Wildfire resilience in Scotland

Briefing – Criminal Justice Committee

25 November 2026



About Scottish Land & Estates

At Scottish Land & Estates (SLE) our work helps to ensure that rural Scotland thrives. We are a membership organisation for landowners, rural businesses, and rural professionals. We promote the wide range of benefits land-based businesses provide: tourist attractions, leisure facilities and landscapes enjoyed by the public, as well as housing, employment, tourism & enterprise and farming opportunities. We represent the interests of our members and wider rural Scotland to the UK and Scottish Governments to help ensure that policy and legislation reflects the unique requirements of rural Scotland and its communities. As well as the practical role played by our members, SLE senior staff members serve as vice-chair of the Scottish Wildfire Forum and as a member of the Strategic Oversight Group, ensuring that SLE plays an active role in shaping Scotland's approach to wildfire resilience and preparedness.

Key messages

- **Recent wildfire incidents** demonstrate that Scotland's wildfire risk is increasing in both scale and complexity.
- **The experiences of the Carrbridge and Dava and Glenmore-Strathnethy wildfires** suggest that future resilience will require greater investment in specialist wildfire capability, enhanced training, stronger partnership arrangements and improved mechanisms to utilise private-sector equipment and expertise alongside the Scottish Fire and Rescue Service (SFRS).
- **SLE supports the delivery of the Strategic Action Plan**; however, we believe there is a need for greater pace and urgency in its implementation.
- **Prevention and preparedness** must be prioritised alongside emergency response. Reducing wildfire risk before ignition is significantly more effective and cost-efficient than suppressing large, established fires.
- **Strategic fuel load management**, integrated wildfire management plans and improved wildfire forecasting should form the foundation of Scotland's wildfire resilience strategy.
- **Rural land managers**, gamekeepers, farmers, forestry operators and contractors provide critical operational capacity, specialist equipment and local knowledge that should be recognised as a strategic component of Scotland's wildfire preparedness and response arrangements.
- **Greater investment is needed** in specialist wildfire capability, including wildfire-specific training, tactical back burning, fire behaviour analysis, all-terrain equipment and enhanced aerial support.
- **The Community Asset Register** and capability mapping should be expanded to ensure trained personnel, specialist machinery and local resources can be identified and mobilised rapidly during incidents.
- **Regular multi-agency training** and exercising involving SFRS, land managers and other rural stakeholders would improve interoperability, strengthen command and control arrangements, and enhance operational effectiveness.
- **Firefighter safety and welfare** must remain a core priority. Investment in training, planning, communications and welfare provision is essential to support personnel operating during prolonged and demanding wildfire incidents.
- **The Cairngorms seasonal fire management byelaw** provides an encouraging example of how targeted prevention measures, supported by public engagement and enforcement, can reduce wildfire risk and support wider resilience objectives.
- **Future policy and funding** decisions should support a more integrated approach to wildfire management that combines prevention, preparedness and response, while fully utilising the expertise and resources available across Scotland's rural sector.

Scale and Nature of Recent Wildfire Incidents

Recent years have seen some of the largest wildfires ever recorded in Scotland.

The Carrbridge and Dava wildfires burned approximately 11,827 hectares of moorland and woodland, making them Scotland's largest recorded wildfire event at the time. At least 33 land-based and rural businesses contributed resources and personnel to suppression efforts.

The Glenmore-Strathnethy wildfire burned more than 3,300 hectares during July and August 2026. More than 40 businesses and organisations were contacted, involved or placed on standby, contributing substantial personnel, machinery and specialist expertise.

These incidents illustrate that wildfire is no longer an occasional land management issue but an increasingly significant national resilience challenge affecting communities, infrastructure, biodiversity, carbon stores and rural businesses.

Prevention and Preparedness

Scotland's approach to wildfire must place greater emphasis on prevention and preparedness, alongside operational response. Experience from recent incidents demonstrates that once large wildfires become established, suppression becomes significantly more resource-intensive, expensive and potentially hazardous to personnel.

Fuel Load Management and Landscape Resilience

Fuel load management is one of the most important factors in reducing wildfire risk and limiting fire spread. Existing firebreaks, managed vegetation and areas subject to active land management often provided opportunities to slow progression of fires and create safer conditions for firefighting operations.

Muirburn is a particularly important fuel management tool, helping to reduce the build-up of combustible vegetation, create strategic fuel breaks and maintain a more resilient mosaic of habitats that can limit the intensity and spread of wildfires.

In contrast, extensive continuous fuel loads increased fire intensity, prolonged burning and complicated suppression efforts. The Committee may wish to consider how future wildfire policy can support strategic fuel reduction, integrated wildfire management planning and landscape-scale resilience measures.

Fire Management Planning

SLE suggest wider adoption of integrated fire management plans across high-risk landscapes. Such plans should identify access routes, water sources, helicopter landing areas, communications arrangements, firebreak locations, machinery availability and key personnel prior to incidents occurring.

Developing and maintaining these plans would allow emergency responders to mobilise resources more quickly and improve situational awareness during major incidents.

Community Asset Registers and Capability Mapping

Significant wildfire suppression capability already exists within Scotland's rural businesses and land management sector. However, responders did not always know what equipment or expertise was available, where it was located or how it could be mobilised.

The Committee may therefore wish to support further development of Community Asset Registers (CARs) or similar systems that identify trained personnel, firefighting equipment, heavy plant, water resources and specialist operators in advance of wildfire incidents.

Training and Exercising

Preparedness depends not only on available equipment but also on regular exercising and interoperability between partners. The value of joint training exercises involving SFRS, estates, gamekeepers, farmers, forestry operators and conservation organisations is significant.

Future exercises should include tactical back burning, fire behaviour analysis, command and control arrangements, heavy plant deployment, helicopter coordination, welfare provision and communications systems.

Retaining Wildfire Skills and Expertise

Approximately 79% of those involved in the Carrbridge and Dava suppression activities had experience of muirburn or prescribed burning operations. Similarly, the Glenmore-Strathnethy wildfire highlighted the substantial contribution made by gamekeepers, estate workers and wildfire specialists with practical experience of fire behaviour, fuel management and suppression techniques.

Scotland should seek to retain and build upon this experience through accredited training programmes, joint exercises and formal partnership arrangements that make specialist skills available when major incidents occur.

Early Warning and Risk Assessment

The importance of wildfire danger assessments and forecasting systems in identifying periods of heightened risk before incidents occur is significant. Strengthening fire weather forecasting, fire behaviour analysis and risk assessment capabilities would support earlier decision-making, pre-positioning of resources and targeted public awareness campaigns.

Byelaws

The introduction of the Cairngorms seasonal fire management byelaw has been widely regarded as a positive step in reducing human-caused wildfire risk during periods of heightened fire danger. By restricting the lighting of open fires, including campfires and barbecues, between 1 April and 30 September, the byelaw has provided a clear and enforceable framework for wildfire prevention.

During its first season, rangers recorded just 100 active fires, compared with 312 in 2025 and 320 in 2024, representing a reduction of almost 70%. More than 100 rangers and partner staff delivered 1,400 patrols across the National Park, supported by joint patrols with Police Scotland, while a communications campaign reached more than 2.1 million people and significantly increased public awareness of the restrictions. Survey evidence indicated that 90-95% of residents and visitors were likely to comply with the new rules.

While the cause of the 2026 Glenmore and Strath Nethy wildfire remains unknown, the byelaw is increasingly seen as an important preventative measure that supports the wider Cairngorms National Park Authority Integrated Wildfire Management Plan by reducing ignition sources, protecting communities and habitats, and lessening pressure on the Scottish Fire and Rescue Service during periods of extreme wildfire risk. The early evidence suggests that targeted regulation, backed by public engagement and enforcement, can make a significant contribution to reducing wildfire risk in Scotland's most vulnerable landscapes.

Operational Response

Both incidents demonstrated the dedication and professionalism of SFRS personnel but also highlighted the increasingly important role played by land managers, gamekeepers, contractors and rural businesses.

During the Glenmore-Strathnethy wildfire, more than 250 pieces of specialist equipment worth approximately £6.4 million were recorded as available or deployed, including Argocats, ATVs, excavators, bulldozers, water tanks, bowsers, pumps, radios and specialist wildfire equipment. The response also involved at least 266 person-days and 38 person-nights of support from private and third-sector personnel.

During the Carrbridge and Dava wildfires, land managers contributed 34 ATVs, 27 fogging units, nine tractors, five diggers, five water bowsers and 50 leaf blowers, representing equipment valued at more than £3 million. At least 101 personnel participated in suppression efforts.

This demonstrate that effective wildfire response increasingly depends upon integrating public-sector capabilities with private-sector expertise and resources, particularly during large and prolonged incidents.

Challenges Encountered During the 2026 Wildfire Season

Evidence from the Glenmore-Strathnethy response identified several operational challenges:

- Confusion around registration, deployment and tasking of volunteers and specialist operators.
- Limited communications between incident command and external responders.
- Difficulties integrating helicopters, heavy plant and private-sector resources.
- Delays in deployment of some machinery and specialist capability.
- Weak mobile phone coverage and insufficient radio interoperability.
- Concerns regarding welfare arrangements, PPE provision and fatigue management.

The principal issue was not a lack of available capability, but the ability of the formal response structure to absorb and effectively utilise that capability.

Resource and Capacity Considerations

Recent incidents suggest that Scotland's wildfire response capability relies heavily on assets and expertise held by land-based businesses.

At Carrbridge and Dava, approximately 79% of the personnel involved had practical experience using fire through muirburn operations. Tactical back burning, firebreak construction, ATV-mounted fogging units and specialist suppression techniques featured prominently in the response.

At Glenmore-Strathnethy, respondents repeatedly highlighted the importance of local land-management knowledge, wildfire experience, off-road access capability, heavy plant and fire behaviour expertise. Tactical back burning, firebreak creation and specialist wildfire suppression techniques were widely deployed throughout the incident.

The evidence suggests that future funding should support:

- Enhanced wildfire-specific training for SFRS personnel.
- Tactical back burning training and accreditation
- Training in tactical back burning and wider suppression techniques.
- Fire behaviour analysis capability.
- Off-road response vehicles and fogging units.
- Better integration of helicopters, heavy plant and rural resources.
- Regular joint training exercises with land managers, estates, gamekeepers and forestry operators.
- Development of nationally recognised wildfire competency frameworks that allow trained land managers and gamekeepers to operate safely alongside emergency responders.

Firefighter Safety and Welfare

Wildfires present unique operational hazards, including prolonged exposure to heat, smoke, fatigue and rapidly changing fire behaviour.

Carrbridge and Dava identified numerous accidents and near misses, with sudden wind changes repeatedly cited as a significant hazard. Smoke inhalation risks, machinery incidents and personnel becoming isolated in difficult conditions were also reported.

Glenmore-Strathnethy identified concerns around fatigue, dehydration, welfare provision and the need for improved accountability systems during extended operations.

Investment in specialist wildfire training, welfare arrangements and operational planning should therefore be viewed as a firefighter safety issue as well as an operational capability issue.

Partnership Working

Effective wildfire response depends on strong partnership working.

The Carrbridge and Dava response was coordinated through cooperation between SFRS, the Cairngorms National Park Authority, gamekeepers, estates and wildfire specialists including Paul Wilson, Kevin Begg and Bright Spark Burning Techniques. Most respondents reported positive experiences of cooperation, particularly with land managers and gamekeepers.

Both incidents identify the value of trained gamekeepers and estate staff who possess specialist knowledge of local terrain, fire behaviour, fuel management, access routes and water sources. This expertise should be viewed as a strategic asset that complements the capabilities of emergency responders during major incidents.

Opportunities to Strengthen Scotland's Wildfire Resilience

The evidence points towards several practical actions that could strengthen Scotland's resilience.

1. Strengthen Prevention and Preparedness

Support integrated wildfire management plans, strategic fuel reduction measures, wildfire danger forecasting, capability mapping and Community Asset Registers to improve readiness during periods of elevated risk.

2. Increased Wildfire Funding

Dedicated funding should be made available for:

- Wildfire-specific equipment.
- Specialist all-terrain vehicles.
- Fogging units and suppression equipment.
- Enhanced aerial support arrangements.
- Fire behaviour analysts and forecasting capability.
- Expert training providers, such as Bright Spark Burning Techniques.

3. Enhanced Training

The Committee may wish to support investment in:

- Tactical back burning training.
- Landscape-scale wildfire command.
- Fire behaviour analysis.
- Wildfire containment and suppression techniques.
- Specialised wildfire incident command capability.

4. Joint Training with Land Managers

Both incidents identify the value of regular multi-agency exercises involving:

- SFRS.
- Estates and farms.
- Gamekeepers.
- Forestry operators.
- Contractors.
- Conservation organisations.

Such exercises should cover command and control, use of heavy plant, helicopter operations, communications, welfare arrangements and tactical back burning.

5. Formal Use of Rural Equipment and Expertise

Scotland already possesses a significant reserve of wildfire capability within rural businesses.

Recent incidents demonstrated the value of:

- Gamekeepers with practical fire experience.
- Estate fire teams.
- Land managers familiar with local terrain and fuel conditions.
- Privately owned ATVs, Argocats and fogging units.
- Heavy plant operators capable of constructing firebreaks and access routes.

6. Insurance and Reimbursement

A common barrier for those asked to assist is that insurance may not cover equipment deployed during wildfire response or may not meet the cost of repairs and replacement if damage occurs.

Mechanisms to reimburse equipment damage, servicing, fuel, transport and repair costs incurred while assisting emergency operations. Such arrangements would provide confidence to those capable of offering support and help secure future participation.

Conclusion

The evidence from both the Carrbridge-Dava and Glenmore-Strathnethy wildfires indicates that Scotland's wildfire resilience depends on combining professional emergency response with the skills, equipment and local knowledge held by land-based businesses.
Future funding for SFRS should therefore support specialist wildfire training, including tactical back burning, regular joint exercising with land managers, improved mobilisation of private-sector capability, and arrangements that enable trained gamekeepers and rural operators to safely support major incidents under SFRS command.

Doing so would strengthen operational effectiveness, improve firefighter safety and enhance Scotland's resilience to increasingly severe wildfire events.

Scottish Land & Estates had published two reports on the 2025 Carrbridge and Dava wildfires and the 2026 Glenmore-Strathnethy wildfire, which can be found in the appendices.

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Appendix 1: The Response to the Carrbridge and Dava Wildfires by Land-Based and Rural Businesses

THE RESPONSE TO THE CARRBRIDGE AND DAVA WILDFIRES BY LAND-BASED AND RURAL BUSINESSES

A REPORT FOR THE SCOTTISH GOVERNMENT

16 JULY 2025

About Scottish Land & Estates

At Scottish Land & Estates (SLE) our work helps to ensure that rural Scotland thrives. We are a membership organisation for landowners, rural businesses and rural professionals. We promote the wide range of benefits land-based businesses provide: tourist attractions, leisure facilities and landscapes enjoyed by the public, as well as housing, employment, tourism & enterprise, sporting and farming opportunities. We represent the interests of our members and wider rural Scotland to the UK and Scottish Governments to help ensure that policy and legislation reflects the unique requirements of rural Scotland and its communities. SLE is a member of the Scottish Wildfire Forum and the Muirburn Code Working Group.

EXECUTIVE SUMMARY

I. **The Carrbridge and Dava wildfires collectively constituted Scotland's largest wildfire event,** covering approximately **11,827ha** of moorland and woodland.

II. **At least 33 rural and land-based businesses responded,** including 27 estates, 2 farms, 2 nature reserves, a groundworks business and a garden services business.

III. Businesses contributed **34 ATVs (excluding pick-ups)**, **27 fogging units**, **9 tractors**, **5 diggers**, **5 water bowsers** and **50 leafblowers** to the containment and suppression effort. The conservative estimate of the total value of this equipment is nearly **£3.1 million. 18 businesses** recorded a wide range of damages and breakages ranging from **£50 to £5,000**.

IV. At least **101 employees** from the businesses surveyed were engaged in the containment effort. At least **80 employees** had experience of using fire (muirburn) in the course of managing land.

V. Land managers discharged several suppression and containment tactics, including: **tactical back burning**; **suppression by fogging unit**; **suppression by leafblower**; **suppression by fire beaters**; **excavating firebreaks**; **swiping firebreaks**; **suppression by rain gun on a mounted slurry tanker**; and **excavating burning peat**.

VI. **On-the-ground co-operation was co-ordinated through five key stakeholders**, including the Scottish Fire and Rescue Service, the Cairngorms National Park Authority, Paul Wilson (Headkeeper, Cawdor Estate), Kevin Begg (Headkeeper, Lochindorb Estate) and Bright Spark Burning Techniques.

VII. **17 businesses observed accidents or near-misses** during the course of the containment, mostly when the wind suddenly changed direction causing unpredictable fire behaviour.

VIII. **Businesses said the SFRS response could have been improved by ensuring access to appropriate equipment to tackle wildfires in difficult terrain.** Other suggested improvements included: greater helicopter availability; enhanced training in wildfire containment techniques; relaxing restrictions which prohibit firefighters from leaving the roadside; improved communication at the fire itself; and enhanced authority for SFRS commanders to mobilise helicopters.

IX. **Businesses said the response from the land management community could be improved by underscoring the importance of fuel load management and fire breaks**, both in terms of preventing wildfires and enabling more effective containment / suppression. Other suggestions included: helping the SFRS to build better situational awareness about available resources; strategic placement of water and equipment; strengthening of the Scottish Outdoor Access Code; establishing local response networks; and the creation of a targeted grant to enable businesses to invest in counter-wildfire capabilities.

CONTEXT

1. On 30 June 2025, Scottish Land & Estates (SLE) promulgated a 'call for volunteers' from Firebreak Services Ltd to provide resources to help contain two major wildfires in the vicinity of Carrbridge and Dava. The call was issued at the request of the Scottish Fire and Rescue Service (SFRS).

2. Many land-based and rural businesses from across Scotland responded to the call, contributing specialist firefighting equipment, as well as people and skills, to the containment and suppression effort over approximately 4 days[1]. It is widely acknowledged that this contribution was integral in bringing the fires under control.

3. It has since been established that the Carrbridge and Dava wildfires collectively constituted Scotland's largest wildfire event. The Carrbridge fire covered 5,234ha, of which 4,728ha was moorland and 506ha was woodland. The Dava wildfire covered 6,593ha, of which 5,846ha was moorland and 747ha was woodland. Collectively, the fires covered 11,827ha (figure 1 refers).

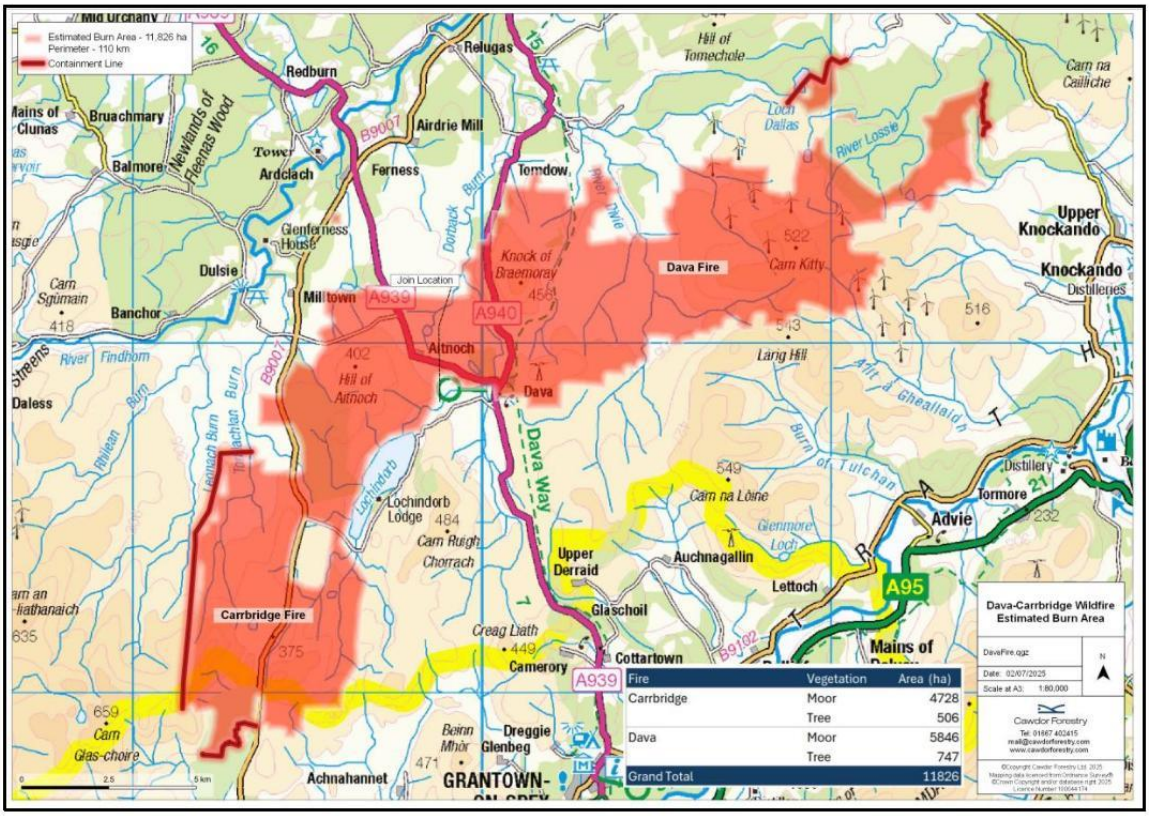

Figure 1 – Carrbridge-Dava Wildfires estimated burn area (credit: Cawdor Forestry).

[1] At the time of writing, impacted landholdings remain engaged in efforts to dampen down hotspots and flareups. The substantive contribution of land-based and rural businesses beyond those impacted by the fires took place between 28 June and 01 July.

4. There is a clear appetite across both public and private sectors to identify lessons – and learn from them. At the request of government officials and members, SLE commissioned a targeted survey of the land-based and rural businesses who responded to the call for volunteers on (and before) 30 June 2025. The aims of the survey were:

    - to understand which land-based and rural businesses responded;
    - to quantify the amount of resources and number of people provided by land-based and rural businesses;
    - to quantify any damages and breakages which were incurred by land-based and rural businesses;
    - to quantify any injuries, accidents or near misses which occurred in relation to land-based and rural businesses;
    - to understand the direct lines of communication and co-operation in place during the containment effort;
    - to understand what strategies, tactics and techniques were employed during the containment effort;
    - to understand what land-based and rural businesses think could improve the overall response.

5. The survey attracted 34 responses, and this report presents the general findings. In the discussion section, SLE has signposted recommendations for the Scottish Government and its agencies to consider. These recommendations are being made to improve the overall effectiveness of wildfire suppression and containment, while also seeking to reduce the likelihood of fires starting in the first place.

GENERAL FINDINGS

6. **Responders.** At least 27 estates and 1 National Nature Reserve contributed resources to the containment effort, alongside at least 2 farms, a nature reserve owned by an e-NGO, a groundworks business and a garden services business. Of the responding estates, the majority were situated in the Strathdearn and Speyside region. However, notable support was also provided by estates in Deeside, Donside and as far away as Perthshire.

7. **Resources.** Respondents to the survey detailed a diverse range of private resources which were ostensibly gifted towards the containment effort. For the purposes of this report, only firefighting equipment is listed, but it should be recognised that a considerable range of other assets (pickup trucks, fuel, radios, quadbikes, trailers, gas torches, drip torches, shovels, wire cutters and more) were similarly employed. The total number of assets provided by survey respondents is listed in table 1 below.

Asset	Number	Approximate cost per unit (£)	Estimated value (£) of equipment used
Argocat ATV	29	30,000	870,000
Polaris ATV	2	20,000	40,000

Can-am ATV	3	20,000	60,000
Leafblowers	50	700	35,000
Fogging Units	27	7,000	189,000
Tractors (including flail/swpie)	9	100,000	900,000
Diggers	5	100,000	500,000
Water Bowsers	5	100,000	500,000
Total Estimated Value of Equipment Used			**£3,094,000**

Table 1 – Summary of assets provided by land-based and rural businesses.

8. **Damage.** 18 respondents detailed an array of different types of damage and breakages which were incurred during the course of the containment. Some respondents were able to specify with a high degree of precision the expected costs for repairs, which ranged from replacing a suction pipe and strainer (estimated £50) to repairing the axle of a tractor (estimated £5,000). The most commonly referenced item reported to have broken was Argocat chains. Some respondents also noted that while no damage had been observed, ATVs would be sent for servicing as a consequence of the high intensity and prolonged workload endured over the course of the suppression and containment effort.

9. **People.** At least 101 employees from the businesses surveyed were engaged in the containment effort. Of those who attended, 67 had completed an approved muirburn training course, while a further 13 employees had experience of making muirburn but had not been trained. 80 of the 101 employees (79%) thus had experience of using fire (muirburn) in the course of managing land.

10. **Co-operation.** Respondents noted that there was on-the-ground co-operation with several individuals and agencies, including:

    - the SFRS – referenced by 14 respondents;
    - the Cairngorms National Park Authority (CNPA) – referenced by 3 respondents;
    - Paul Wilson (Headkeeper, Cawdor Estate) – referenced by 9 respondents;
    - Kevin Begg (Headkeeper, Lochindborb Estate) – referenced by 4 respondents;
    - and Bright Spark Burning Techniques – referenced by 3 respondents.

    Most respondents (28) expressed positivity about the co-operation overall. All respondents were favourable about the co-operation with gamekeepers and land managers. A small number of respondents (6) were critical of the SFRS, citing a general lack of effectiveness, presence and organisation.

11. **Tactics and Techniques.** Several tactics were employed during the containment and suppression effort, including: tactical back burning (10 references); suppression by fogging unit (19 references); suppression by leafblower (14 references); suppression by fire beaters (4 references); excavating firebreaks (5 references); swiping firebreaks (8 references); suppression by rain gun on a mounted slurry tanker (2 references); and excavating burning peat (2 references). Of note is the multiple respondents who referenced the co-ordinated employment of multiple ATVs

with fogging units as well as the strategic creation of firebreaks. One respondent described in detail the tactics employed on Knockando Hill.

"We assessed the fire and noted the real damage could be done to the East end and with help from Knockando agent, Alastair Davidson, found access to the Knockando Hill. With a tractor (driven by ex Knockando keeper) and swipe leading on the southern fire edge we used the swipe to cut the heather and raise the moss, the argo fogging unit with hose operator and driver to put out the fire. Jake from Altyre (fantastic shift from him) operating the leafblower behind, over a significant distance of about 2.5 miles. We contained the southern flank of the fire and forced it into Loch of the Cowlatt. It was clear by then that the Northern edge had gone into forestry of Dallas woods and would need helicopter assistance burning in the brash. We arrived on site at 2pm and left at 8pm leaving our argo on site for Willie Smith (Knockando keeper) to use to make sure the fire did not restart on his ground."

12. **Accidents and Near Misses.** Half of the respondents (17) reported no accidents or near misses. Of those who did report one or more accidents or near misses, 6 referenced circumstances where the wind had suddenly changed direction. The recollection of two respondents who encountered such circumstances are detailed below.

    "When extinguishing part of the fire, the wind changed so for safety reasons I pulled out from the fire. Unfortunately the Argo broke down with no drive to one side. This made driving the Argo extremely difficult, all the time, fire getting closer and smoke making visibility very limited. I knew roughly where to head. On reaching a locked gate on the plantation boundary, I feared I would have to leave the Argo to be burned. I was after a while able to contact someone and got the padlock code. Fire and smoke getting closer all the time. Not an ideal situation. I was lucky. By using my mobile phone and a satellite map app I could see where I needed to get to. It was not an easy journey driving a broken Argo. On reaching a safe place, I called another person to collect my 4x4 vehicle to pick me up."

    "Myself and 2 colleagues, alongside the Aberlour fire crew, were almost trapped on the main Carrbridge to Ferness road. We were burning along the roadside to create a break and the wind changed direction and we were minutes from being caught out."

    Other reported incidents included: machinery getting stuck; driving through fire to rescue livestock; narrowly avoided road traffic collisions due to smoke obscuring visibility; missing persons; drivers ignoring road closures and lack of road closure enforcement; a tractor dropping through a bridge; a refuge centre in Edinkillie not being open as advertised; effects of smoke inhalation; and cut hands from fixing machinery.

13. **SFRS Response.** When asked what would improve the overarching SFRS response, the most prominent theme expressed was ensuring access to appropriate equipment to tackle wildfires in difficult terrain (22 references). In particular, respondents pointed to the provision of ATVs with fogging units as being integral to

an effective response. Other common themes expressed by respondents included: improved helicopter availability (6 references); enhanced training in wildfire containment techniques (3 references); relaxing restrictions which prohibit firefighters from leaving the roadside (2 references); improved communication at the fire itself (7 references); and enhanced authority for SFRS commanders to mobilise helicopters (3 references). One respondent detailed several key themes in their response.

"Clear lines of communication need to be understood. In addition to protecting people and property, the SFRS need to be able to fight the fire on open ground and need to be provided with more funding to have more equipment. Access to the hill needs to be understood to get SFRS equipment to the front line. Local estates need assistance with more breathing and firefighting equipment. SFRS ought to meet with estates on an annual basis to understand access, contacts and equipment needs."

14. **Land Manager Response.** When asked what would improve the response from the land management community, respondents cited a range of themes. One of the more prominent themes was the importance of fuel load management and fire breaks (9 references), both in terms of preventing wildfires and enabling more effective containment / suppression. Figure 2 below illustrates this point well. Other themes that emerged were: helping the SFRS to build better situational awareness about available resources (4 references); strategic placement of water and equipment (5 references); strengthening of the Scottish Outdoor Access Code (2 references); establishing local response networks (3 references); and the creation of a targeted grant to enable businesses to invest in counter-wildfire capabilities (2 reference). The sentiments of two respondents who touch on several of the above themes are detailed below.

"Equipment (tractors, ATVs, swipes, breathing apparatus, fire beaters, etc) need to be provided to private estates in order that rapid deployment can take place to tackle fires in a timely manner. Strategically placed machinery, in addition to the machinery provided by private estates would allow more effective firefighting. CNPA and Scottish Forestry need to accept the needs for more fire breaks in moorland and woodland schemes. Landowners need more freedom to carry out muirburn and create access routes. Fighting a fire of this nature on foot is almost impossible and it is imperative that ATVs can take people and equipment to the face of the fire quickly to stop the spread. The evidence on the ground shows how valuable controlled muirburn is at stopping fires. With more muirburn and bigger fire breaks, the fire could have been contained before the rain stopped it."

"A very specific and targeted grant system to fund the purchase of specialist moorland firefighting equipment and training for staff. As landowners, keepers, foresters and managers, we can respond so much more quickly than the fire brigade but we need everyone to have access to the equipment required. We suggest that moorland firefighting specialists (keepers, rangers etc) should be identified and encouraged to train the fire brigade - knowledge sharing is invaluable. Both wildfires which have affected this estate have passed through the wind farm development - we suggest the wind farm developers take some responsibility in the reduction of fuel load on the hill, perhaps an obligation on them to include fire risk reduction in their

emergency-response equipment. Rather, they exist because estates routinely need trained people, all-terrain mobility, water-moving capacity, ignition control, suppression equipment and fire-behaviour experience to undertake managed burning safely. This creates an important policy risk: if muirburn licensing becomes so restrictive, uncertain or impractical that muirburn is materially harder or effectively unachievable, estates may have less reason to invest in the equipment, training and staffing that currently provide Scotland with a ready-made wildfire response reserve. Disinvestment would be a second-order consequence resulting in fewer fogging units, fewer ATVs, fewer leafblowers, fewer trained operators and less practical fire experience when wildfire occurs.

TACTICS USED ON THE GROUND

16. The tactics recorded in the returns included direct firefighting, hot-spot suppression, fogging-unit work, damping down, spotting, use of beaters and backpack sprayers, tactical backburning, helicopter guidance, creation of firebreaks and track access and water-point creation. Bright Spark Burning Techniques returns also highlight the value of structured briefings, rapid risk assessment, check-ins after initial deployment and refined plans as wind conditions changed.

17. Where the response worked well, it appears to have depended on trusted local leadership, clear sector-level command and practical deployment of the right assets to the right task. Examples include estate and contractor teams working alongside SFRS, wildfire consultants supporting tactical backburning and helicopter guidance, contractors creating firebreaks and access tracks, as well as NatureScot staff operating as self-contained teams under internal supervision while tasked to hotspots.

18. The evidence also highlights the value of pre-planned heavy plant deployment. The first bulldozer deployment was on Forestry and Land Scotland (FLS) land at Glenmore, following a request from land managers on the fireground which was escalated to the night-time FLS Duty Manager. The decision was made easier because the potential need for bulldozer support had already been anticipated in the FLS fire plan. This illustrates the importance of having heavy plant options identified in advance, with clear authority to deploy them when conditions require.

19. The use of wetting agent was also reported as partially successful. It appears to have assisted knockdown efforts significantly and follow-up discussions have been held to amend guidance. However, the evidence suggests that its effectiveness depended on adequate water volume, appropriate concentration and sufficient mop-up and patrolling resources to deal with smouldering. Feedback from the contractor who used it most was that wetting agent has the potential to save significant time and water, particularly during mop-up, if applied within the right operational framework.

OPERATIONAL WEAKNESSES IDENTIFIED

- Landholding D: losses include c. 120ha of commercial forestry and some hill ground. Black grouse, red grouse, wading birds and mountain hares all adversely affected. C. £750,000 worth of damage to trees and fences.
- Business specialising in peatland restoration: lost earnings across 3 landholdings between now and financial year 2026-27 estimated to be £33,000 (+VAT) plus a six-figure sum loss in relation to work scoped on one impacted landholding over several years.

DISCUSSION, ANALYSIS AND RECOMMENDATIONS

Resources, People, Tactics and Techniques.

16. It is clear from the responses to the survey that land-based and rural businesses mobilised *en masse* to support the containment and suppression effort. The provision of resources seems to have been particularly consequential – with ATVs and fogging units ensuring both access to and extinguishment of the fire's flanks and tail, as well as any emergent spot fires. The tactical employment of multiple ATVs and fogging units in what one respondent described as a 'chain' seems to have also proven effective, as was the use of tactical backburning to reduce fuel loads beyond the fire's head.

17. ATVs and fogging units are generally – although not exclusively – purchased and utilised by estates for the purposes of supporting muirburn operations. Thus it is important to acknowledge that the future availability of these resources is in-part dependent on the scale and extent of muirburn activity in the future. Landholdings unwilling or unable to make muirburn are less likely to invest in the kind of resources which were readily employed over the course of the Carrbridge and Dava wildfires.

18. It is similarly striking that, of the 101 employees who responded, c. 79% had direct experience of making muirburn, while 66% had completed an approved training course. Again, it is important to acknowledge the correlation between those who responded on the ground and those who routinely make muirburn. Put simply, a majority of those who did respond had a familiarity with fire in controlled contexts which gave them the requisite skills, experience and knowledge to engage meaningfully in the suppression and containment effort.

19. These observations are important because Part 2 of the Wildlife Management and Muirburn Act 2024 is due to be commenced on 01 January 2026. The commencement will introduce a licensing scheme, statutory code and compulsory training for muirburn. The cumulative impact of these provisions is that it will be more restrictive to make muirburn in the future, which will carry implications for the response to future wildfire events by many land-based and rural businesses.

20. The licensing scheme, in particular, is likely to significantly constrain the ability of land managers to make muirburn. There are two reasons for this.

    - To apply for a licence, you need to first understand where the land constitutes peatland (peat > 40cm depth) and non-peatland. NatureScot has developed

an interactive map to support this process, but there will still be a requirement to survey land with a peat probe. This is not helped by the fact that the interactive map has a significant amount of land designated as 'uncertain', for which there is no information about peat depth relative to the 40cm threshold.

- If applying for a licence on peatland, NatureScot has to be satisfied that "muirburn is *necessary* for the specified purpose, and [that] *no other method of vegetation control is available*"[2] [emphasis added]. These provisions present a high evidential bar for land managers to satisfy.

21. Using figure 3 below, it is possible to infer how the licensing scheme would be applied in the area impacted by the Carrbridge and Dava wildfire. Most of the impacted land is peatland (purple), which means land managers intending to make muirburn in this area would need to satisfy NatureScot: i) that it is necessary for a specified purpose[3]; and ii) that no other method of vegetation control is practicable. For the uncertain areas (green), a survey using peat probes will need to be carried out to ascertain whether the land is peatland or non-peatland before applying for a licence. For areas shaded in blue (non-peatland), licences will be more easily obtainable and subject to an 'appropriateness' test, which has a lower legal standing.

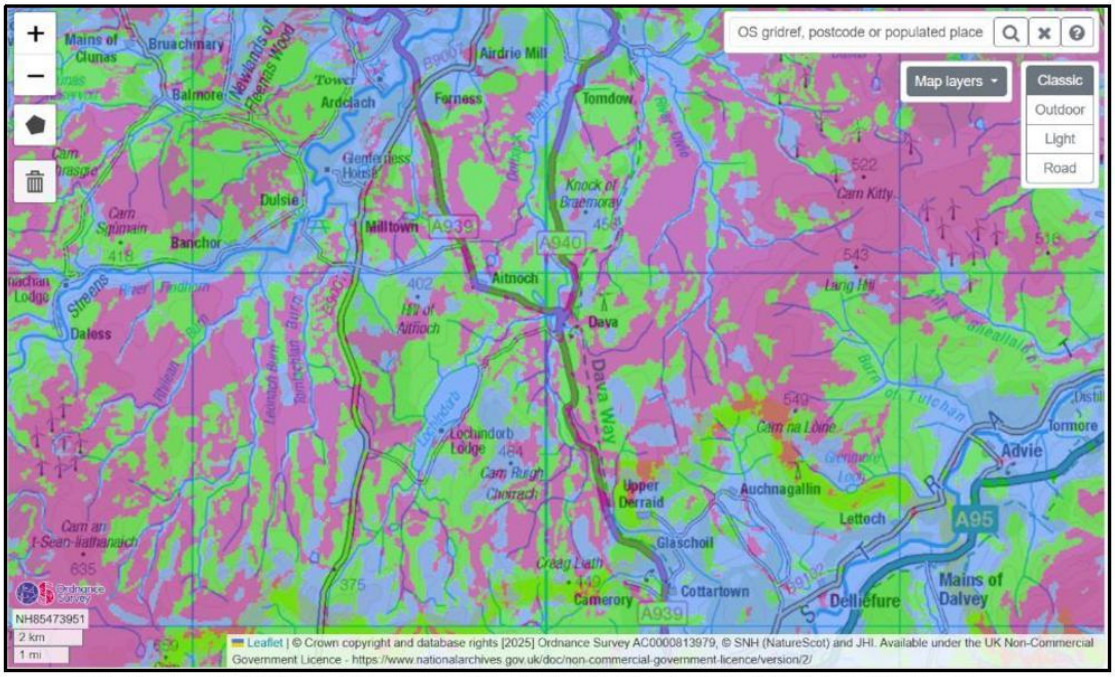

Figure 3 – NatureScot's Muirburn-Peatland Map data overlaid on the area impacted by the Dava-Carrbridge wildfires. Purple = peatland (>40cm); blue = non-peatland; green = uncertain.

[2] Sub-Section 1, Section 14, Part 2 of the Wildlife Management and Muirburn (Scotland) Act 2024. Available here.

[3] There are four specified purposes on peatland: i) restoring the natural environment; ii) preventing, or reducing the risk of, wildfires causing damage to habitats; iii) preventing, or reducing the risk of, wildfires causing harm to people or damage to property; and iv) research.

22. It is not unreasonable to infer that the licensing scheme will result in a reduction in muirburn activity across the impacted area. This will carry implications for fuel load management – which several respondents to the survey credited for making the containment easier – but also investment in resources and the retention of skills which were so critical in confronting the recent wildfires.

23. If the Scottish Government wants the support of land-based and rural businesses in combatting wildfire events to endure, urgent consideration will need to be given to the impact of the muirburn licensing scheme on fuel load management, investment in resources and the retention of skills. **As a minimum, SLE recommends that section 14(b)(i) and (ii) of the Wildlife Management and Muirburn Act 2024 be repealed via the Natural Environment (Scotland) Bill.** This would retain a licensing scheme for muirburn but replace the 'necessity' test with the 'appropriateness' test, and remove the presumption in favour of other vegetation control methods. It is envisaged that such a change would enable muirburn to be carried out more freely while simultaneously retaining regulatory oversight.

Damages and Expenses

24. It is clear that the containment and suppression effort exerted a considerable toll on private resources. While some may be able to claim back the costs for such expenses on insurance, we know that for many the cost will be borne privately. **SLE recommends that the feasibility of compensating land-based and rural businesses for any damages, breakages and servicing be explored by the Scottish Government and relevant public bodies.** SLE has a detailed list of breakages, with some associated costings, and has permission to feed this information directly to relevant agencies along with business contact details.

25. It is understood that the Fire (Scotland) Act 2005 contains provision for the renumeration or reimbursement of expenses. This may be an appropriate vehicle to affect such a recommendation.

SFRS Response

26. The Carrbridge and Dava wildfires exposed a number of critical gaps in SFRS capabilities. While their contribution was undoubtedly important, land-based and rural businesses were clearly bearing the brunt of containment and suppression efforts. That said, the SFRS did play an important role, as one respondent observed:

    "I have to say that my overall experience with the SFRS was a positive one. Nick Nethercott, area commander from Speyside, could not have been more helpful. He made it clear that he was there to support us and not the other way round. The SRFS has clear limitations when it comes to fighting wildfires. In a supporting role, they were fine."

27. The Scottish Government will ultimately need to decide who it wants to own capabilities when it comes to the suppression and containment of wildfires. In the case of the Carrbridge and Dava wildfires, it was land managers – and their privately funded resources – who constituted the bulk of that capability. **For that equation to rebalance, SLE recommends the following:**

    - **Investment in bespoke SFRS ATVs with suppression and containment capabilities.** A fleet of 50 (minimum) geographically dispersed ATVs with fogging units is probably required given the scale of response to the Carrbridge and Dava wildfires. These could be bought centrally, or it might be more efficient to keep the equipment of third parties on retainer.
    - **Investment in a bespoke SFRS aerial capability and enhanced authority for SFRS commanders to mobilise private helicopter assets.** The mobilisation of helicopters during the Carrbridge and Dava wildfires was reportedly frustrated by weather conditions, pilot availability and uncertainty over accountable parties. This could be streamlined with an SFRS-owned capability and enhanced authority for commanders to mobilise (and finance) private assets.
    - **Investment in enhanced wildfire training for firefighters.** Firefighters need to be taught wildfire-specific containment and suppression techniques using tactical back-burns, fogging units, leafblowers, fire beaters, swiping and excavation. Beyond that, SFRS commanders responsible for containment at the landscape scale require enhanced training on tactics and strategy. Such training should enable firefighters to meaningfully engage in active containment and suppression, as well as the supportive functions they exercised during this incident.
    - **Investment in fire behaviour analysts, wildfire research and wildfire danger rating assessments.** These capabilities are critical for mounting an effective, considered response and driving continuous improvement. Wildfire danger rating assessments are also integral for providing advanced warning about conditions which could precipitate a wildfire event.
    - **Raising situational awareness among land managers with regards to command, control, co-ordination and communication (C4).** Some land managers struggled with C4 operating procedures and would benefit from being sighted on these before a substantive response is required.
    - **Creation of a Scotland-wide Integrated Fire Management Strategy (IFMS) as an urgent priority, with leadership and input from the Scottish Government.** The strategy should focus on review and analysis, risk reduction, readiness, response and recovery (R5). This will ensure everything possible is done to prevent wildfires, while simultaneously bolstering preparedness.

Land Manager Response

28. Notwithstanding the recommendations in respect of muirburn (paragraphs 19-22), **SLE would recommend the following in relation to improving the response from the land management community.**

- **Embarking on a campaign to encourage the registration of resources on the community asset register.** It is not known how many of the resources utilised were activated via the register. However, the responses to this survey suggest that many of the assets were cohered in response to calls from land managers on the ground or SLE's call for volunteers. If the register is to play a meaningful role in responding to wildfire events, its importance must be elevated among the land management community.
- **Establishing formal 'fire groups' (some of which already exist) with the SFRS, land managers and stakeholder representatives to prepare for and cohere a meaningful response to wildfire events.**

Damage Assessment

29. Work to assess the full scale of damage is ongoing. However, if lessons are to be learned, it will be vitally important to interrogate factors which may have exacerbated and mitigated the fire's effects. **To that end, SLE recommends that funding is made available to conduct this research and inform future mitigation strategies.**

CONCLUSION

30. The Carrbridge and Dava wildfires ought to be a watershed moment for the Scottish Government. Wildfires are an increasingly prevalent threat and swift action must now be taken to bolster public and private sector preparedness for such incidents. Simultaneously, it must be recognised that prevention is better than cure, and this will require matters that are beyond the scope of this report to be considered – including options to prohibit the setting of recreational fires and strengthening the Scottish Outdoor Access Code.

31. Land-based and rural businesses mounted an incredible response, alongside government agencies. For this they deserve total admiration. Beyond this, it is vital that the Scottish Government takes steps to ensure that it does not inadvertently compromise hundreds of years of collective skill and experience that enabled land managers to respond decisively and effectively to this emergency. Without this invaluable knowledge, it is clear that a far greater swathe of the landscape would have succumbed to the flames.

Ross Ewing
Director of Moorland

16 July 2025

Appendix 2: The Response to the Glenmore-Strathnethy Wildfire by Land-Based and Rural Businesses

THE RESPONSE TO THE GLENMORE-STRATHNETHY WILDFIRE BY LAND-BASED AND RURAL BUSINESSES

A REPORT FOR THE SCOTTISH GOVERNMENT

MONDAY 31 AUGUST 2026

About Scottish Land & Estates

At Scottish Land & Estates (SLE) our work helps to ensure that rural Scotland thrives. We are a membership organisation for landowners, rural businesses and rural professionals. We promote the wide range of benefits land-based businesses provide: tourist attractions, leisure facilities and landscapes enjoyed by the public, as well as housing, employment, tourism & enterprise, sporting and farming opportunities. We represent the interests of our members and wider rural Scotland to the UK and Scottish Governments to help ensure that policy and legislation reflects the unique requirements of rural Scotland and its communities. SLE is a member of the Scottish Government Wildfire Strategic Oversight Group and Scottish Wildfire Forum, and our members have been actively engaged in wildfire prevention, preparedness and response.

EXECUTIVE SUMMARY

I. **Land-based, rural and conservation businesses mounted a substantial response to the Glenmore-Strathnethy wildfire which burned more than 3,300 hectares in July-August 2026.** The assistance came via estates, plant-hire and construction businesses, wildfire consultants, forestry and arboriculture contractors, NatureScot and third sector interests.

II. **Fire-behaviour evidence is central to understanding both the incident and the response.** The behaviour experienced had been predicted in the wildfire danger assessment of 12-13 July 2026, with extensive smouldering later predicted in follow-up assessment. However, this should not be read as meaning that the fire's development was wholly predictable. The significant wind change to a westerly on Friday 24 July materially altered fire behaviour and had a major impact on fire growth at that point. The fire was predominantly fuel-driven, with occasional slope-driven behaviour and a short wind-driven phase, observed flame lengths generally of 1-2 metres and extensive smouldering and re-burning in heavy heather, moss/litter, undecomposed organic matter and peat.

III. **A survey commissioned by Scottish Land & Estates (SLE) records more than 40 named businesses or organisations that were contacted, volunteered assistance, were authorised to assist, or were placed on standby during the response.** This included more than 50 employees and contractors who volunteered or were made available by their employers during the course of the fire, with at least 70 on standby in the event of the fire threatening Tomintoul. In most cases the response depended on individuals choosing to assist, with employers releasing them from normal duties and, subject to future funding or reimbursement arrangements, absorbing or recording the associated costs. The full scale of the response has not been captured due to the ongoing efforts of impacted landholdings.

IV. **The response included more than 250 recorded pieces of specialist off-road wildfire equipment, heavy plant, water-carrying capability and hand tools, with a combined stated equipment value of nearly £6.4 million**. This included Argocats with fogging units, Can-Am vehicles, ATVs, bulldozers, tracked and wheeled excavators, Marooka dumpers, tractors, water tanks, bowsers, pumps, leafblowers, beaters, chainsaws, radios and PPE.

V. **The data records a considerable private and third sector personnel contribution, including multi-day involvement**. **In total, the survey returns record 266 person-days and 38 person-nights volunteered, authorised to assist, or placed on standby.** Several responders worked extended days and nights, with some plant operators recording shifts of up to 15 days or nine nights across the incident period.

VI. **The tactics employed included direct firefighting, hot-spot suppression, fogging-unit deployment, leafblower suppression, tactical backburning, helicopter attack, creation of firebreaks, opening access tracks, clearing**

vegetation, digging ponds for helicopter water supply, damping down and supporting Scottish Fire and Rescue Service (SFRS) crews.

VII. **Respondents repeatedly emphasised that local land-management knowledge, muirburn experience, off-road access, water-moving capability and heavy plant were critical capabilities. Respondents also recorded recurring weaknesses in registration, tasking, muster points, check-in/check-out, communications, welfare, PPE supply, integration with helicopters and clarity of command and control.**

VIII. **A notable feature of the Glenmore-Strathnethy response was the number of capable volunteers and contractors who travelled to muster points or stood by with equipment but were not deployed, were turned away, or were sent home.** This included several plant operators, estate teams and specialist responders with wildfire-relevant equipment.

IX. **The report also demonstrates that significant land-management capability was available but not always fully used.** Respondents identify under-use or delayed use of heavy plant, ATVs, thermal drones, water-moving equipment, common VHF communications, local knowledge and trained personnel.

X. **Helicopter support was valuable albeit within operational limits.** Helicopters slowed fire spread and supported suppression in difficult terrain, but their availability was weather-dependent and reliant on private contractor availability. They provided a useful direct attack capability, but only within suitable fire-behaviour limits, including flame lengths below approximately 4 metres. Helicopter support is best utilised in support of ground crews rather than as a standalone suppression solution.

XI. **There is a clear policy risk if muirburn licensing undermines the practical capability that supports wildfire preparedness.** Much of the estate-based equipment, trained personnel and fire-behaviour knowledge recorded in the response exists because estates undertake and prepare for planned muirburn. If lawful muirburn becomes impractical, uncertain or commercially unjustifiable, Scotland risks losing part of the ready-made wildfire response reserve currently sustained by land-based businesses.

XII. **The main practical lesson is the need to move from ad hoc goodwill to a formal, exercised wildfire capability system.** A live capability register, linked to a standard mobilisation process, should identify estates, contractors, conservation bodies and specialist advisers before incidents occur. That system should be tested through multi-agency exercises covering muster points, registration, command and control, aircraft tasking, radio use, water logistics, heavy plant use, welfare, PPE and end-of-shift accountability. It should also produce clear actions, owners and review dates so lessons from previous wildfires are not lost.

INTRODUCTION AND CONTEXT

1. This report summarises the contribution made, and offered, by land-based and rural businesses during the Glenmore-Strathnethy wildfire response. It draws on contact records and follow-up survey returns from estates, contractors, plant-hire businesses, wildfire consultants, conservation bodies and other rural operators. The evidence demonstrates both the scale of goodwill and practical capability available from the private and third sectors, as well as the operational barriers that limited the full use of that capability.

2. The Glenmore-Strathnethy incident drew support from a wide geography and from a wide range of business types. Responders included estates such as Rothiemurchus, Seafield & Strathspey, Balmoral, Moray, Glendoe and Wildland Ltd; plant and construction businesses including MacDougall Plant Hire, O'Hare Construction, GC Campbell, Duncan G. Grant Ltd and CR Contractors; wildfire specialists from Bright Spark Burning Techniques; and public-sector land interests including NatureScot.

3. This report does not offer a complete picture of the response. Some of those known to have been involved (including impacted landowners such as RSPB Scotland) did not respond to the survey on account of ongoing dampening down efforts, while others involved in the response have not yet been identified. The numbers presented are therefore conservative and it is likely the true figures are much higher.

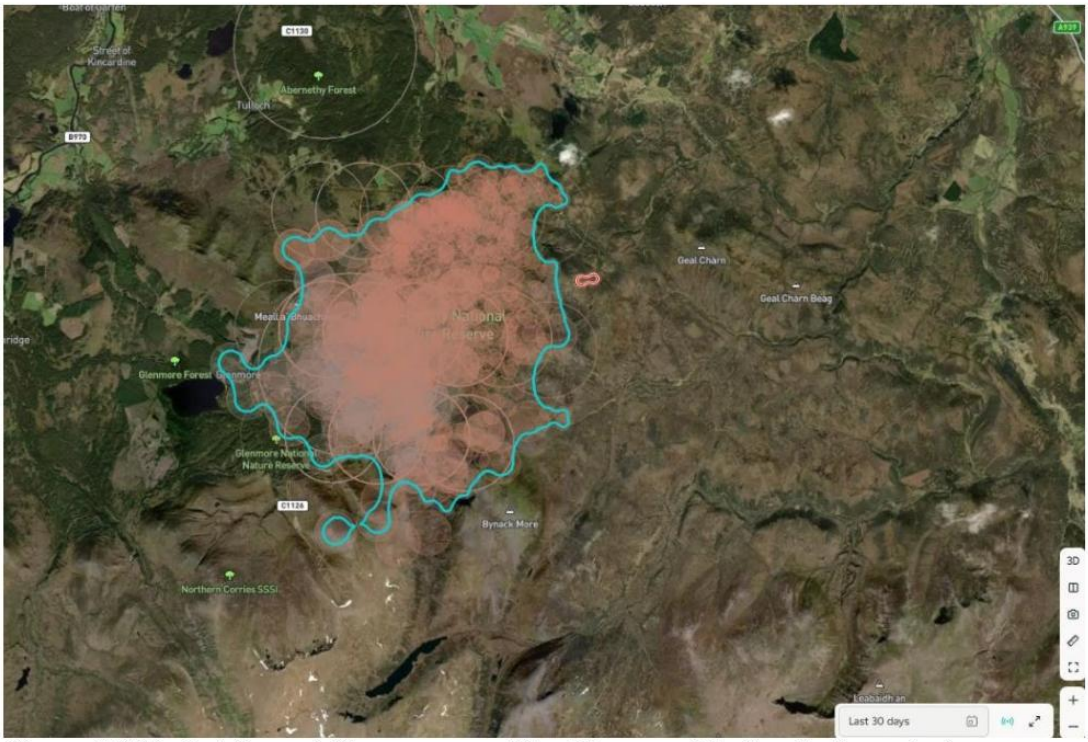

Figure: WildfireSolution satellite summary of the Glenmore-Strathnethy fire extent supplied by Firebreak Services Ltd, showing hotspot clustering, mapped fire perimeter, burnt area, affected area and fire confidence.

4. Fire-behaviour evidence provided by Firebreak Services Ltd is also important context for the land-management response. The behaviour experienced had been predicted in the wildfire danger assessment of 12-13 July 2026, before the fire started on the afternoon of Wednesday 15 July, with extensive smouldering subsequently predicted in the follow-up assessment of 28 July. However, this should not be read as meaning that the fire's development was wholly predictable. For most of the incident the rate of spread was slow, but the significant wind change to a westerly on Friday 24 July materially altered fire behaviour and had a major impact on fire growth at that point, the same day that the muster was organised.

5. Observed flame lengths were generally in the range of 1-2 metres, with a maximum of around 3 metres, which is consistent with the highest satellite-observed fire intensity of 3,479 kW/m and a corresponding heathland flame length of approximately 3 metres. The heather moor fuel load was extremely high across the above-ground shrub, moss/litter and undecomposed organic matter layers, all of which were available to burn at points during the incident.

6. Large areas also re-burned, with some ground burning up to three times, progressively consuming moss/litter, heather stick, undecomposed organic matter and eventually peat. No crown fires were observed, but there was extensive smouldering in peat and around tree roots, creating a falling-tree hazard where root systems had been undermined. Overall, the fire was assessed as predominantly fuel-driven, with occasional slope-driven behaviour and only a short period when it became wind-driven.

THE SCALE OF THE RESPONSE

7. The contact records show that more than 40 businesses and organisations were contacted, involved or placed on standby. Survey responses then provide detailed evidence of personnel involved, standby arrangements, equipment availability, tactics used and operational barriers encountered. Taken together, the evidence shows a large informal rural resilience network capable of responding rapidly. The issue was not that people moved too quickly or before there was a clear task. Rather, it was the gap between the speed at which rural capability became available and the speed at which command, registration, tasking and communication arrangements were able to absorb that capability. Future CONOPS arrangements therefore need to ensure that the formal response can match the pace of the land-based response, while keeping resources safely under SFRS command.

8. Personnel contributions were significant. More than 50 employees were involved during the course of the fire, with at least 70 on standby in the event of the fire threatening Tomintoul. The evidence should not be read as implying that employers instructed staff into hazardous situations without choice: in most cases individuals volunteered or agreed to assist, while employers released them from normal duties and either absorbed the associated costs or recorded costs that may require reimbursement through future arrangements. NatureScot recorded multiple staff involved over several days, Wildland Ltd recorded staff working between eight and

twelve days, Rothiemurchus recorded eight days and one night, Seafield & Strathspey recorded four personnel across several days and nights, Bright Spark Burning Techniques recorded specialist staff involvement for both day and night operations, and some plant businesses recorded extended involvement, including Duncan G. Grant Ltd. and GC Campbell.

9. The value of private machinery and equipment placed at risk was also substantial. Returns include high-value bulldozers, tracked and wheeled excavators, Morooka dumpers, Argocats, Can-Am vehicles, tractors, bowsers, water tanks, pumps and trailers. Several businesses also recorded costs for service, repair, damage or wear, including fogging-unit servicing, Argocat damage, punctures, damaged tracks, broken radios, bulldozer wear and equipment cleaning or repair.

EQUIPMENT AND CAPABILITY CONTRIBUTED

10. The survey returns allow the equipment contribution to be illustrated by type. Because the raw data includes both deployed equipment and equipment placed on standby, the figures below should be read as recorded available capability rather than confirmed simultaneous deployment. Where descriptions overlap, similar items have been grouped to avoid overstating precision.

Recorded wildfire equipment and capability by type

Equipment / capability type	Recorded quantity	Notes on grouping
Argos / Argocats / Argo-type vehicles, including water pumps or fogging units	36	Includes Argos, Argocats and Argo-type vehicles with fogging units, pumps or water tanks recorded in survey returns.
Leafblowers	45	Includes estate and standby assets, including leafblowers listed for suppression and hotspot work.
Tractors, tractor-and-swipe units, tractor-and-trailer units and tractor/bowser combinations	17	Includes tractors, swipes, tractor-and-low-loader combinations and tractor-based water capability.
Can-Am / 6x6 buggy / similar off-road utility vehicles	14	Includes Can-Am vehicles and 6x6 buggies with pumps or fogging units where recorded separately from Argos.
Excavators, diggers and 360 machines	11	Includes tracked, wheeled, 8-ton, 13-ton and 16-ton machines, plus 360 diggers with shears and grabs.
Water tanks, bowsers, IBCs and field water-carrying units	11	Includes standalone tanks, field bowsers, water tankers and IBC-based water carrying capacity.
Fogging units, mist sprayers and handheld foggers	10	Includes trailer fogging units, handheld foggers and mist sprayers where listed as discrete equipment.

Trailers and low-loaders	10	Includes trailers, low-loaders and tri-axle / heavy plant transport capability.
Bulldozers / dozers	4	Includes bulldozers and dozers recorded as deployed, available or ready for transport.
Dumpers / Morooka dumpers / tracked dumpers	4	Includes Marooka and tracked dumpers, some fitted or associated with water or fogging capability.
Hand tools and smaller suppression equipment	At least 40	Includes beaters, shovels, picks, backpack sprayers, chainsaws, radios and PPE. These are likely under-recorded.

11. The response was highly practical and capability-led. Estates supplied off-road access and mobile suppression equipment, including Argocats, Can-Am vehicles, ATVs, trailer fogging units, handheld fogging units and water tanks. These were used for firefighting, hot-spot work, backburn support, damping down and moving personnel across difficult ground.

12. Plant and contracting businesses supplied capability not possessed by public sector responders including: bulldozers, 360 excavators, tracked diggers, wheeled diggers, shears, grabs, dumpers, mulchers, tractors, low-loaders and heavy transport. These assets were used, or offered, for creating firebreaks, clearing trees, opening tracks, creating access to the fire front, shifting machinery and digging water points for helicopter use.

13. Firebreak Services Ltd provided a distinct specialist capability through strategic remote wildfire consultancy support. This included interpretation of fire behaviour, fire danger, fire spread and hotspot information, alongside discussion of appropriate tools, tactics and strategies with key managers during the incident. Firebreak Services Ltd also advised senior SFRS personnel and others at an early stage that heavy plant would be required, and that wetting agent could be useful. In addition, the company supplied 18 x 25-litre tubs of wetting agent, distributed across five organisations, together with the associated COSHH information.

14. A further important contribution came from personnel with muirburn and wildfire experience. Many estate staff and wildfire consultants had experience of controlled burning and vegetation management, as well as the impacts that fire behaviour, smoke, wind, access and terrain have on suppression efforts. The evidence shows that this knowledge was most effective when integrated into structured tasking, risk assessment and SFRS operations, but was less effective where responders were left on standby, sent between muster points or turned away without clear explanation.

15. A significant proportion of the private capability recorded in the above table – particularly the highest-volume assets such as Argocats, leafblowers, tractors and all-terrain vehicles – is bought, maintained and retained by estates because it supports planned muirburn operations. These assets are not held primarily as public

emergency-response equipment. Rather, they exist because estates routinely need trained people, all-terrain mobility, water-moving capacity, ignition control, suppression equipment and fire-behaviour experience to undertake managed burning safely. This creates an important policy risk: if muirburn licensing becomes so restrictive, uncertain or impractical that muirburn is materially harder or effectively unachievable, estates may have less reason to invest in the equipment, training and staffing that currently provide Scotland with a ready-made wildfire response reserve. Disinvestment would be a second-order consequence resulting in fewer fogging units, fewer ATVs, fewer leafblowers, fewer trained operators and less practical fire experience when wildfire occurs.

TACTICS USED ON THE GROUND

16. The tactics recorded in the returns included direct firefighting, hot-spot suppression, fogging-unit work, damping down, spotting, use of beaters and backpack sprayers, tactical backburning, helicopter guidance, creation of firebreaks and track access and water-point creation. Bright Spark Burning Techniques returns also highlight the value of structured briefings, rapid risk assessment, check-ins after initial deployment and refined plans as wind conditions changed.

17. Where the response worked well, it appears to have depended on trusted local leadership, clear sector-level command and practical deployment of the right assets to the right task. Examples include estate and contractor teams working alongside SFRS, wildfire consultants supporting tactical backburning and helicopter guidance, contractors creating firebreaks and access tracks, as well as NatureScot staff operating as self-contained teams under internal supervision while tasked to hotspots.

18. The evidence also highlights the value of pre-planned heavy plant deployment. The first bulldozer deployment was on Forestry and Land Scotland (FLS) land at Glenmore, following a request from land managers on the fireground which was escalated to the night-time FLS Duty Manager. The decision was made easier because the potential need for bulldozer support had already been anticipated in the FLS fire plan. This illustrates the importance of having heavy plant options identified in advance, with clear authority to deploy them when conditions require.

19. The use of wetting agent was also reported as partially successful. It appears to have assisted knockdown efforts significantly and follow-up discussions have been held to amend guidance. However, the evidence suggests that its effectiveness depended on adequate water volume, appropriate concentration and sufficient mop-up and patrolling resources to deal with smouldering. Feedback from the contractor who used it most was that wetting agent has the potential to save significant time and water, particularly during mop-up, if applied within the right operational framework.

OPERATIONAL WEAKNESSES IDENTIFIED

20. The strongest and most consistent theme in the evidence is not a lack of willingness or capability, but a lack of preparedness to absorb that capability into the formal response. Multiple responders recorded confusion over who was in charge, where they should report, whether they were required, and how they were to be tasked. Several capable operators travelled to Nethy Bridge, Abernethy, Tomintoul or other muster points only to be stood down, left waiting, or sent home.

21. The concerns recorded include poor information release to the public, poor registration at the start of the incident, unclear muster-point arrangements, inadequate check-in and check-out, lack of welfare checks during long shifts, insufficient PPE replacement, weak mobile phone signal, limited radio provision, limited integration with helicopter tasking and inconsistent acceptance of local land-management expertise.

22. There was also frustration that some heavy plant and experienced personnel were not used at the main fire when respondents believed they could have made a material difference. Evidence from plant operators and estate responders points to delayed tasking, limited situational awareness and unnecessary duplication or under-use of assets. Some businesses also reported that private machinery bore the cost of damage, servicing or wear without an obvious reimbursement mechanism.

23. Attempts to improve communications were also constrained. Firebreak Services Ltd sought to mobilise the COTAG HQ trailer, which has Starlink internet and powerful VHF radio capability and could have provided the land-management sector with logistical and communications support. However, because they could not establish communication with SFRS Incident Command, the initiative could not be progressed.

24. There was also insufficient consideration of the additional resources available from the land-management sector and, in some cases, limited understanding of the tools, vehicles and machinery being offered. Examples include the use of ATVs for crew transport and the importance of compatible VHF radio communications between ground teams and helicopter pilots. Respondents also raised concerns that breaks, welfare and fatigue management for all staff on the fireground were not given sufficient priority, contributing to exhaustion, dehydration and excessive stress.

AERIAL SUPPORT

25. The key aerial lesson from Glenmore-Strathnethy is not simply that helicopters need to be better integrated once they arrive – it is that the current approach to aerial support is not sustainable. The survey records both the value of helicopter support and the practical work required on the ground to support aircraft, including water-point creation, firebreak construction, plant deployment and coordinated tasking. However, Scotland currently relies heavily on private helicopter contractors who may have commercial obligations elsewhere. That means mobilisation can be delayed precisely when aerial support is most needed, while the number of available aircraft can vary during the course of an incident. This creates uncertainty for incident commanders, frustrates ground tactics and weakens the ability to plan around aircraft as a dependable suppression asset.

26. The evidence also underlines the need to recognise the operational limitations of helicopters in wildfire suppression. Helicopters can provide direct attack only within suitable fire-behaviour limits, including flame lengths below approximately 4 metres, and should generally operate in support of ground crews who ultimately extinguish the fire. Their effectiveness is therefore greatest when they are integrated with ground crews, heavy plant, water logistics, communications and mop-up planning, rather than treated as a standalone suppression solution.

27. That does not diminish the value of helicopters. Used well, they can slow fire spread, apply water in difficult terrain, support tactical decisions and buy time for ground crews. However, they are specialist, weather-dependent and currently uncertain because access is not guaranteed. The practical lesson is that Scottish Ministers must establish a contractual mechanism to guarantee access to appropriate helicopter assets during periods of VERY HIGH and EXTREME wildfire risk. Such a mechanism should include mobilisation standards, activation thresholds, availability requirements, funding responsibility, mapped water sources, refuelling and landing options, ground-to-air communications, trained helicopter liaison and clear procedures for linking aircraft with firebreak construction, tactical backburning, water-moving plant and hotspot suppression. It should also be supported by consideration of a UK-wide aerial wildfire capability, falling under resilience arrangements, to provide further redundancy where Scottish or private contractor capacity is unavailable, delayed or already committed. Helicopters should therefore be planned as part of a wider wildfire system – not treated as an emergency improvisation dependent on whether suitable aircraft happen to be commercially available.

LESSONS FOR FUTURE WILDFIRE RESPONSE

28. The Glenmore-Strathnethy evidence reinforces the need for a formal rural wildfire capability framework. The goodwill and equipment exist, but they must be identified, verified, trained, insured, mobilised and commanded. A purely ad hoc request for assistance risks attracting considerable capability without sufficient means to deploy it safely or effectively. That framework should also recognise a hard operational reality: helicopter support is highly valuable but not guaranteed under current arrangements. Reliance on private contractors without a guaranteed availability mechanism creates delays, variable asset numbers and uncertainty during the most dangerous conditions.

29. Future arrangements must also recognise the distinct contribution of land-based businesses: they understand terrain, fuels, access routes, water sources, wind, smoke, livestock presence, woodland edges, moorland vegetation and the limitations of machinery on steep or sensitive ground. That knowledge should be treated as an operational asset and not as an informal or peripheral addition to the response.

30. There is also a distinct policy risk if muirburn licensing becomes unworkable in practice. Much of the skill base, fire-behaviour knowledge and specialist estate equipment available during incidents are sustained because estates undertake planned muirburn. If lawful muirburn becomes too difficult, uncertain or costly to carry

out, the second-order consequence may be the gradual loss of both trained practitioners and the equipment they currently retain for safe burning and wildfire suppression.

RECOMMENDATIONS

31. **Build and maintain a live wildfire capability register via the Community Asset Register (CAR).** This should cover estates, farms, contractors, plant-hire businesses, forestry operators, wildfire consultants and conservation bodies, recording equipment type, operator availability, training, insurance, transport requirements and mobilisation constraints. The purpose should be to turn an informal goodwill network into a known, verified and taskable resilience asset before incidents occur.

32. **Promote and exercise a standard mobilisation and tasking process linked to the CAR.** This should include registration, triage, voluntary participation, employer release, deployment under SFRS authority, check-in/check-out, welfare monitoring, shift guidance, PPE requirements, insurance confirmation, cost recording and clear stand-down procedures so that responders are not left travelling unnecessarily, waiting without tasking, or being turned away despite offering relevant capability. The language and process should make clear that land-based responders are not being instructed by their employers into hazardous situations, but are volunteering or agreeing to assist within a controlled multi-agency system.

33. **Establish local wildfire groups in high-risk areas and integrate estate fire plans into wider wildfire management plans,** with agreed roles for estates, farms, rural businesses, the SFRS, local authorities, land agencies and specialist contractors. Estate-level fire plans should be linked into a larger integrated wildfire management plan for each high-risk landscape, covering prevention, preparedness, access, water sources, communications, heavy plant options, sensitive habitats, neighbouring landholdings and routes into formal command. Consideration should be given as to how public agencies – such as national park authorities and local resilience forums – can support such groups with administration and co-ordination. Groups should develop pre-agreed communication arrangements, including radio channels, mobile signal contingencies and clear information routes between incident command, sector commanders, land managers and machine operators.

34. **Ensure that land managers with muirburn and wildfire experience can be integrated into tactical planning**, particularly in relation to dealing with fire behaviour, backburning, positioning of fire breaks and helicopter suppression.

35. **Create a reimbursement and repair mechanism for private machinery and specialist equipment used in wildfire suppression**, including servicing, damage, wear, fuel and transport costs. This could mirror the arrangements put in place by the Cairngorms National Park Authority and Scottish Land & Estates following the Carrbridge-Dava wildfire in 2025.

36. **Revisit the Concept of Operations (CONOPS) to clarify SFRS command, sector leadership and the role of land-management expertise.** The survey data repeatedly refers to confusion over who was in charge, inconsistent local decision-making and experienced responders being under-used. The CONOPS should make clear that all resources operating on the fireground remain under the control of the SFRS Incident Commander, who has ultimate responsibility for incident resolution and for the safety of all personnel deployed or authorised to assist. Regular multi-agency training and exercising will be key to rehearsing this approach, ensuring maximum awareness and compliance, and giving partner organisations confidence that their personnel and equipment can be used safely within SFRS command arrangements.

37. **Establish a renewed helicopter and pilot services framework exclusively for wildfire response.** This should put in place a contractual mechanism that guarantees access to suitable helicopter assets during periods of VERY HIGH and EXTREME wildfire risk, rather than relying on ad hoc private contractor availability. The framework should define minimum availability, mobilisation times, activation thresholds, funding routes, trained liaison roles, mapped water sources, refuelling and landing options, and arrangements for linking aircraft with ground crews, heavy plant, firebreak construction and hotspot suppression.

38. **Make formal representations to the UK Government that aerial wildfire support is a resilience issue requiring funding and a UK-wide approach.** Scottish Ministers should ask the UK Government for civil helicopter provision, specialist aircraft, national tasking arrangements and Military Aid to the Civil Authorities where civilian contractor availability is insufficient. This should reflect the fact that severe wildfire risk is no longer only a local operational matter: it is a resilience challenge affecting public safety, infrastructure, habitats, carbon stores and rural communities.

39. **Ensure muirburn licensing supports, rather than undermines, wildfire preparedness.** The evidence shows that much of the private capability most relevant to wildfire response is maintained because estates conduct, train for and support planned muirburn. If licensing arrangements make lawful muirburn impractical, unduly uncertain or commercially unjustifiable, the consequence may not simply be fewer managed burns – it may also be reduced investment in fogging units, all-terrain vehicles, leafblowers, trained operators and practical fire knowledge. The Scottish Government should therefore treat workable muirburn regulation as part of Scotland's wildfire resilience architecture, not as a separate land-management issue. If the licensing scheme undermines this in any way, consideration should be given to simplifying or scrapping the scheme.

40. **Create a joint land-manager, SFRS and public-agency exercise programme for high-risk landscapes.** Exercises should test registration, voluntary participation, employer release, command and control under the SFRS Incident Commander, command handover, aircraft tasking, radio use, water logistics, heavy plant deployment, integrated estate fire plans, tactical backburning, welfare, PPE, end-of-shift accountability and post-exercise action tracking. These exercises should be undertaken before the next high-risk season and should explicitly include those

private and third-sector capabilities most likely to be called upon during a major incident. Each exercise should conclude with clear actions, named responsibilities and review dates so that learning is demonstrably carried into future wildfire planning.

CONCLUSION

41. The Glenmore-Strathnethy wildfire response showed the depth of capability available from Scotland's land-based and rural business sector. Estates, contractors, conservation bodies and specialist advisers were willing to provide people, equipment, experience and local knowledge at pace. The survey records a substantial contribution of personnel, heavy plant, all terrain vehicles, fogging units, water-moving capability, firebreak construction, tactical knowledge and practical fire-behaviour experience. In many cases that contribution was significant and effective, but the evidence also shows that it was not consistently absorbed into a planned command, mobilisation and tasking system.

42. The same evidence shows that Scotland cannot rely on goodwill, improvisation or commercial availability alone. Aerial support must be treated as a resilience capability, with guaranteed access to helicopter assets during periods of very high and extreme wildfire risk and a route for UK-level consideration, including Military Aid to the Civil Authorities, where appropriate. Equally, the estate-based equipment and fire knowledge revealed by the survey should not be taken for granted. If muirburn regulation becomes unworkable, Scotland risks weakening the very skills, machinery and practical experience that formed a large part of the rural wildfire response.

43. The Scottish Government's strategic action plan for wildfire provides a strong foundation for that shift. Its content is broadly positive and points in the right direction on prevention, preparedness, response, partnership and governance. The central issue is now implementation: delivery must be accelerated so that the systems described in policy are operational before the next period of very high or extreme wildfire risk. This report also recognises that the action plan is being reviewed in light of the experience and lessons from the Glenmore-Strathnethy fire, and that review should be used to sharpen priorities, assign responsibilities and bring forward practical delivery dates.

44. The policy choice is therefore clear. Scotland can continue to discover during each major incident what capability exists, whether helicopters are available, who can move water, which machinery can reach the fireground and whether local expertise will be used; or it can build a formal wildfire resilience model before the next high-risk season. That model should combine public command, guaranteed aerial access, trained rural responders, workable muirburn regulation, heavy plant capability, communications, welfare and reimbursement arrangements. Done well, it would improve safety, strengthen operational effectiveness and recognise land-based businesses as essential partners in national wildfire resilience.

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