Capercaillie Emergency Plan 2025 - 2030

NatureScot
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Scotland's Nature Agency
Buidheann Nàdair na h-Alba

Cairngorms
National Park Authority
Ùghdarras Pàirc Nàiseanta a'
Mhonaidh Ruaidh

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Image of a male capercaillie and cover image of female capercaillie and a male capercaillie lekking by Mark Hamblin.

1. Executive summary

The Scottish capercaillie population risks extinction within our lifetimes unless urgent action is taken. This Capercaillie Emergency Plan, initiated by the Scottish Government, will deliver renewed intensive measures at pace and at scale to combat this threat and help our capercaillie population to recover.

Aligned with the long-term vision of the Scottish Biodiversity Strategy and the National Park Partnership Plan, which prioritise the landscape scale restoration of pinewood habitat to safeguard capercaillie, this plan is focused on immediate and targeted measures in the short-term. It identifies actions that will maximise existing opportunities and address specific gaps across a range of interventions to rapidly benefit capercaillie, from improving habitat to reducing the impacts of predation and disturbance at scale.

A wide range of public, private and voluntary mechanisms will need to be secured to fund the delivery of this plan. Success will also depend on high levels of collaboration from all stakeholders, led by the Cairngorms National Park Authority and NatureScot.

In the early 1990s, conservation science projected that capercaillie would be extinct in Scotland by around 2010. The fact that capercaillie are still in our forests speaks volumes about our capabilities. While the precarious state of our capercaillie population demands continued support, such ongoing efforts are not uncommon when dealing with highly vulnerable species.

Now, thanks in no small part to the Cairngorms Capercaillie Project, the widest range of people yet are actively helping capercaillie alongside longstanding efforts by land managers. This plan provides clear direction for continuing that collective endeavour to ensure capercaillie remain in our forests for generations.

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2. Introduction and overview

Objective

The objective of this Capercaillie Emergency Plan is to maximise population impact by enabling the delivery of immediate and targeted measures to improve capercaillie breeding success and survival across the core of the capercaillie range in the Cairngorms National Park.

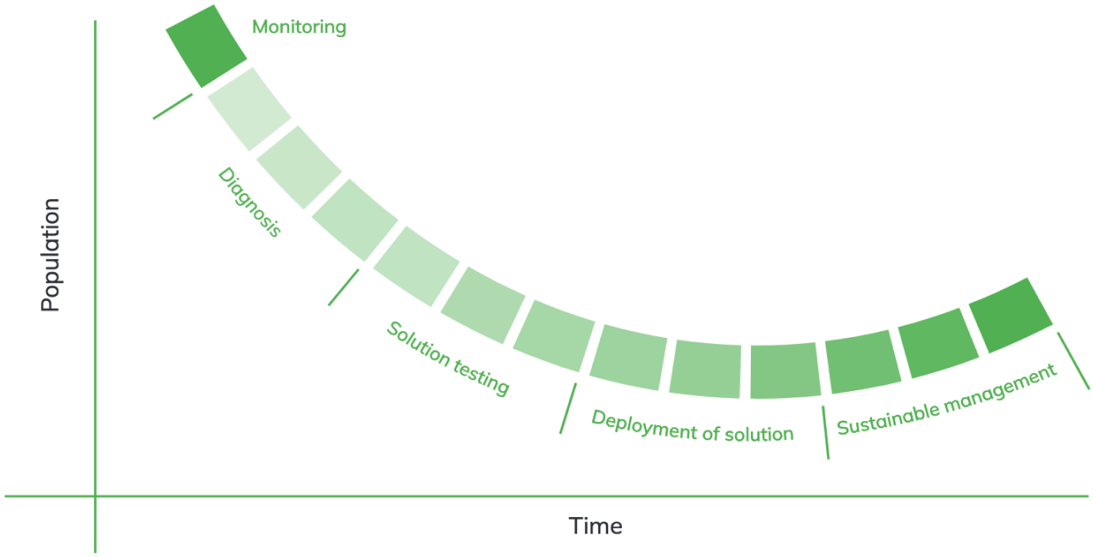
This plan aims to strengthen, and not duplicate work that will benefit capercaillie which is already defined in the National Park Partnership Plan, Active Cairngorms Action Plan and Cairngorms National Park Forest Strategy. That work includes woodland expansion, peatland restoration, deer management, ecological restoration, and minimising disturbance to sensitive species.

Within that wider context, this plan is focused on maximising current opportunities, addressing specific gaps and collaboration at a landscape scale to enable greater levels of action and at pace from 2025 to 2030 to help ensure the long-term survival and recovery of the capercaillie population in the UK.

Background

Capercaillie numbers have decreased by 52% in the last 5 years with the latest national survey (2021/22) estimating that there are only 532 capercaillie left in Scotland. This is the lowest recorded level since the start of the national survey in 1992 – 1994 and places the species at a critical point on the recovery curve around the 'solution testing' and 'deployment of solution' stages.

Figure 1: Species Recovery Curve



Capercaillie continue to face threats, including habitat loss, predation, climate change and human disturbance, which have not yet been adequately mitigated to reverse the population trend. While conservation efforts are underway, these measures have not yet resulted in a significant population recovery, indicating that the species is still in the declining phase rather than moving towards recovery.

A subgroup of the NatureScot Scientific Advisory Committee has advised that capercaillie could be lost within two to three decades if we do not move quickly, and that renewed intensive measures are needed if the population is to be conserved.

> **To maximise population impact, measures to improve breeding success and survival should be targeted in the core range, which is in the Cairngorms National Park where 85% of the UK capercaillie population now lives.**
>
> **The Cairngorms National Park Authority and NatureScot have been asked by the Scottish Government to lead on the development of this Emergency Plan in collaboration with relevant stakeholders to achieve the long-term vision of a thriving capercaillie population in Scotland.**

The actions in this plan are based on the best available evidence and learning from work recently delivered to benefit capercaillie, including through the Cairngorms Capercaillie Project and Cairngorms Connect.

Views have also been gathered from a wide range of stakeholders through a programme of meetings, workshops and an online survey facilitated by the Park Authority and NatureScot. Those views have helped to inform this plan to ensure it is reflective of costs and practicalities and appropriate within the wider context of biodiversity and communities in the National Park.

A key initial step in implementing this plan will be to conduct standardised habitat assessments across the capercaillie range within the National Park. These assessments will help to identify where the interventions outlined can provide the greatest benefit, as the aim of this plan is not to implement every action in every location. Rather it is about delivering the ‘right interventions in the right places’, or the right combination of interventions in targeted areas to maximise population impact on a landscape scale and because there is no "silver bullet" solution.

Scope

The scope of this plan as set out by the Scottish Government is:

1. Landscape scale restoration of pinewood habitat as the long-term mechanism to achieve the vision for a thriving population of capercaillie in Scotland.
2. Costed and spatially explicit positive management measures based on the recommendations of the NatureScot Scientific Advisory Committee subgroup.
3. A fundraising strategy which explores a wide range of public, private and voluntary mechanisms to generate further funding for capercaillie conservation.
4. A pine marten population survey.

Geographical scope

Whilst this plan is focused on outlining targeted measures to improve capercaillie breeding success and survival across the core of the capercaillie range in the Cairngorms National Park, it is also designed to be useful for managers of capercaillie forests outside the National Park. Those land managers may wish to adopt some of the activities described in this plan and or utilise the learnings and insights gained through the delivery of this plan.

Roles and responsibilities

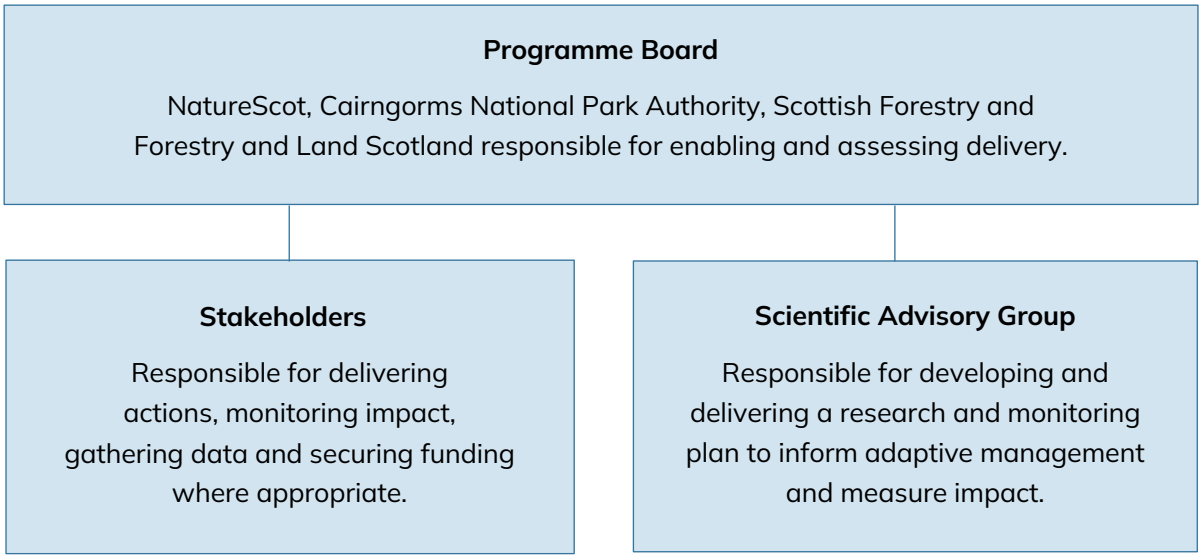
The governance and management of this plan is outlined overleaf. The Park Authority and NatureScot are responsible for this plan at a strategic level. A Programme Board comprising of NatureScot, the Park Authority, Scottish Forestry and Forestry and Land Scotland will enable and assess the delivery, and reporting information will be shared publicly and presented for annual review to the Park Authority Board Performance Committee.

Stakeholders are responsible for working proactively to implement the activities outlined, monitor impact and help secure funding where appropriate. Specific partners are listed for each of the activities, with lead partners to be defined.

A Scientific Advisory Group, chaired by NatureScot, are responsible for developing and delivering a research and monitoring plan to inform adaptive management and measure the impact of the activities outlined in this plan. The group will also maintain oversight and support the specific research actions within this plan, e.g. the reinforcement feasibility study.

A Terms of reference to define the purpose and structure of the Scientific Advisory Group will be developed by NatureScot and the Park Authority and organisations and individuals will be invited to join the group accordingly.

Governance and management



Scottish Capercaillie Group

Formed in 1994, the Scottish Capercaillie Group, provided a central forum for a range of stakeholders to discuss capercaillie matters. Chaired by the Park Authority, the group was set up to implement the Species Action Plan for Capercaillie within the UK Biodiversity Action Plan and was instrumental in developing and delivering the 2001 FCS Challenge Fund, the 2002-2007 EU Capercaillie LIFE Project, and the 2007-2012 Species Action Framework. Whilst the group has continued to meet since 2012, the membership has reduced.

This plan provides an opportunity to reinvigorate and realign efforts to save capercaillie drawing on the full breadth of partners across the public, private and third sector as highlighted by the list of stakeholders overleaf. As the remaining members of the Scottish Capercaillie Group can actively contribute their expertise as part of that wider stakeholder group, the Park Authority will cease to Chair the Scottish Capercaillie Group and instead prioritise collaboration with the full breadth of partners.

Stakeholders

The capercaillie population in the National Park extends across approximately 30 landholdings. The key stakeholders for this plan are those who own, manage or represent the interests of those landholdings; those who represent recreational groups relevant to those landholdings; and those who manage public, private and voluntary funding mechanisms relevant to activities in this plan. Those stakeholders include:

- Aberdeenshire Trail Association
- Abergeldie Estate
- Aigas Field Centre (Lek It Be Champion)
- Anagach Woods Trust
- Aquila Wildlife and Nature CIC (Lek It Be Champion)
- Arc Guiding (Lek It Be Champion)
- Atholl Estate
- Badaguish Outdoor Centre
- Baddengorm Wood
- Badenoch and Strathspey Trail Association
- Ballogie Estate
- Balmoral Estate
- BASC Scotland
- BirdGuides
- Birding Ecosse (Lek It Be Champion)
- Birding Ecotours (Lek It Be Champion)
- Bird's Wildlife & Nature (Lek It Be Champion)
- Birdwatching and Wildlife Club (Lek It Be Champion)
- Birdwatching Trips (Lek It Be Champion)
- Birse Community Trust
- Cairngorms Birding (Lek It Be Champion)
- Cairngorms Business Partnership
- Cairngorms National Park Authority
- Cairngorms Runners
- Carrbridge Capercaillie Group
- Cawdor Estate
- CONFOR
- Developing Mountain Biking in Scotland
- Dorback Estate
- Dunecht Estates
- East Cairngorms Moorland Partnership
- Finzean Estate
- Forestry and Land Scotland
- Fountains Forestry
- Game and Wildlife Conservation Trust
- Glenmore Lodge
- Glenmuick Estate
- Glen Tanar Estate
- Highland Quietlife (Lek It Be Champion)
- Highland Wildlife (Lek It Be Champion)
- Invercauld Estate
- Instinct (Lek It Be Champion)
- Llagganlia Outdoor Centre
- Mar Estate
- Mar Lodge Estate
- Moray Estates
- Mountaineering Scotland
- Naturalist Journeys (Lek It Be Champion)
- NatureScot
- NatureTrek (Lek It Be Champion)
- Norfolk Birding (Lek It Be Champion)
- North East Adventure Tourism
- Oriole Birding (Lek It Be Champion)
- Police Scotland
- Ramblers Scotland
- Rare Bird Alert
- Rothiemurchus
- RSPB
- Royal Zoological Society of Scotland (RZSS)
- Scot Mountain Holidays (Lek It Be Champion)
- Scottish Capercaillie Group
- Scottish Forestry
- Scottish Gamekeepers Association
- Scottish Ornithologist's Club
- Scottish Orienteering Association
- Scottish Woodlands
- Scotways
- Seafield and Strathspey Estates
- Speyside Wildlife (Lek It Be Champion)
- Tombain Wood
- Tulchan Estate
- University of Aberdeen
- University of Glasgow
- University of St Andrews
- Wildland Limited
- Wild Discovery (Lek It Be Champion)
- Wild Scotland
- Wings Birding Tours (Lek It Be Champion)
- Woodlands For Sale
- Volunteer Cairngorms

Research and monitoring plan

A Scientific Advisory Group will develop and oversee a research and monitoring plan to assess the effectiveness of the management actions within this Emergency Plan. The critical question being - are the positive influences of the management actions sufficient to increase the UK capercaillie population.

An Integrated Population Model will be key to answering this question by enabling historical survey data to be combined with new evidence e.g. improvement on nest or chick survival in response to diversionary feeding, or juvenile survival in response to fence removal. Using this data, the model can predict the future trajectory of the UK capercaillie population and inform adaptive management and the prioritisation of actions and funding where necessary. The Capercaillie Integrated Population Model developed by the University of Glasgow is particularly well-suited for this task and will be adopted to annually review and update this Emergency Plan.

Findings, key insights and recommendations from interim data analysis will be fed from the Scientific Advisory Group to the Programme Board on a rolling basis to enable timely adjustments to strategies as needed. New scientific findings may also identify a need to adjust approaches, and the research and monitoring plan will be reviewed and updated as required to reflect adapted approaches and incorporate new information.

CaperMap will be used to present research and monitoring data spatially and in an accessible format to enable a collective understanding of progress and where adapted approaches are required. CaperMap has already proven effective as a communication and planning tool within the Cairngorms Capercaillie Project.

Fundraising strategy

Delivering capercaillie conservation at a landscape scale will require effective partnership working, particularly in securing funding. Given the scale of the task and limited Scottish Government resources, it is essential to blend various funding streams to implement the actions in this plan and accelerate delivery.

Key Scottish Government grant programmes, including the Forestry Grant Scheme (FGS), Nature Restoration Fund (NRF), and Peatland ACTION, form the core of funding for capercaillie conservation. These grants will play a pivotal role in the blended funding strategy, helping to drive investment from non-governmental organisations and private sources.

> **The Cairngorms Capercaillie Project is a proven example of how a blended finance model can successfully deliver benefits for capercaillie. The project budget constituted over £900,000 of investment from private, public and charitable sources, along with over £100,000 of volunteer time. This combined resource leveraged £2 million from the National Lottery Heritage Fund and attracted additional funding, bringing the total investment to over £3 million. The Emergency Plan's fundraising strategy focuses on scaling up this approach.**

The actions outlined in this plan will deliver ecological restoration and expand our native pinewoods. This will benefit capercaillie while also providing broader environmental gains. FGS, NRF and Peatland ACTION funding are all focused on actions that deliver the widest benefits, thus ensuring value for public money. Those benefits include supporting unique ecosystems, enhancing biodiversity, boosting natural carbon sinks, reducing flood and wildfire risks, and advancing sustainable pine forest management.

The Emergency Plan presents significant opportunities for NGOs, private sector entities and local communities to use Scottish Government grants to leverage additional funding sources which they are best placed to access. A collective agreement among stakeholders assures funders that the interventions in this plan are the right priorities, offering the greatest return on investment for capercaillie and the wider natural environment. Scotland's iconic capercaillie also provides a strong profile for fundraising efforts, which should attract further donations. Additional private finance opportunities are being actively explored. However, key risks include constraints on initial (Year 1) funding which could limit the potential to quickly unlock other funding streams. Targeting limited Scottish Government funding effectively will help mitigate this risk.

The table overleaf provides an overview of the estimated cost for delivering this plan and the availability of Scottish Government funding for Year 1. Once standardised habitat assessments have been conducted across the capercaillie range within the National Park to identify where the actions outlined can provide the greatest benefit, more specific costings can be developed.

	Estimated total budget 2025 - 2030	Estimated budget 2025 / 2026 (Year 1)	Public funds available 2025 / 2026 (Year 1)
Adaptive management and measuring impact			
Research and monitoring plan To inform adaptive management and to measure the impact of interventions. Includes data collection and analysis.	**£250,000**	**£50,000**	**£15,000** Contribution to Capercaillie Advisory Officer post
Expanding and improving habitat			
Woodland expansion planning Increase the amount of new native woodland planned around capercaillie forests where opportunities exist for expansion and improved connectivity.	**£200,000**	**£100,000**	**£100,000**
Woodland restructuring Increase the structural diversity and adoption of continuous cover forestry in plantations where opportunities exist to benefit capercaillie.	**£1.1m**	**£500,000**	FGS SMF Native Woodland for deer management and FGS SMF WIG for natural regeneration *Eligible for FGS as a contribution to costs with additional funding from NGO and private sources required to achieve the estimated budget. ***
Woodland grazing Enable woodland grazing with cattle in the National Park where all opportunities exist to benefit capercaillie.	**£4.36m**	**£871,000**	FGS Sustainable Management of Forests: Grazing **
Robocutting Enable robocutting where all opportunities exist to benefit capercaillie.	**£4.23m**	**£845,000**	FGS WIG: Habitat and species **

	Estimated total budget 2025 - 2030	Estimated budget 2025 / 2026 (Year 1)	Public funding available 2025 / 2026 (Year 1)
Forest bog restoration Enable forest bog restoration where all opportunities exist to benefit capercaillie.	**£1.4m**	**£280,000**	**£280,000**
Reducing the impacts of predation			
Diversionary feeding Deliver a 4-year programme (2026 – 2030) of diversionary feeding on all sites in the National Park with suitable hen records.	**£260,000**	**£65,000**	**£0**
Monitoring vole populations Survey vole abundance annually using vole sign index across the core capercaillie range to inform the deployment of predator management actions.	**£97,000**	**£19,400**	**£0**
Lethal control of foxes and crows Assess the current activity of predators in relation to capercaillie hen densities and breeding performance in areas where predator management strategies are in place.	**£5,000**	**£5,000**	**£0**
Monitoring pine marten populations Establish a reliable baseline for pine marten populations in Strathspey to monitor changes in activity over time and track population trends.	**£60,000**	**£25,000**	**£25,000**
Removing and marking fences			
Fence removal Reduce the net amount of fencing in core capercaillie areas.	**£490,000**	**£300,000**	FGS SMF Native Woodland for deer management **

	Estimated total budget 2025 - 2030	Estimated budget 2025 / 2026 (Year 1)	Public funding available 2025 / 2026 (Year 1)
Reducing disturbance			
Reduce recreational disturbance in the priority areas relevant to capercaillie outlined in the Active Cairngorms Action Plan (2024 – 2028).	**£250,000**	**£40,000**	**£40,000**
Capercaillie monitoring			
Monitoring productivity Enable the development and delivery of methods for monitoring capercaillie productivity that gather necessary ecological data at scale but do not require the use of dogs.	**£50,000**	**£10,000**	**£0**
Monitoring leks Enable the development of more robust techniques to monitor target lek sites.	**£50,000**	**£10,000**	**£0**
Monitoring morbidity and mortality Develop and implement an infectious disease surveillance monitoring program for capercaillie and sympatric Galliformes to identify factors affecting capercaillie morbidity, mortality and reproductive success.	**£5,000**	**£5,000**	**£0**
Reinforcement feasibility			
Reinforcement feasibility Evaluate the feasibility of reinforcing the Scottish capercaillie population by introducing birds from Europe and performing exchanges within the Scottish capercaillie population.	**£40,000**	**£40,000**	**£0**

Expanding and improving habitat

Image of a male capercaillie by Mark Hamblin

3. Expanding and improving habitat

Woodland expansion planning

It is a target within the National Park Partnership Plan to create a minimum of 35,000 hectares of new woodland cover by 2045, including a minimum of 80% native woodland and 10,000 hectares of natural regeneration without planting. It is also a target to expand woodland by a minimum of 7,000 hectares by 2027 through the delivery of the Cairngorms National Park Forest Strategy and targeted grant schemes. Whilst planning and approval for woodland expansion takes time and will not produce immediate results; by influencing plans now we can increase woodland cover in core capercaillie areas and ensure the right type of woodland in the right place that capercaillie can access in future.

Objective

Increase the amount of new native woodland planned around capercaillie forests where opportunities exist for expansion and improved connectivity.

Actions by 2030

1. Work with all land managers to support and enable woodland expansion plans where native woodland expansion will deliver the greatest benefits for capercaillie.
2. Use deer management plans to minimise the use of fencing as part of woodland expansion plans in capercaillie areas.

Measures of success

- Native woodland expansion plans in place where all viable opportunities exist to benefit capercaillie in the National Park and that favour establishment through deer management and removing redundant fences.
- Increase in native woodland expansion by natural regeneration and a net reduction in fencing where opportunities exist to benefit capercaillie.

Partners (alongside the Park Authority and NatureScot)

- Land managers in target areas
- Scottish Forestry
- CONFOR

Woodland restructuring

Capercaillie prefer coniferous forests that are open enough to allow plenty of blaeberry to grow, with a mix of bogs, patches of tree regeneration and other shrub and ground cover. This variety is critical, particularly in the capercaillie brood rearing season when access to bog cotton improves the breeding condition of hens, access to invertebrates is essential for chicks, and shrub and ground cover provides protection from predators. Woodland management should try to recreate these conditions, particularly in plantations which account for much of the habitat across the core capercaillie range.

Whilst plantations may have some features like mature trees, they often lack others. Thinning, winching-over trees, small-scale felling to remove non-native conifers and effective deer management can promote regeneration, enable more light to reach the forest floor and rapidly provide the variety of habitat in plantations that capercaillie need. Compared to a clear fell system, employing these techniques in plantations also maintains habitat that could support more capercaillie and avoids the need for fencing restocking sites. With ongoing deer management and forestry operations planned in capercaillie areas, it is essential that up to date, good practice guidance and coordinated management is in place, and strengthened where needed, to protect capercaillie and maximise opportunities for the species.

Objective

Increase the structural diversity and adoption of continuous cover forestry in plantations where opportunities exist to benefit capercaillie.

Actions by 2030

1. Produce new good practice guidance for forest managers to replace the 2003 ‘Forest Management for Capercaillie: An Illustrated Guide for Forest Managers’. Include new and updated information, e.g. key times, dates, distances and managing storm damage, to ensure a consistent approach across all capercaillie areas.
2. Promote the new good practice guidance and the use of Deer Management Plans to forest managers, agents and all relevant agency staff and departments.
3. Identify all thinning and felling operations planned in core capercaillie areas within the National Park and work with Scottish Forestry and the respective land managers to ensure they adhere to the new good practice guidance.

Measures of success

- More plantations in the National Park managed in a way that recreates the diverse habitat required by capercaillie.
- Thinning and felling operations in capercaillie areas follow new good practice guidance.
- Increased capercaillie usage of plantations.
- Higher capercaillie productivity in plantations.

Partners (alongside the Park Authority and NatureScot)

- Land managers in target areas
- Scottish Forestry
- CONFOR

Image of a female capercaillie by Mark Hamblin

Woodland grazing

Seafield and Strathspey Estates, Rothiemurchus Estate, Moray Estates and RSPB Abernethy all currently undertake woodland grazing with cattle to benefit capercaillie and other species. In Abernethy Forest, where ~1,000 hectares are grazed by cattle using Nofence collars, the grazing has produced greater variety in structure, including areas of heather die-back and recovery of blaeberry, track creation for chicks and exposed mineral soil for dustbaths. From ad-hoc observations, capercaillie usage of the grazed areas has increased significantly. Within the main grazed area, the count of lekking males increased from 3 in 2019 to 10 in 2024. Hen and chick numbers have also risen. The Nofence GPS collars allow the herd to be controlled within a virtual boundary, removing the need for fences.

Objective

Enable woodland grazing with cattle in the National Park where all opportunities exist to benefit capercaillie.

Actions by 2030

1. Identify and map target areas in the National Park where woodland grazing stands to deliver the greatest benefit for capercaillie, and where evidence suggests the intervention is already benefitting capercaillie.
2. Utilise opportunities for additional support for woodland grazing under the current FGS budget and as part of the FGS review in 2025 / 26.
3. Secure agreements with local graziers to enable more woodland grazing.
4. Investigate the feasibility, risks and benefits of grazing non-commercial / conservation herds in capercaillie areas.
5. Gather and analyse data from woodland grazing and control sites, using the Woodland Herbivore Impact Assessment where appropriate, to build an evidence base for the intervention and to inform adaptive management.
6. Use the evidence base to inform funding streams for woodland grazing from 2025 / 26 onwards, e.g. optimum scales of delivery and payment rates to enable maximum benefit for biodiversity / value for money.
7. Produce good practice guidance about woodland grazing for capercaillie, ensuring alignment with the Woodland Grazing Toolbox developed by Scottish Forestry, NatureScot and Forestry and Land Scotland.

Measures of success

- Cattle grazing in woodlands where all opportunities exist that favour capercaillie.
- No increase in fencing because of cattle grazing in woodlands.
- Higher capercaillie productivity in woodlands where cattle grazing is in place.
- Increased invertebrate biomass in woodlands where cattle grazing is in place.

Partners (alongside the Park Authority and NatureScot)

- Land managers in target areas and currently undertaking woodland grazing
- Scottish Forestry

Key points on current feasibility and delivery

1. Woodland grazing is eligible for FGS funding at £100 per hectare for a maximum of 100 hectares per 5-year period subject to a woodland grazing management plan and monitoring. Funding is limited and does not meet current demand.
2. Sites will vary, but to continue achieving the anecdotal benefits to capercaillie in Abernethy Forest it is expected that an increased area requires grazing for around 6 months per year for 3 years with about 100 cattle.
3. The delivery cost is estimated to be ~£67 per hectare per year for Nofence collars (assuming a 5-year lifespan for the collars), feed and staff time. Additional funds may also be required to cover start-up costs which can be significant, e.g. handling facilities.
4. SSSI consent and a Habitat Regulations Appraisal (HRA) is required for woodland grazing in protected areas, including the use of prophylactic vet medication.
5. Arrangements for managing cattle vary from a dedicated stockperson employed by the landowner to the grazier taking full responsibility. Different approaches can lead to different outcomes in terms of costs and ecological impact.

Robocutting

Keeping some heather short is an important aspect of providing habitat in which chicks can thrive. Thick, tall heather is difficult for young birds to move through and find the insects they need. A small-scale trial of heather cutting in Abernethy Forest in the early 2000s demonstrated a more than doubling of blaeberry cover and invertebrate biomass and a 7-fold increase in capercaillie usage. Around 200ha of heather has now been cut in Abernethy Forest using a robocutter. Seafield and Strathspey Estates and Rothiemurchus Estate have also recently undertaken robocutting for capercaillie. Compared to strimming or using a flail and tractor, a robocutter can navigate complex pinewood terrain to cut a larger area more quickly, providing instant benefits for broods. Robocutters can also cut into the moss layer and mulch material promoting faster recovery of blaeberry.

Objective

Enable robocutting where all opportunities exist to benefit capercaillie.

Actions by 2030

1. Identify and map target areas in the National Park where robocutting stands to deliver the greatest benefit for capercaillie and where evidence suggests the intervention is already providing benefits to capercaillie.
2. Utilise opportunities under the current FGS budget and seek improved support as part of the FGS review in 2025 / 26 including updated / more appropriate payment rates for robocutting in target areas.
3. Gather and analyse data from robocutting and control sites to build an evidence base for the intervention.
4. Use the evidence base to inform funding streams for robocutting from 2026 onwards, e.g. optimum scales of delivery and payment rates to enable maximum benefit for biodiversity / value for money.
5. Produce good practice guidance for land managers and contractors about robocutting to benefit capercaillie and wider biodiversity.

Measures of success

- Robocutting undertaken where all opportunities exist that favour capercaillie.
- Increased capercaillie usage of robocut areas.
- Higher capercaillie productivity in robocut areas.

Partners (alongside the Park Authority and NatureScot)

- Land managers in target areas and those currently undertaking robocutting
- Scottish Forestry

Key points on current feasibility and delivery

1. Based on robocutting in Abernethy Forest where several patches have been cut within a wider area, it is estimated that the technique can benefit capercaillie across 3 times the area actually cut.
2. Robocutting patches within a wider area allows for some cover and continuity whilst the blaeberry carpet forms after cutting; a process that can take up to 3 years.
3. The benefits of robocutting can be expected to last for around ten years until heather re-dominates. Maintenance by follow-up cattle grazing could extend the impact.
4. Cost per hectare physically cut is around £870 plus ~£100 per hectare for time spent managing contractors. As the benefits to capercaillie extend across ~3 times the area cut, the total cost is around £325 per hectare benefitted.
5. Robocutting qualifies as a heather swiping technique eligible for FGS funding. The payment rate in the current scheme is £210 p/ha.
6. SSSI consent and an HRA is required for robocutting in protected areas.
6. Up to 3 contractors with robocutters / flailbots are currently able to undertake work in the Cairngorms.

Forest bog restoration

In a changing climate, forest bogs stand to be an increasingly crucial habitat during extended dry spells and are critical in the capercaillie brood rearing season when access to cotton grass in early spring improves the breeding condition of hens and access to invertebrates is essential for chicks. Through the Cairngorms Capercaillie Project a programme of drain blocking carried out on Balmoral Estate has restored at least 90 hectares of forest bog to benefit capercaillie. The work was undertaken by volunteers working with Estate staff. Similarly, within the Cairngorms Connect partnership area, over 70 hectares of bog woodland has been restored. In addition to the benefits to capercaillie, forest bogs are a natural carbon sink, support unique ecosystems and biodiversity, reduce flood risk, improve water quality in streams and rivers and reduce wildfire risk.

Objective

Enable forest bog restoration where all opportunities exist to benefit capercaillie.

Actions by 2030

1. Investigate the feasibility, risks and benefits of using LIDAR to map drains (where required) in capercaillie areas in the National Park.
2. Identify priority locations in capercaillie areas to block drains before the 2025 breeding season.
3. Target Peatland ACTION funding to block drains in priority locations to enable landscape-scale restoration of forest bogs.

Measure of success

- Forest bog restoration undertaken where all opportunities exist that favour capercaillie.
- Increased capercaillie usage of forest where bogs have been restored.
- Higher capercaillie productivity in forests where bogs have been restored.

Partners (alongside the Park Authority and NatureScot)

- Land managers in priority locations
- Peatland ACTION Teams
- Scottish Forestry

Key points on current feasibility and delivery

1. Drain blocking is eligible for FGS funding, with contribution towards costs varying depending on the distance between drains and their width.

2. Most drains are part of a system requiring a holistic approach to effectively restore the area to forest bog. Peatland ACTION funding supports a holistic approach and includes a wider range of interventions to enable restoration compared to FGS. Funding can however be restricted if the work is eligible through FGS.

Image of a male and female capercaillie by Mark Hamblin

Reducing the impacts of predation

Image of a female capercaillie by Mark Hamblin

4. Reducing the impacts of predation

Diversionary feeding

From 2021 – 2023, the Cairngorms Connect Predator Project undertook a diversionary feeding trial which increased the chances of artificial nest survival by 83%. When diversionary feeding is present, early analysis of real broods also indicates a higher chance of detecting a hen with chicks instead of a barren hen. The research is now published in the British Ecological Society's Journal of Applied Ecology and diversionary feeding is part of routine operations for Wildland Limited, Forestry and Land Scotland Glenmore and RSPB Abernethy.

In Deeside, facilitated by the Cairngorms Capercaillie Project, Invercauld Estate, Glen Tanar Estate, Forestry and Land Scotland Pannaniach and Cambus o'May, RSPB Crannach, NatureScot Muir of Dinnet and Balmoral Estate are carrying out diversionary feeding. Abergeldie Estate, Finzean Estate, Birse Community Trust and Ballogie Estate also engaged although did not qualify for feeding sites in 2024 as no signs of hen activity were found during cold searching. If hen signs are found in future, it would indicate an opportunity to begin diversionary feeding. Out with the National Park, Moray Estates have also begun diversionary feeding.

The original Cairngorms Connect Predator Project trial took place across 60km^2 of sampling sites across the Cairngorms Connect partnership area in Badenoch and Strathspey. It aimed to evaluate diversionary feeding as a management intervention to reduce depredation on nests of capercaillie. The trial saw feeding sites identified around suitable signs of hen activity. The sites were stocked with ~10kg of deer parts per fortnight over an 8-week period from the end of April to the end of June.

The feeding sites were monitored for predator activity. Artificial capercaillie nests near each feeding site were also monitored. The artificial nests were deployed in and outside of feeding zones. Over two years of sampling, analysis showed that the chance of an artificial nest surviving to 28 days (hatch age) was 40% in control (unfed) sites and 73% in fed sites; an increase of nest survival of 83%. This was primarily due to a reduction in the likelihood of pine marten, the main predator of artificial nests in the study, consuming or caching eggs and a significant reduction in artificial nest predation by badgers, with variability year on year.

Objective

Deliver a 4-year programme (2026 – 2030) of diversionary feeding on all sites in the National Park with suitable hen records.

Actions by 2030

1. All landholdings report signs and sightings of hens through the Capercaillie Sightings and Signs App to help identify areas where diversionary feeding stands to deliver the greatest benefit for capercaillie.
2. Capture the learning from sites that delivered diversionary feeding for capercaillie in 2024 and sites where diversionary feeding was not undertaken. Where necessary, update approaches for 2025 in response.
3. Produce good practice guidance about diversionary feeding for capercaillie.
4. Deliver a programme of training and support for sites undertaking diversionary feeding.
5. Secure agreements with owners of deer larders, game dealers and stalkers to access carrion / waste material to support diversionary feeding.
6. Recruit and train a team of volunteers to assist with the collection and delivery of carrion to sites; establishing and restocking feeding sites; deploying and managing monitoring cameras; and processing and analysing images.
7. Deliver diversionary feeding in 2025 on sites with suitable hen records. Capture the learning from all sites and update approaches where necessary.
8. Deliver a 4-year programme (2026 – 2030) of diversionary feeding on all sites with suitable hen records.

Measure of success (where diversionary feeding is present)

- A decrease in the predation of capercaillie nests and eggs.
- An increase in the number of successfully hatched chicks and their survival rates.
- Positive trends in local capercaillie population growth rates.

Partners (alongside the Park Authority and NatureScot)

- Land managers in areas with suitable hen records
- University of Aberdeen
- University of St. Andrews

Key points on current feasibility and delivery

1. Diversionary feeding sites are only deployed in areas (1km^2 zones) where hens have been recently recorded, and scope therefore exists to see more hens with chicks if nest predation is reduced. This approach also avoids feeding where it would not act as a diversion and would just be feeding.
2. Diversionary feeding is likely to be most beneficial in years when field vole populations are low, which can cause predators to divert to other food sources. Vole population monitoring should therefore form an essential part of diversionary feeding.
3. Fox and crow control for capercaillie can continue alongside diversionary feeding which is primarily targeted at pine marten and badger. If delivered in tandem, it is not currently known how both interventions may influence efficacy. However, sites in Deeside that undertake fox and crow control for capercaillie are also undertaking diversionary feeding and this may provide insights.
4. Options for deploying food at feeding sites include culling deer if viable out of season and leaving carcasses in-situ (or moving them into situ) or taking ~10kg of carrion to the sites every 2 weeks for 8 weeks.
5. On landholdings that do not undertake deer control, collaboration is recommended to source material. This approach was trialled in Deeside with waste material from the local Forestry and Land Scotland deer larder being used to supply feeding sites on Forestry and Land Scotland Pannaniach and Cambus o'May, RSPB Crannach and NatureScot Muir of Dinnet. A volunteer was recruited to help collect and distribute the material to sites.
6. Scope exists to develop agreements with other deer larders, game dealers and stalkers to enable greater access to carrion / waste material.
7. Deer culled with non-lead ammunition is preferable for use on feeding sites.

8. The delivery cost is estimated to be ~£3 per hectare per year for staff time to process deer culled over the winter and deploy to feeding sites in the spring. This approach of freezing and redeployment guarantees food is available in the spring and means only waste biproducts are used instead of venison.

9. To monitor impact on productivity and chick survival, trail cameras can be deployed on dust baths (or potential dust baths) within feeding zones with the aim of capturing images of female capercaillie and chicks. The cost of this approach is estimated to be ~£2 per hectare per year for trail cameras, batteries and SD cards and time to deploy and manage the cameras, and process and analyse the images.

10. 48 trail cameras purchased by the Cairngorms Capercaillie Project are available to use.

Image of a male capercaillie by Mark Hamblin

Monitoring vole populations

Grassland field voles and forest bank voles play a crucial role in influencing predator populations that impact capercaillie productivity because the species are primary prey for predators such as pine martens. Vole abundance has appeared as the main predictor of capercaillie population growth rate in the Capercaillie Integrated Population Model. The model has highlighted the importance of voles in partially explaining the multi-year cycle in capercaillie productivity. Vole numbers fluctuate widely in a 3 to 4-year cycle, so monitoring vole abundance and understanding the stage of the vole cycle allows us to anticipate when predators might switch to targeting capercaillie more heavily.

Objective

Survey vole abundance annually using vole sign index (VSI) across the core capercaillie range to inform the deployment of predator management actions.

Actions by 2030

1. Design an upscaled approach based on existing vole monitoring undertaken by Cairngorms Connect partners and the University of Aberdeen to survey vole abundance annually using VSI across the capercaillie range in the National Park.
2. Recruit and train a team of volunteers to assist with the survey / data collection.
3. Input data gathered to the Capercaillie Integrated Population Model to inform predator management strategies.

Measures of success

- Ability to accurately predict periods of increased predator pressure on capercaillie.
- A decrease in the predation of capercaillie nests and eggs and an increase in capercaillie survival rates informed by regular and reliable data on vole abundance.

Partners (alongside the Park Authority and NatureScot)

- Landmanagers in target areas
- University of Aberdeen

Lethal control of foxes and crows

Past research has shown that lethally controlling foxes and crows can positively impact capercaillie productivity. However, the predator community in capercaillie areas has evolved since the method was last scientifically evaluated in the UK around 20 years ago. To ensure that capercaillie populations are effectively protected alongside our evolving predator community, there is a need to assess the current impact of fox and crow control.

Pine marten populations have begun to recover in response to increased legal protection and it is important to establish that management strategies are not disadvantaging capercaillie by potentially benefiting pine marten, especially if diversionary feeding is not in place to reduce the impact of pine marten predation.

As part of the Cairngorms Capercaillie Project a full-time gamekeeper was employed from 2020 – 2023 to systematically control foxes and crows on open ground around two lek sites in fragmented areas of forest on Castle Grant (Seafield and Strathspey Estates). Diversionary feeding was not undertaken in the area. During the period of fox and crow control - within and beyond 1.5km of the target lek sites – the number of cocks attending the lek sites declined by 60% at one site and 50% at the other. Annual brood counts in the target area showed an 83% decrease in cocks, 50% decrease in hens, 100% decrease in broods and 86% decrease in chicks.

From 2020 – 2023 the Cairngorms Capercaillie Project also funded fox and crow control on Rothiemurchus Estate which differs in habitat structure compared to Castle Grant. The target lek sites were on neighbouring FLS ground where diversionary feeding was also deployed. The leks were not counted in 2020 due to the Covid pandemic, but from 2021 to 2023 the number of cocks attending the lek sites stayed stable at one site and increased by 56% at the other. The brood count results in the target area showed a 66% decrease in cocks, but a 50% increase in hens, a 100% increase in chicks and the number of broods found remained stable.

Analysis of predator activity on Castle Grant, Rothiemurchus Estate and neighbouring FLS ground is needed in relation to these insights to assess the impact of fox and crow control on the wider predator community.

Objective

Assess the current activity of predators in relation to capercaillie hen densities and breeding performance in areas where predator management strategies are in place.

Actions by 2030

1. Commission a study of predator activity in relation to capercaillie hen densities and breeding performance in areas where predator management strategies are in place, and ensure alignment with the pine marten survey (see page 32).
2. Establish a framework for ongoing monitoring and follow-up studies to assess the long-term impact of predator management strategies on capercaillie populations.

Measures of success

- Successful gathering of accurate, relevant data on predator activity, capercaillie hen densities, and breeding performance in all target areas.
- Identification of correlations between predator activity and capercaillie breeding success in all areas where predator management strategies are employed.
- Results integrated into future predator management plans, leading to measurable improvements in capercaillie productivity.

Partners (alongside the Park Authority and NatureScot)

- Land managers delivering predator management strategies
- University of Aberdeen
- GWCT

Monitoring pine marten populations

NatureScot will lead a pine marten survey to establish a baseline for pine marten populations where they coexist with capercaillie. The aim of the survey is to monitor changes over time by replicating previous assessments and integrating into a broader monitoring scheme to generate an index of activity and track population trends. The survey method will follow the published standard approach and involve fixed transects along forest tracks to count pine marten scats. Where possible, within the overall sample, a single 10km transect will be undertaken to replicate the methodology of previous predator studies undertaken in 1995 and 2009 in the forests of Rothiemurchus, Craigmore, Inverlaidnan, Kinveachy, Abernethy and Glenmore. A representative sample of scats will be collected for DNA analysis to verify the ID and enable a correction factor to be applied.

Objective

Establish a reliable baseline for pine marten populations in Strathspey to monitor changes in activity over time and track population trends.

Actions by 2030

1. Commission a survey to provide a baseline for tracking changes in pine marten populations over time.
2. Develop a scheme to generate periodic indexes of pine marten activity in the National Park using baseline data.

Measures of success

- Successful establishment of a reliable baseline for pine marten populations in Strathspey.
- Generation of accurate and consistent indexes of pine marten activity.

Partners (alongside the Park Authority and NatureScot)

- Land managers relevant to survey sites.

Removing and marking fences

Image of a male capercaillie by Mark Hamblin

5. Removing and marking fences

Removing and marking fences

Much progress has been made over many years to mark and remove deer fences in capercaillie areas. However, unmarked fences that remain, and fences with degraded marking, still stand to contribute to juvenile and adult mortality.

Whilst the collision risk is reduced, marked fences still kill capercaillie and research with radio-tagged birds showed that the percentage of juvenile capercaillie killed by colliding with fences is higher compared to adult mortality. This may be partly due to dispersal after fledging. Dispersal distances can extend up to 16km and juveniles killed by fences as they disperse reduces the likelihood of capercaillie being able to expand into new areas. Chicken wire used on fences to restrict rabbits can also restrict the movements of broods. Fences can also advantage predators that use fence lines to funnel prey.

With the threat of fencing removed, recent modelling by GWCT suggests capercaillie numbers could be 16% higher and the risk of extinction within 50 years might fall from 95% to just 3%.

It is a target within the National Park Partnership Plan to minimise the amount of fencing across the Cairngorms National Park by removing redundant fences. Whilst this will benefit both capercaillie and black grouse, scope exists to do more with recent estimates of unmarked fencing in capercaillie areas indicating that c15km remains within 1km of active lek sites; c86km within 1km - 3km; and c156km within 3 - 5km of active lek sites.

FGS funding available for marking and removing fences and converting deer to stock fences is restricted to within 1km of an active capercaillie lek site, and the impacts of stock fencing on capercaillie are unknown. Additionally, FGS funding is not always viable as it does not cover 100% of the costs involved in marking and removing fences. A Long-term Forest Plan or Scottish Forestry approved management plan is also a requirement to access the funding which can present challenges for small landholdings with limited capacity.

To overcome these barriers in the short term, the Cairngorms Capercaillie Project secured funding from the BASC Wildlife Fund, the National Lottery Heritage Fund and volunteer support to rapidly mark or remove over 23km of fencing within dispersal distances of active lek sites, reducing the risk of collisions over 800 hectares.

Across the Cairngorms Connect partnership area, land managers have also been actively reducing the deer population through a collaborative programme of stalking to enable the removal of deer fences.

To inform further action, the Cairngorms Capercaillie Project recruited and trained a team of dedicated Fence Monitoring Volunteers who have walked over 200km of fence lines in capercaillie areas to record the status of fences and marking. With these records the project created a comprehensive database of fences and their status in capercaillie areas.

Objective

Reduce the net amount of fencing in core capercaillie areas.

Actions by 2030

1. Target the removal of fences within 1 to 5km of active lek sites (c156km of fencing).
2. Support existing Fence Monitoring Volunteers and recruit and train more volunteers to check and record the status of fences in the field and assist with fence marking and removal.
3. Update the fence inventory by integrating fence information held by Scottish Forestry and put mechanisms in place to maintain this flow of information.
4. Identify all new woodland creation fences that have been approved or constructed to identify where marking is outstanding and or removal is possible.
5. Produce and launch new good practice guidance to replace the 2012 ‘Fence marking to reduce grouse collisions’. Include new and updated information to ensure a consistent approach across all capercaillie areas regards deer and stock fencing.
6. Promote the new good practice guidance to forest managers, fencing contractors, woodland agents and all relevant agency staff and departments.

Measures of success

- All fencing within 5km of active lek sites removed or marked.
- Less fencing in core capercaillie areas.
- All new woodland expansion plans favour establishment through herbivore management and removing redundant fences.

Partners (alongside the Park Authority and NatureScot)

- Scottish Forestry
- Land managers in core capercaillie areas
- RSPB

Key points on current feasibility and delivery

1. A team of trained Fence Monitoring Volunteers can check and record the status of fences in the field using a dedicated app. The volunteers, their equipment, app and training programme are managed through Volunteer Cairngorms with support from the RSPB.
2. The fence inventory created by the Cairngorms Capercaillie Project is available on Arc GIS and is currently hosted and maintained by the RSPB.

Reducing disturbance

Image of a male capercaillie by Mark Hamblin

6. Reducing disturbance

Reducing disturbance

Disturbance can have severe consequences for capercaillie. It can physically deter the birds from mating and cause eggs to chill if they are left unattended when birds are disturbed. Chicks separated from their mother become more vulnerable to hypothermia and predation and human presence raises stress hormone levels in capercaillie. This can lead to chronic stress in the case of repeated disturbance, which affects growth, body condition, immune function, reproduction and survival.

> **Our activities also influence the distribution of capercaillie, with Scottish studies showing that disturbance causes the birds to avoid up to 40% of the habitat they need to survive.**

The Cairngorms Capercaillie Project has been primarily focused on reducing disturbance to capercaillie by developing truly participatory and community-led solutions to the issue. These solutions have resulted in outcomes including:

> - **Reduced disturbance by mountain biking activity over 450 hectares of core capercaillie habitat.**
> - **55% less birdwatchers and photographers looking for capercaillie during the breeding season.**
> - **A 200% increase in commercial operators choosing not to guide for capercaillie.**
> - **More dogs being walked on a lead in response to pilot work with dog walkers in Boat of Garten woods.**

Capercaillie in Boat of Garten woods were recorded lekking until midday during the pilot. In previous years they would typically finish lekking up to 3 hours earlier because of disturbance.

It is an action in the National Park Partnership Plan and Active Cairngorms Action Plan to upscale the work delivered by the Cairngorms Capercaillie Project and consider all potential mechanisms to reduce disturbance on key species in particular locations at certain times of year. Figure 2 on page 41 outlines those locations, which including core capercaillie areas.

Objective

Reduce recreational disturbance in the priority areas relevant to capercaillie outlined in the Active Cairngorms Action Plan (2024 – 2028).

Actions by 2030

1. Scope the potential to research the impact of disturbance on productivity to build an evidence base and help inform future management measures.
2. Within the priority areas for managing recreational disturbance outlined in the Active Cairngorms Action Plan, identify target areas in which to reduce the impact of disturbance on capercaillie and work with land managers to implement site-specific actions in those areas.
3. Evaluate and share learnings from the pilot campaign delivered in Boat of Garten during the 2024 breeding season by the Cairngorms Capercaillie Project which aimed to reduce the impact of disturbance by dogs.
4. Use the learning from the pilot campaign in Boat of Garten to develop and deliver a 'Dog friendly Cairngorms where wildlife can thrive' programme of work, including supporting communities to create and develop dog walking spaces to meet the needs of dogs and reduce pressure around lek sites and known brood rearing areas, and build knowledge and support by developing an active community of dog owners with information and understanding at its heart.
5. Continue to support the Badenoch and Strathspey and Aberdeenshire Trail Associations in delivering and developing their respective Mountain Biking Recreation Management Plans created as part of the Cairngorms Capercaillie Project to reduce the impact of disturbance by mountain biking.
6. Continue to deliver the Lek It Be campaign to encourage birdwatchers, photographers and commercial operators to not look for capercaillie and promote adherence to the law during the breeding season.
7. Develop standard messaging and proactive comms as part of the Lek It Be campaign to reduce disturbance to rogue males and tame hens.

8. Continue to support Lek It Be Champions (commercial operators that have volunteered not to look for capercaillie) to enable them to excel in their role as champions of good practice.

9. Support the Scottish Orienteering Association and local orienteering clubs through a programme of information sharing and in person meetings to reduce the impact of disturbance from orienteering activities.

Measures of success

- Reduced disturbance levels in target areas.
- Increased capercaillie usage and productivity in target areas.

Partners (alongside the Park Authority and NatureScot)

- Land managers in targeted areas
- Scottish Orienteering Association
- Badenoch and Strathspey Trail Association
- Aberdeenshire Trail Association
- Developing Mountain Biking in Scotland
- BirdGuides
- Rare Bird Alert
- Scottish Ornithologists' Club
- Lek It Be Champions
- Police Scotland

Figure 2: Priority areas for the management of recreational disturbance

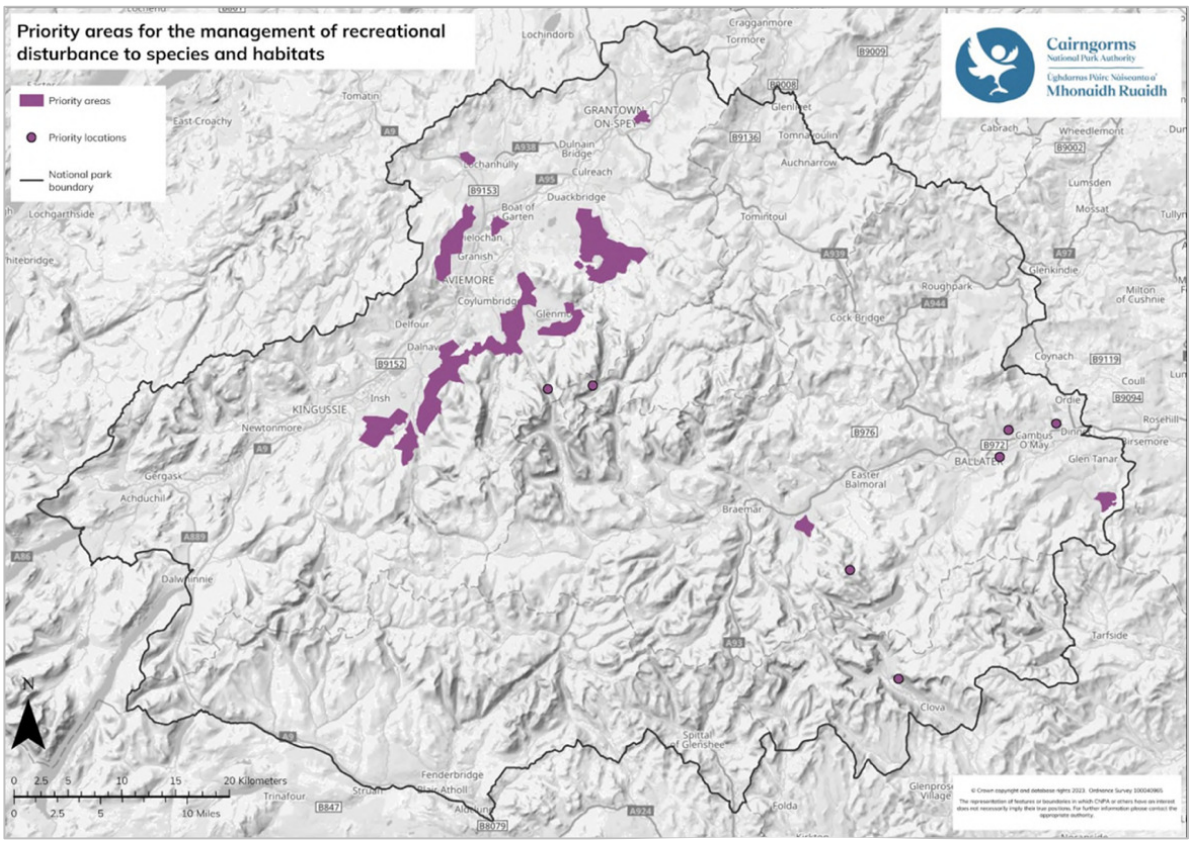


Image of a male capercaillie
by Mark Hamblin

Capercaillie monitoring

Image of a female capercaillie by Mark Hamblin

7. Capercaillie monitoring

Monitoring productivity

In Special Protection Areas (SPAs) with less than 10 hens present the conclusions of HRAs conducted by NatureScot is that brood counting could have an adverse effect on site integrity. Brood counts are therefore un-licensable unless they are conducted in SPAs where there are at least 10 hens present, and un-licensable specifically within Glen Tanar SPA and Ballochbuie SPA based on the conclusions of HRAs.

Recently, brood counts for capercaillie using dogs have been conducted on Rothiemurchus Estate, Castle Grant on Seafield and Strathspey Estate and in Baddengorm Wood and Tolquhonie Wood. Of these sites, only Rothiemurchus Estate falls within an SPA so could qualify for a licence to conduct brood counts subject to hen records. Historically, counts have also been conducted in the Kinveachy SPA on Seafield and Strathspey Estate which, in 2024 had at least 10 hens present.

In the past, brood counts have also been conducted on other landholdings including the Abernethy SPA. In 2019, the RSPB took the decision to stop conducting brood counts using dogs to reduce disturbance and because the method was known to cause mortalities to capercaillie. As part of the Cairngorms Connect Predator Project and working with the University of Aberdeen, RSPB have since begun to trial an alternative method of counting broods using trail cameras placed at dust baths. This has seen close to 1 million images captured by cameras at dust baths and research is now underway to develop AI to successfully identify images captured of capercaillie to provide an indication of productivity.

Objective

Enable the delivery of methods for monitoring capercaillie productivity that gather necessary ecological data at scale but do not require the use of dogs.

Actions by 2030

1. Identify ways to fast-track the training of AI to be able to identify images of capercaillie at different life stages.
2. Where possible, conduct brood counting with dogs in tandem with trail cameras and explore how the methods compare to inform plans to maintain historic brood datasets if brood counting with dogs is un-licensable

Measures of success

- Reliable, non-invasive methods for monitoring capercaillie productivity adopted across the capercaillie range.
- Successful gathering of accurate productivity data across the capercaillie range.
- Identification of correlations between capercaillie productivity and management strategies employed.

Partners (alongside the Park Authority and NatureScot)

- GWCT
- Rothiemurchus Estate
- RSPB
- Seafield and Strathspey Estates
- University of Aberdeen
- University of St. Andrews

Key points on current feasibility and delivery

1. The University of Aberdeen has developed a robust model using camera trap data to assess the impact of diversionary feeding, demonstrating its suitability for evaluating other management interventions. Using this method, it is possible to provide a chick to hen ratio by comparing images of broods to images of barren hens.
2. Using a sample set of 18,000 images from ~400,000 images captured from dust baths during the diversionary trial, AI has been trained to identify a cock capercaillie and a hen capercaillie in camera trap images.
3. Compared to brood counts with dogs, camera trap data offers more detailed insights into factors affecting capercaillie, such as brood activity patterns, changes in brood size over time, and the ratio of chicks to hens within specific timeframes. This creates opportunities for adaptive management if, for example, image data shows different survival rates at different life stages and on different sites.

4. Current methodologies for brood counting with cameras range from higher densities of cameras deployed (~20 cameras per 2km^2) to increase the likelihood of detections, to lower densities of cameras (~3 cameras per 1km^2) to increase the likelihood of independent sightings. The latter could be scaled up to produce a chick to hen ratio at a landscape scale, e.g. for the Cairngorms, as well as at a site scale.

5. Cold searching is necessary to identify dust baths or other features where cameras could be deployed, but this requirement should reduce over time once features become known, particularly those where birds are detected in multiple years. It is estimated that 3 - 4km^2 could be cold searched per day.

6. Excluding cold searching, the 5-year cost of using trail cameras for brood counting is estimated at ~£4 per hectare, covering equipment, deployment, management, and image analysis.

7. Image volume varies, with some dust baths generating thousands of capercaillie images and others only a few, but with a 50% detection rate for both sexes.

8. If cameras are routinely deployed at the same sites within a 1km^2 grid system, over time this may allow for a wider landscape scale analysis, including the extinction and colonisation of capercaillie at different locations.

Image of male and female capercaillie by Mark Hamblin

Monitoring leks

Whilst it is vital to keep monitoring the capercaillie population using field surveys, other techniques could bring new insights, produce more robust estimates than currently possible and reduce the risk of disturbance. The practice of using genetic material to survey lek sites is already used successfully in Europe and has been proven to produce more accurate results. To explore this in more detail, the Cairngorms Capercaillie Project undertook a pilot genetic survey in 2022 and commissioned RZSS to analyse the droppings collected. The results identified 5 unique genotypes at one lek site which correlated with the results from the traditional lek survey. At a second lek site, 18 unique genotypes were identified using droppings whereas the traditional lek survey recorded 15 birds. This indicates that the use of genetic material (droppings) produces a more robust estimate of lekking birds, with further work needed to sex the birds using droppings.

Objective

Enable the development of more robust techniques to monitor target lek sites.

Actions by 2030

1. Extend the pilot genetic lek survey to include a larger number of lek sites and run in parallel with traditional surveys to further test the method.

Measures of success

- Enhanced accuracy and reliability of data collected from lek sites, particularly those that can be challenging to survey using traditional methods.
- Results integrated into management interventions, leading to measurable improvements in capercaillie productivity.

Partners (alongside the Park Authority and NatureScot)

- RZSS
- RSPB

Monitoring morbidity and mortality

Following a study commissioned by the Carrbridge Capercaillie Group as part of the Cairngorms Capercaillie Project, scope now exists to investigate infectious disease threats from gastrointestinal parasites as a potential cause of morbidity and mortality.

The Carrbridge Capercaillie Group commissioned RZSS to assess the feasibility of monitoring parasite egg counts in capercaillie droppings whilst evidence shows that parasitism significantly impacts Tetraonidae species and contributes to morbidity, mortality, and population declines. This is well-documented in red grouse, where parasites lead to decreased growth rates, smaller clutch sizes, and higher mortality.

In many wildlife species it is believed that parasites do little or no harm, unless their hosts are otherwise compromised, for example by malnutrition, stress or adverse weather and climate change. If compromised by such factors, parasitism can become a significant contributor to morbidity and mortality.

The pilot study by RZSS successfully demonstrated that non-invasive faecal sample collection from wild capercaillie is feasible and provides results comparable to those from European populations, including the detection of potential pathogens.

To better understand the impact of gastrointestinal parasites on capercaillie, further research is needed, including serial sampling of breeding areas to examine parasite distribution and prevalence. Research into the parasitology of other birds in capercaillie areas is also recommended, particularly pheasant as they are likely reservoirs of parasites that can significantly impact health and may be a potential risk for capercaillie.

A programme of infectious disease surveillance for capercaillie and sympatric Galliformes could involve the collection of droppings to monitor parasite presence and prevalence; the periodic health assessments of captured birds if opportunities arise; and prompt and thorough postmortem examinations of deceased birds. Data collected can be used to guide management decisions and inform any necessary interventions to mitigate disease impacts.

Tissue samples taken and biobanked for disease analysis would also help to increase the existing sample size of genetic material from Scottish populations as recommended by RZSS as part of the genetic diversity research commissioned by the Cairngorms Capercaillie Project. The study brought

together the largest amount of capercaillie genetic information to date and provides the first fine-scale genetic picture across the Cairngorms. Scope exists to continue building this picture by routinely biobanking tissue samples whenever opportunities arise.

Objective

Develop and implement an infectious disease surveillance monitoring programme for capercaillie and sympatric Galliformes to identify factors affecting capercaillie morbidity, mortality and reproductive success.

Actions by 2030

1. Develop a programme of infectious disease surveillance for capercaillie and sympatric Galliformes.
2. Establish and promote a protocol for collecting and transferring tissue samples to a publicly accessible biobank from any capercaillie carcass found in Scotland.

Measures of success

- Consistent and accurate collection of data on parasite prevalence in capercaillie.
- Actionable insights that contribute to improved capercaillie survival and reproductive success.
- Proportion of capercaillie reported dead that have been given a postmortem with samples bio-banked.

Partners (alongside the Park Authority and NatureScot)

- Carrbridge Capercaillie Group
- RZSS
- RSPB

Reinforcement feasibility

Image of two male capercaillie by Mark Hamblin

8. Reinforcement feasibility

Reinforcement feasibility

If the positive influences of the management actions outlined in this plan are found to be insufficient to reverse population declines, it may be necessary to reinforce the UK capercaillie population with birds from outside the UK. The National Species Reintroduction Forum has advised that any reinforcement be carefully coordinated with ongoing conservation efforts. To ensure a swift response should population declines continue, an exploration of reinforcement will be pursued alongside the intensified conservation measures detailed in this plan.

A study by RZSS commissioned by the Cairngorms Capercaillie Project to identify the genetic diversity of the UK capercaillie population also recommends that reinforcing the Scottish capercaillie population with birds from Europe would benefit the species by increasing genetic diversity in the Scottish population, providing more resilience to future challenges.

The study identified that samples from capercaillie DNA collected in contemporary Scotland show genetic similarity to samples from Scandinavia and central Europe, termed “the Northern lineage”. Within the Northern lineage, Scotland has the lowest genetic diversity: lower than Austria, Germany, Norway, Poland and Sweden.

The dataset for the study of over 600 samples, identifies that there is some variation in genetic diversity across the Scottish locations sampled with Abernethy, Anagach Woods and Kinveachy having the highest genetic diversity and Glenmore, Inshriach and Deeside with the lowest. As well as recommending reinforcement of the Scottish capercaillie population, the study advises that conservation efforts should consider how to manage the finding that there is rare genetic diversity present in Abernethy. Translocations between sites could be considered depending on other risks.

Developing proposals for reinforcement and translocations requires time and careful evaluation of risks and benefits. Considerations include the availability and suitability of reinforcement and translocation methods, whether other threats or constraints at release sites have been sufficiently mitigated to justify reinforcement, and decisions around reinforcing existing sites or establishing new populations in areas without capercaillie.

Even if reinforcement is not currently feasible, a feasibility study can outline the criteria that must be met for it to be considered in the future. The study may also identify knowledge gaps that need to be addressed, such as developing an understanding of the impact of disturbance on productivity, the risk of disease, or the impact of climate and weather on capercaillie populations.

Objective

Evaluate the feasibility of reinforcing the Scottish capercaillie population by introducing birds from Europe and performing exchanges within the Scottish capercaillie population.

Actions by 2030

1. Commission a study to investigate the feasibility of reinforcing the Scottish capercaillie population with birds from Europe and performing exchanges within the Scottish capercaillie population.
2. Run a workshop with stakeholders to review the findings of the feasibility study and identify next steps.

Measures of success

- A thorough assessment of the potential risks, benefits, and logistical considerations of reinforcing the Scottish capercaillie population with birds from Europe and performing exchanges within the Scottish capercaillie population.
- A well-informed decision on whether to proceed with reinforcement and exchanges, supported by a strong scientific foundation and strategic framework.
- Clear criteria that must be met for future reinforcement and translocation efforts, ensuring that any decisions are based on robust evidence and thorough planning.

Partners (alongside the Park Authority and NatureScot)

- RZSS

For further information and to stay in touch visit
cairngorms.co.uk/capercaillie

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Image of a male capercaillie lekking by Mark Hamblin