protocol and Corporate accounts methods have been proven as useful means for improving an organisation's or business's understanding of benefits accrued from natural capital and ecosystem services for both themselves and for wider society. Importantly, natural capital assessment is not all about benefits, but also the disbenefits of business activities. It is increasingly being recognised that well-managed natural capital stocks can create positive opportunities to reduce negative impacts of, for example, farming, while mitigating future financial risks, and responding to increasing scrutiny levels of business environmental responsibility. Natural capital assessment can help evaluate business for wider benefits and impacts and help land managers to align business strategies with future net-zero targets and public payments for public goods requirements.

The latter would seem to connect well with ongoing efforts to integrate public interest into Deer Management Plans, through landscape-scale land management plans addressing wider environmental, cultural and social objectives (ie public goods). Habitat Impact Assessment, and associated deer impact monitoring systems which are adopted now by the majority of upland deer managers can provide relevant elements for a comprehensive, sectoral natural capital assessment.

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For the Attention of Estate Owners, Woodland Managers and Conservation Bodies

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Restoring Scotland's Peatlands



Andrew McBride
Project Manager, Peatland ACTION

Most deer estates will be familiar with peatlands, vast areas of soil made of decaying plant material in waterlogged conditions. Surprisingly, peatlands play a crucial role in all of our lives. As stores of carbon they are important in tackling climate change but also help with flood regulation, water quality and support nationally and internationally important nature, including uniquely adapted wildlife. They are a key part of our rural, farming and crofting communities. Recognised as internationally renowned landscapes, peatlands also benefit tourism.

Sadly, peatlands are also one of Scotland's largest degraded ecosystems. At almost two million hectares of peatlands, they cover about 20% of Scotland's land area. It is generally thought that around 80% of Scotland's peatlands are damaged in some way. Much of the damage relates to historical management, for example, inappropriate burning and overgrazing.

When peatlands are damaged, drained or burned, peat decomposes and the stored carbon dioxide (CO₂) is released into the atmosphere, contributing to climate change. The rate of release is greatly accelerated when peatlands dry out. However, when they are restored, peatlands capture carbon through the process of peat formation. Restoring peatlands is gaining increasing recognition as a nature-based solution to mitigating climate change.

Peatland ACTION in action

In 2012, the Scottish Government allocated funds to an SNH-led peatland restoration project to kick-start the restoration challenge. Peatland ACTION continues to restore damaged peatlands in Scotland by providing advice and funding to landowners and land managers who want to restore their peatland habitats. This support is available from a project's conception through to help with practical work.

From the start of Peatland ACTION to the end of March 2019, over £20 million has been invested in the initiative. More than 19,000 hectares have been put on the road to recovery, covering over 200 sites across Scotland in both the lowlands and uplands.

The work continues. The recent climate emergency declaration has raised peatlands' national and international profile. Scottish Government has a goal to restore 250,000 hectares of damaged peatland by 2030. In this current financial year (2019/20), Scottish Government allocated £14 million to peatland restoration activities involving a number of partners in public, private and third sectors, and partly coordinated by SNH through Peatland ACTION. By protecting and restoring peatlands we can safeguard their existing carbon store and help Scotland meet its ambitious climate change targets.

Peatland and deer management

The impacts of deer can have a major influence on habitat restoration: trampling and grazing are two of the biggest



Reprofiling bare peat
Photo: Peatland ACTION



Sphagnum
Photo: Peatland ACTION

pressures on the condition of the Scottish uplands. In conjunction with estates managing their deer numbers, peatland restoration reduces these pressures by improving the resilience of bog vegetation.

Peatland restoration creates small pools which provide water and insects for grouse and other upland birds, benefiting both nature and estates.

Restoring peatlands also contributes to the Code of Practice for Deer Management Public Interests which requires wild deer managers to prevent damage to peatlands.

How to apply for Peatland ACTION funding

Our funding primarily supports on-the-ground restoration activities. This includes combined ditch/grip blocking and reprofiling to increase water levels, allowing the peat-building mosses, called sphagnums, to re-establish. It also supports more novel techniques such as reprofiling bare peat banks (peat hags) which uses the surrounding vegetation to stabilise the bare eroding peat.

There are no geographical restrictions or target areas for Peatland ACTION funding. Before applying you should, however, check whether your proposed restoration activities meet the fund's outcome and eligibility requirements.

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Project information: www.nature.scot/peatlandaction

If you would like to contribute to the ongoing work of Peatland ACTION please contact peatlandaction@nature.scot

Peatland restoration and deer management case study:
www.nature.scot/peatland-action-case-study-whats-connection-between-peat-and-deer-management

We are on Twitter. Follow us @PeatlandACTION

PEATLAND RESTORATION ON AUCHLYNE & SUIE ESTATE

Photo: R J Cooper
Loch Lomond & The Trossachs
National Park Authority / Peatland ACTION

Nicola Colquhoun
Auchlyne & Suie Estate

Auchlyne & Suie Estate is located in Glen Dochart and is part of the Breadalbane DMG in the north and the Balquhiddier DMG to the south. It lies on the northern boundary of the Loch Lomond and the Trossachs National Park (LLTNPA) and it was by working with the LLTNPA's land management team, and taking a more holistic view of the estate, that helped us to identify opportunities that could improve both the financial and environmental sustainability of the business.

We looked at the current farming and forestry practices, sporting interests and diversification and a couple of the outputs from this were an application to the Scottish Rural Development Programme Agri-Environment and Climate Scheme (AECS) and applications to Peatland ACTION.

We understood that the peatland on the estate was degrading due to previous Government schemes supporting the construction of drains (grips) and historic over-grazing of livestock. However, given the reduction in grazing in the 20 years preceding the projects, the main pressures on the peatland were the active draining through the grips, and the effect of weathering on the exposed peat.

So, in partnership with Peatland ACTION and the LLTNPA, we have carried out two peatland restoration projects - in 2016/17, 101ha on Bovain and in 2017/18, a further 54ha on Innishewan. A total of 28km of hag/gullies and 12km of grips have been re-profiled. 314 peat dams have been installed and 100m² of bare peat covered.

Much of the work was to block drains to raise the water table and prevent the fast flow through which erodes the peat and releases the carbon into the atmosphere. We also vegetated bare peat, by reprofiling the peat hags, or covering over areas of bare peat with turves that will allow revegetation.



Photo: R J Cooper
Loch Lomond & The Trossachs
National Park Authority / Peatland ACTION

The benefits are clear: with the peat acting like a sponge, peak flows are reduced in the burns; the ground with a healthier vegetated surface rather than bare peat, offers an "early bite"; fewer lambs will be lost in the drains; and carcass extraction through re-profiled peat hags will be much easier.

By undertaking peatland restoration, the roles of grazing pressures, retained water, and landscape and wildlife enhancement within the estate business are better understood. These benefits may take time to be realised in the estate finances but will ensure the business is environmentally on a more sustainable footing.

The other benefits obtained through peatland restoration are often having impacts beyond the estate boundary and for the wider public good: carbon storage; flood prevention; wildlife and landscape enhancement. With these public benefits it is seen that public funding is appropriate in taking the restoration forward, especially as it was Government incentives of the past that had an adverse effect on these habitats.

We are currently looking at further project sites on the southern side of the estate as we see the benefit in carrying out this conservation work.

I'd like to thank Richard Cooper, the LLTNPA's Peatland ACTION Officer for his photographs and input for this article.

BLANKET BOG RESTORATION – LOCHROSQUE AND KINLOCHEWE ESTATES

Photo: Angus Davidson Ltd



Angus Davidson,
Angus Davidson Ltd

Blanket bog restoration began on Lochrosque and Kinlochewe Estates, member of the West Ross Deer Management Group, in 2017 and to date over 300ha has been restored in a number of phases. In 2019 the estate was awarded the Enhancing Our Environment Award by Scottish Land and Estates for its innovative approach to land management and its ongoing commitment to blanket bog restoration.

The peatland restoration works have been funded through the Peatland ACTION project which has supported restoration of around 19,000ha of damaged peatlands in Scotland since 2012. Blanket bog restoration has been a significant success story in Scotland's goal to protect its carbon stocks and was originally conceived as an important tool to support the Scottish Government target of net-zero emissions of all greenhouse gases by 2045. It was also seen as part of a wider global response co-ordinated through the Paris Agreement (2016) which aims to strengthen the global response to the threat of climate change.

The emphasis on restoration of blanket bog systems is important because they are one of the most significant global resources that isolate and store atmospheric carbon. Blanket bogs cover only 3% of the earth and store 550 Giga tonnes (550,000,000,000 tonnes) of carbon whereas all the forests on earth isolate around 275 Giga tonnes of carbon.

The benefits of restoration on Lochrosque Estate has had significant impact on a number of areas:

- Biodiversity, particularly sphagnums in pool systems have flourished (an important milestone in blanket bog restoration).
- Many of the distinctive characteristics of a Highland bog system have been restored and the effect is visually striking.

- There has been an increase in ground nesting bird populations - likely supported by ditch blocking which is a key element in reducing chick mortality.
- Measurable reductions in sediment in drinking water treatment plant intakes at Achnasheen (Information via Scottish water).
- High rainfall and runoff are managed more effectively by the creation of large interconnected pool systems - this has reduced blockages at the water intake for the hydro scheme.
- A reduction in runoff and increased water storage capacity have led to positive increases in the generating capacity of the hydro scheme that sits at the mouth of the main restoration site.
- There is much less scouring of the small river that exits the catchment, which should in the long term increase water biota/improve fisheries.
- The site is next to a popular hill walking route and the public have been very positive around the visual changes on site.
- Provides local employment and develops/maintains restoration specific skillsets.

Looking forward, the Scottish Government has committed to 20,000 hectares per year of peatland restoration from 2020 onwards in its latest climate change plan. This initiative will open up new opportunities across the board and the wider implications are that blanket bog restoration will begin to form an important part of property portfolios as well as delivering significant societal and environmental benefits.

Angus Davidson is founder and owner of Angus Davidson Ltd

www.angusdavidsonltd.com

Peatland restoration old and new

In 2018, support from the Peatland ACTION Fund helped Glenfalloch Estate to restore approx. 40ha of peatland on the Beinglas Burn.

This peatland has helped to restore a sensitive area within a National Park and on the boundary of a National Scenic Area. This area is also known to host a number of upland bird species and by doing this work the habitat available to a number of these species has been increased. Photos show before and after the restoration work.



Photo: Glenfalloch Estate, Beinglas Burn before



Photo: Glenfalloch Estate, Beinglas Burn after



Cladich, Argyll

Photo: Leif Brag, Wildlife Manager, Tilhill Forestry

At Cladich, Argyll a peatland restoration project was undertaken in 2005 in conjunction with black grouse management where peat dams were installed in a natural run off with great effect.

There was also a lot of heavy respacing of lodgepole pine in order to create a Swedish style bog land.

What's the connection between peat and deer management?

The answer is working in partnership with Deer Management Groups.

This case study focuses on peatland restoration across 14 estates in the Monadhliath Deer Management Group (MDMG) over a three-year period between 2017 and 2020.

www.nature.scot/peatland-action-case-study-whats-connection-between-peat-and-deer-management

Native woodland must be viewed by land managers as an opportunity, not a threat.



Andy Turnbull
Partner, Bidwells

Action to reduce the threats posed by global warming is moving up everyone's agenda and, apart from dramatic reductions in

our use of fossil fuels, one of the most effective means of reducing atmospheric CO2 is to plant trees.

Governments across the UK have switched on to this message, with cross-party support for increasing the levels of woodland creation focusing on both commercial and native woodlands.

Between April 2018 and March 2019, the UK planted some 13,400ha of new forest, almost 85% of which was in Scotland. And it is currently only in Scotland where systems are in place to deliver the planting targets (which have recently been ramped up again with Holyrood Ministers signing a pledge to increase planting to 18,500ha per annum by 2024/25). This is in response to the First Minister's declaration of a 'climate emergency' last year and the recent passing of the Climate Change (Emissions Reductions Targets) (Scotland Bill) in September 2019. The Bill increases the rate at which Scotland should reduce its emissions from an 80% cut on 1990 base level by 2050 to a 100% cut by 2045 – which is five years before the rest of the UK.

There are a number of reasons why new woodland creation is an attractive tool for the Government to deploy. Forests are recognised for delivering multiple policy outcomes including locking up carbon, rural employment, production of sustainable construction materials, health and wellbeing, and (particularly for native woodlands) biodiversity benefits. New woodlands, over time, possess the benefit of providing winter shelter to deer herds particularly during periods of adverse weather and red deer are, of course, woodland creatures by nature. These benefits and more are also being delivered for a relatively small pot of money - currently an annual budget of £42 million, via the Forestry Grant Scheme - when compared to the annual agricultural budget of around £500 million.

In addition to creating new woodlands, there is also a focus by Government agencies on improving the condition of existing native woodlands. SNH's recent *Assessing Progress in Deer Management* report stated that the national native woodland condition and restoration targets were not yet showing sufficient progress, with deer being cited as a major factor. This focus, suggests the report, will have direct relevance to the declared 'climate emergency'.

Many people, particularly within the deer sector, may say that SNH's views on the effects of deer are debatable and some commentators believe SNH is possibly using Habitat Condition Reports as an excuse to further an agenda of



Photo: Victor Clements

dramatic deer reductions. Nonetheless, when combining the pressure from SNH and the recommendations set out in the Deer Working Group's recent report, *The Management of Wild Deer in Scotland*, the policy direction does appear to be clear. The deer sector will need to be even more sensitive to numbers, impact, habitat and other land uses than ever before – despite the great strides made in these areas over recent years.

In addition to the carbon sequestration potential of new and regenerating native woodlands, there is increasing recognition of the ecosystem services delivered by trees, uplands and peatlands in wider land use issues such as flood amelioration, freshwater temperature control and providing opportunities to arrest declining biodiversity. The development in Natural Capital and Green Finance markets may provide real opportunities for land managers and owners to benefit from enhancing natural assets such as native woodlands.

Building on work undertaken to date, Deer Management Groups have an opportunity to play a pivotal role in helping to deliver new woodlands and improving the condition of existing native woodlands. Focusing on these areas will help demonstrate that DMGs are "doing their bit" to mitigate climate change and enhance the biodiversity of the uplands. Deer and trees are often seen to be in conflict, however with a progressive management approach, in the absence of/and with fencing, new trees – in the right place - can be established. These 'forests for the future' should be regarded for the multiple benefits they deliver including the value they have for deer welfare and sporting diversity. The current strong support from the public and Government for more native woodlands should be taken advantage of by DMGs. Cultural change may be needed in some quarters but there is a real opening to all involved in the management of deer to show leadership in woodland planting and restoration.

MONTANE WILLOWS, HOW DID THEY GET THERE?

Photo: Victor Clements



Victor Clements

There is a popular meme which we often see on social media, with a cow stuck in a gate, or a giraffe up a tree, or a politician promoted well above their ability, with the caption being: "Did you ever see something and wonder how it got there?"

In terms of deer management, montane willows are a type of habitat which is exceptionally difficult to resolve, even with the will to do so, and a significant number of Special Area of Conservation (SAC) designated woodland features in unfavourable condition are of this type. Willows are extremely palatable and nutritious and are easily the most attractive vegetation that a deer might encounter in our high hills. Because of this, most surviving fragments are confined to inaccessible ledges, and the prospects of them spreading out further are practically zero in current circumstances. It is possible to reduce deer densities in an upland area and achieve an improvement in a range of habitats, but montane scrub is so vulnerable to any browsing pressure that most people accept that they will be the last habitat to recover, if indeed they can recover at all at any likely deer density. In many areas, you suspect the required density might be zero.

It is worth taking a step back and asking the obvious question, in order to understand the problem with which these sites present us.

How did they get there?

After the last ice age, new forests will have spread quickly along the bottom of our Highland glens, and more gradually up the flanks of the hills on either side so that they eventually reached a height where climatic factors dictated that trees and shrubs could grow no higher. Some

species were more capable of growing at higher altitudes than others and, over thousands of years, these species will have adapted their growth form and habits in order to survive. Some genetic mutations might have taken place and, as is common still today with willows, all sorts of combinations of hybrids probably arose, some of which were better suited to the higher areas than others. It is possible that in some areas, little fragments of woodland survived the ice flows, but there is no way of knowing this for sure. So, the answer to this question is that, almost certainly, montane species did not just appear at the top of our hills. The woodlands of which they were a part started at the bottom of the glens and spread upwards. Some species could only survive at lower levels. Others could not compete on the more fertile soils but found they could establish a niche for themselves where others could not survive.

Our montane species existed as part of this wider forest, extending from the floor of the glen to the tops of the hills. Whatever browsing pressure existed will have been dispersed over this wider woodland area, with proportionately less pressure on these higher areas, especially as most animals would have preferred to graze at lower levels. These montane species will have had a decent chance of getting away. This is the obvious context in which they first developed and were able to sustain themselves.

Thousands of years later

In the landscape we see today, the lower forests have been felled so that we could develop agriculture and feed a growing population, and the vast majority of our native forests in upland areas have been cleared by over exploitation, fire and grazing, to the point where, in many areas, small fragments of montane scrub high up on cliffs are all that is left.

Montane Willows - continued

It is also now fairly well understood and accepted that, on a parallel timescale, changes in climate have favoured the growth of peat over native woodland, with the former now making the latter more difficult to establish in many areas, and government now advising against this. Today, in 2020, ninety-nine percent of the native woodland in many glens is gone. The montane fragments remained because they had no economic value, and were out of reach of both people, deer and livestock. It isn't the best of the forest that has survived, but the worst, the little bits that no-one wanted. What we designate today are not examples of what used to be there, but just little splinters of it. This process has taken centuries if not thousands of years to get to this point, it hasn't just happened in the 150 years or so since Victorian times.

What we have today

Today, many of these areas of montane willows are designated and held up as some of our most precious and diverse upland habitats. There is a lot of interest in preserving them, and in many areas, agency attention is turning to lowering deer densities to protect them as most are in unfavourable condition. As with many habitats, we struggle to define what 'favourable condition' might look like, or what the timescale for achieving that might be. The vision is a process by which the current fragments can spread out and expand their range, but this is not how they got there in the first place.

Connectivity is important - no tree is an island

These fragments established and sustained themselves in the past because they were part of a much bigger forest, covering the vast majority of the landscape. This is how small palatable shrubs survived, in a much wider matrix of woodland. There may well have been bears and wolves and other natural processes at work to reduce overall browsing, but there was also an over-abundance of other alternative browse as well, for example species such as birch which could withstand much more pressure, and this will have been an important part of the overall equation.

It is not possible to make these montane habitats self-sustaining by expanding them at the top of our hills. If we want to see them functioning in their natural state, then we need to recreate forests at a lower level and spread them up the hill to join these surviving fragments. The best montane fragments we have in Scotland tend to have this habitat connection, most notably in the Cairngorms, but many of our designated features are completely isolated. If we want to save them, we need to build the foundations by having that lower forest first. If you think of the problem in terms of a ladder to the mountain tops, there is no point in having the top rung in place if the ones below are missing. In many areas, that is a major undertaking, and one that many people will not contemplate. They may well judge that something else should be prioritised, given the commitment, expense and opportunity cost required, and they may well be right in this.

We cannot regenerate tiny fragments of native woodland in isolation with any prospect of success. If we want to build that ecological ladder that works in practice, we have to do it from the bottom of the hill upwards, and that may well take hundreds - if not thousands - of years.

If it took this long to remove our forests, it will certainly take the same time if not longer to put them back, and who knows what trials and tribulations will take place in the interim? Looking at it on this timeline, each of us can only have a very small part to play, but one thing is sure: if we want to do these things, we need to expand forests from the places that are strong to join up with the places that are weak, not the other way around. Any plan that looks at these areas in isolation will not work.

Victor Clements is a native woodland advisor working in Highland Perthshire. He is secretary of the Breadalbane DMG and a member of the Executive Committee of ADMG.



Photo: Victor Clements

Scenarios for the persistence of woodland in the presence of grazing.

Victor Clements has also reviewed an important recent paper by James Fenton which will be of interest to those concerned about the natural environment of the Highlands and particularly the balance between moorland, native trees and deer.

James Fenton's paper was published on 9 October 2019. The link to the review is:

www.deer-management.co.uk/woodland-or-open-ground-scenarios-for-the-persistence-of-woodland-in-the-presence-of-grazing/



Forestry and Land Scotland - Deer Fencing



Ian Fergusson, Deer Management Officer,
Forestry and Land Scotland

Forestry and Land Scotland manages 630,000ha of Scotland's nationally owned forests and land on behalf of

the people of Scotland.

Deer management is an important part of that work and is seen as being pivotal to achieving many of the Scottish Government's climate change and environment targets.

To help protect Scotland's national forests and land from the negative impacts of deer we employ a number of tactics. Although culling remains our principal method, we also make targeted use of deer fencing in various forms such as strategic, boundary and enclosures.

Fencing is an important management tool. It comes with a significant cost however and can't provide the total solution. It has a limited life, is difficult to keep deer-proof and does not offer an effective solution in many circumstances.

Where we have a legal requirement to deer fence or maintain a deer fence, then we will continue to do so. However, as we continue to face financial challenges ahead, we will be looking to reduce our deer fencing costs across Scotland. This approach may on occasions be viewed unfavourably by some of our neighbours, particularly adjacent to deer forests, whereby we might be unable to maintain and renew strategic deer fences.

Over the coming months, we will be reviewing our protocol for managing emergency situations related to deer on Forestry and Land Scotland land.

Any of our local teams that are looking to erect/maintain deer fencing must - for each site - make a business case, which is then reviewed by senior managers to ensure that we take the best decision while making the best use of our limited resources.

Business cases that contain a commitment from neighbouring landowners to contribute a minimum of 50% towards the cost of renewing/maintaining a deer fence, will clearly be easier to consider. This very targeted approach to fencing has the support of many environmental non-government organisations.

Other factors we need to consider are that fencing can be visibly intrusive, can restrict access and can have an impact on other wildlife, such as increasing the number of bird strikes and preventing animals from gaining shelter in adverse weather conditions. It can also displace deer from one area of land to another and so create – or magnify - issues relating to deer population levels.

In response to the Deer Working Group report and to play our part in the Scottish Government's commitment to afforestation and biodiversity targets related to the climate emergency we will give further careful consideration to our deer fencing policy when we update our Deer Management strategy later in 2020.

In the meantime we will continue to work with our neighbours and NGOs to manage deer populations to levels that are sustainable and that do not have a negative impact on environmental and land management objectives.

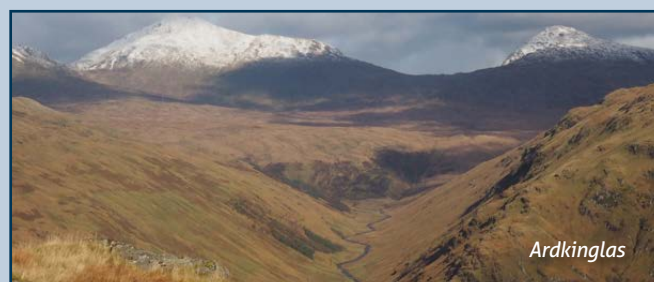
New planting and restoration of native woodland is not new policy. Land managers have been engaged in this for many years, for example:

.....

In 2012 Glenfalloch planted an area of 14.12ha of native woodland in Coire Ordren. This new broadleaf woodland extended the area of Native Woodland on this part of the Estate that was already home to two compartments of a woodland SSSI, Glen Falloch Woods. The new woodland took some work in getting going but is now established in a nice mosaic of open ground and woodland and has contributed towards extending the area of native woodland which is already an important habitat as exhibited by its designated status.



At Ardkinglas around 80ha of new native woodland in three blocks was planted in the Upper Glen Fyne area. Whilst more than 10 years old, this is still 'recent' in woodland terms and is later than much of the work done in the Native Woodland Survey of Scotland.



Scottish Deer Health Survey Update

Prevalence and species of *Cryptosporidium* present in Scottish wild deer populations

Dr Beth Wells and Dr Tom McNeilly, Moredun Research Institute



***Cryptosporidium* is a parasite which is commonly found in the environment, and in particular water. The parasite has many different species, of which *Cryptosporidium parvum* causes disease in a variety of host animals.**

This species is the commonest cause of diarrhoea in calves and also can be passed to humans, where it is responsible for almost 40% of cases of cryptosporidiosis in the UK. Although cattle are known to be the main reservoirs of the parasite, there is evidence that wildlife, such as deer, rabbits and geese, can transmit *C. parvum*, usually when co-grazing with cattle.

The parasite is of particular interest to the water industry as it can cause contamination of water supplies, making the water unfit for human consumption.

As part of the Scottish Deer Health Survey (2017 - 2018) where faecal samples from Scottish wild deer were collected for analysis for the prevalence of *E. coli* O157, 988 of the samples were also analysed for the presence of *Cryptosporidium*. Results showed that 122 samples out of 988 analysed (12.8%) were positive for *Cryptosporidium* parasites.

The species of *Cryptosporidium* found in positive samples was also determined and is shown in Figure 1.

The most prevalent species found was 'deer isolate', a species common in deer, which has not been reported to cause disease in deer, cattle or humans and is mainly transmitted from deer-to-deer. *C. parvum* and *C. ubiquitum* were the next most common species and these are known to be zoonotic, that is they can infect and cause disease in humans. However, to put these values in context, only 3.8% of the total number of samples analysed were positive for zoonotic species of *Cryptosporidium*, which is very low compared to cattle.

We now intend to carry out further analysis of the data to determine what factors are associated with a sample being positive for zoonotic *Cryptosporidium* species, such as how close the sampled deer were to livestock farms.

These results will be highly informative for water catchment management as they will assist water companies to build models using deer as environmental sentinels of *Cryptosporidium* parasites within catchment areas.

We would like to thank the Scottish Wild Deer Study Steering Group, ADMG and the deer industry for all your time and effort in collecting samples for this study. Without your help, this study would not have been possible. We would also like to thank our funders, Food Standards Scotland and the Scottish Government.

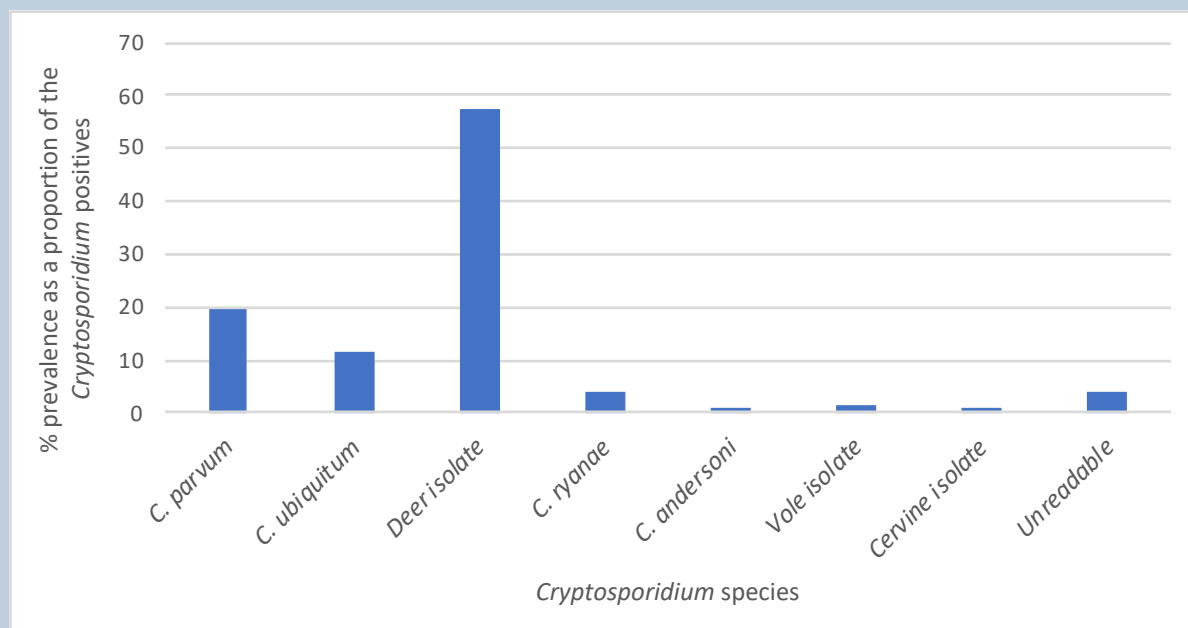


Figure 1:
Prevalence of different species of *Cryptosporidium* parasites found in Scottish wild deer.

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