Wildfire Wise Wales
Doeth am Dan Cymru

A Land Management Guide

February 2024

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Healthy Hillsides

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A Land Management Guide

Phased Sign-off			
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Wildfire Wise Wales Doeth am Dân Cymru: A Land Management Guide

Executive Summary

The Healthy Hillsides project is a collaborative approach to wildfire management, supported by the European Agricultural Fund for Rural Development through Welsh Government. Steered by four core partners; Natural Resources Wales; South Wales Fire & Rescue Service; Wildlife Trust for South & West Wales; and Rhondda Cynon Taf County Borough Council, the initiative champions a collaborative working for integrated wildfire management on a Landscape scale.

Working with key organisations, stakeholders, and communities, the Healthy Hillsides project focuses on creating a proactive year-round solution to a seasonal wildfire problem through evidence building and demonstration trials within the South Wales Valleys. We have taken a co-productive approach to exploring the issues and making recommendations.

Healthy Hillsides explores wildfire as an environmental, socio-economic, cultural and incident response challenge. The project has looked at the many and varied environmental and social connections to wildfire. It is recognised that no one action can tackle the challenge of wildfire, to irradicate, minimise or reduce impact. A suite of actions across society are needed to ensure a resilient landscape, resilient communities and resilient public services.

Prevention: To adapt and change behaviours which will create a wildfire wise culture across communities, public services and land managers. This will act to reduce the behaviours which increase risks and build resilience to wildfire.
Response: Actions to reduce risk, tackle ignitions, fuels and ways in which we manage the landscape, our interaction with the environment and tactical response to wildfire.
Education: Increase understanding of the wildfire cycle, how actions can reduce or increase risk. Raise awareness of the environmental and social connections to wildfire and the Welsh landscape. Build capabilities to adapt and to act preventatively to reduce wildfire, to build resilience in the environment and social, wellbeing and economic resilience in communities.

This report captures the learning from the Healthy Hillsides demonstration project, particularly the land management trials and land management engagement. This report takes the learning and makes a series of recommendations to build wildfire resilience within the landscape, through action on the ground and awareness throughout the different land management sectors and across the landscape. This report also highlights the need for better integration of wildfire management within policy and legislative drivers. This report provides a guide on how to assess wildfire risk in the landscape to collaboratively act to reduce wildfire risk.

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Wildfire Wise Wales Doeth am Dân Cymru: Canllaw Rheoli Tir

Crynodeb Gweithredol

Mae prosiect Llethrau Llon yn ddull cydweithredol o reoli tanau gwyllt, wedi'i gefnogi gan Gronfa Amaethyddol Ewrop ar gyfer Datblygu Gwledig trwy Lywodraeth Cymru. Wedi'i lywio gan bedwar partner craidd, sef Cyfoeth Naturiol Cymru, Gwasanaeth Tân ac Achub De Cymru, Ymddiriedolaeth Natur De a Gorllewin Cymru, a Chyngor Bwrdeistref Sirol Rhondda Cynon Taf, mae'r fenter yn hyrwyddo cydweithio ar gyfer rheoli tanau gwyllt mewn ffordd integredig ar raddfa'r dirwedd.

Gan weithio gyda sefydliadau, rhanddeiliaid, a chymunedau allweddol, mae prosiect Llethrau Llon yn canolbwyntio ar lunio datrysiad rhagweithiol gydol y flwyddyn i broblem dymhorol tanau gwyllt trwy ddatblygu tystiolaeth a threialon arddangos yng Nghymoedd De Cymru. Rydym wedi mabwysiadu dull cydgynhyrchiol o archwilio'r materion a gwneud argymhellion.

Mae Llethrau Llon yn archwilio tanau gwyllt fel her amgylcheddol, economaidd-gymdeithasol, diwylliannol ac o ran ymateb i ddigwyddiadau. Mae'r prosiect wedi edrych ar y cysylltiadau amgylcheddol a chymdeithasol niferus ac amrywiol â thanau gwyllt. Cydnabyddir na all un cam gweithredu fynd i'r afael â her tanau gwyllt, i'w hatal neu i leihau eu heffaith. Mae angen cyfres o gamau gweithredu ar draws cymdeithas i sicrhau tirwedd wydn, cymunedau gwydn a gwasanaethau cyhoeddus gwydn.

Atal: Addasu a newid ymddygiad a fydd yn creu diwylliant doeth am danau gwyllt ar draws cymunedau, gwasanaethau cyhoeddus a rheolwyr tir. Bydd hyn yn lleihau'r ymddygiadau sy'n cynyddu'r risgiau ac yn meithrin gwytnwch rhag tanau gwyllt.
Ymateb: Camau i leihau'r risg, mynd i'r afael â thaniadau, tanwydd a ffyrdd yr ydym yn rheoli'r dirwedd, ein hymwneud â'r amgylchedd ac ymateb yn dactegol i danau gwyllt.
Addysg: Cynyddu dealltwriaeth o'r cylch tanau gwyllt, sut y gall gweithredoedd leihau neu gynyddu'r risg. Codi ymwybyddiaeth o'r cysylltiadau amgylcheddol a chymdeithasol â thanau gwyllt a thirwedd Cymru. Meithrin galluoedd i addasu ac i weithredu'n ataliol i leihau tanau gwyllt, i feithrin gwytnwch yn yr amgylchedd a gwydnwch mewn cymunedau o ran lles, cymdeithas a'r economi.

Mae'r adroddiad hwn yn casglu'r hyn a ddysgwyd o brosiect arddangos Llethrau Llon, yn arbennig y treialon rheoli tir ac ymgysylltu â rheoli tir. Mae'r adroddiad hwn yn cymryd y dysgu ac yn gwneud cyfres o argymhellion i adeiladu gwytnwch tanau gwyllt yn y dirwedd, trwy weithredu ar lawr gwlad ac ymwybyddiaeth ar draws y gwahanol sectorau rheoli tir ac ar draws y dirwedd. Mae'r adroddiad hwn hefyd yn amlygu'r angen am well integreiddio o ran rheoli tanau gwyllt o fewn ysgogwyr polisi a deddfwriaethol. Mae'r adroddiad hwn yn darparu canllaw ar sut i asesu risg tanau gwyllt yn y dirwedd i weithredu ar y cyd i leihau'r risg o danau gwyllt.

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1. Introduction: The Healthy Hillsides Wildfire Demonstration and Evidence Project.

The Healthy Hillsides project looks at how we can collaboratively and sustainably tackle the challenge of wildfire. Wildfire is a complex problem, with root causes within society, the landscape and policy. The Healthy Hillsides Project was borne out of the significant number of wildfires in the South Wales Valleys as part of our work in developing ways of working and a place-based approach as part of the Well-being and Future Generations Act and the Environment Wales Act. This project sought to explore what does an integrated approach to an environmental, socio-economic problem look like, working collaboratively in the spirit of the Environment Wales Act and Well-being and Future Generations Act.

Through extensive discussion across a variety of stakeholders representing different sectors, communities and perspectives we have learned that an integrated approach is essential, no one solution can resolve this problem. Integrated wildfire management is the approach to take. This is echoed internationally, having learned from many years of focused action not resolving the problem of wildfire.

In exploring the findings of the Healthy Hillsides project, this land management guide has been produced to inform and guide land managers to better understand the risk of wildfire and mitigate the risk on the land. This guide presents learning to inform habitat and land management for the benefit of wildfire reduction in a manner that is sympathetic to wildlife

This guide is accompanied by the prevention strategy, which makes a series of recommendations on where wildfire resilience and prevention measures needs to be better integrated across different sectors for on the ground delivery and to inform regional and National policy and strategy.

2. A Land Management Guide – Target Audience

This is a guide for the management of land where wildfire is now a risk and in consideration of climate change predictions how wildfire risks are set to become a greater problem across the Welsh landscape.

This guide is applicable to all land managers and owners throughout the Welsh landscape, who manage; unenclosed agricultural land, designated sites, nature reserves, AONBs, National Parks, public estates, and Ministry of Defence land. It also applies to those who manage land adjacent or adjoining open land, highlighting the need to work with neighbours, partners, and colleagues across the land.

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This guide seeks to inform land managers and raise awareness of fuel loading on the landscape and consider the management of the land to reduce fuel loads and, to reduce wildfire risk to build wildfire resilience. The guide encourages land managers to identify their key assets, whether this is a conservation feature, infrastructure, business asset, community or property. Wildfire mitigation actions should be built into all levels of landscape planning from conservation plans, agricultural practice, habitat restoration plans, access management to Regional and National strategic planning as development plans and the Sustainable Farming Scheme.

The need to build in wildfire resilience is already an important mitigation measure to many, though under climate change scenarios, wildfire will become a growing risk across Wales. Under climate change predictions wildfire amongst other environmental hazards are set to become more prevalent, this will have significant direct and indirect impacts on landscape character. As outlined in the Climate Change Risk Assessment (CCRA) Evidence Report for Wales Summary[1], wildfire is a significant concern to terrestrial and freshwater species and habitats, and agricultural and forestry production with climate change predictions.

3. What is Wildfire?

Wildfire is an uncontrolled, rapidly spreading fire that can consume vegetation, woodlands, forests, grasslands, gardens, buildings or structures. Wildfires can cause significant damage to the environment, wildlife, property, and pose serious risks to human safety. They are often fuelled by dry conditions, strong winds, and high temperatures, making them difficult to contain and extinguish.

South Wales has one of the highest numbers of wildfire incidents within the UK. Wales is 8 times more likely to have wildfire incidents than any other UK country[2]. In South Wales this is primarily an antisocial behaviour problem, with wildfires being started deliberately.

Firefighting incident response has evolved to tackle these challenging fires, requiring a different set of skills, equipment, and strategy to tackle wildfires. Wildfire fighting uses a variety of different techniques in an incident, but also increasingly having wildfire prevention measures in place are important to support effective fire suppression, but also providing a safer environment for firefighters to put out wildfires. Building in preventative measures is something we have been doing within properties for decades, through smoke alarms, fire doors and fire safety. This is just as essential in the wider landscape where wildfire is a persistent and growing challenge.

There are actions which land management practices can increase risk to wildfire and can increase the spread and severity of the fire and therefore the damage and impact of the wildfire on the crop, conservation feature or wider in the landscape or environmental quality. Due to the potential for wildfires to take up resources for long periods and divert

[1] CCRA Evidence Report for Wales Summary
[2] Forest Research 2011: Wildfire in Wales

resources from structural fires or rescue services, it is an important part of the wildfire management to ensure land managers of all kinds are making efforts to reduce their risk to support firefighters and protect their own land, assets or conservation features and that of their neighbours.

3.1 The Wildfire Prone Landscape

The varied Wales landscape in places can be unpopulated, expansive and open and in contrast we have the populated valleys and Rural - Urban Interface (RUI) on the edge of large open landscapes. The large expansive areas of the Bannau Brecheiniog, Eryri, and the Clwydian range are areas of peatland, moorland and heathland habitats creating large continuous covers of vegetation or fuel across the landscape. By contrast the valley communities particularly in South and Northeast Wales are some of our most populous and urban areas being immediately adjacent to the ffridd hillsides, a landscape dominated by vegetation which are highly susceptible and adapted to fire. This close interaction of communities and high fuel loads, also known as the RUI increases the risk for wildfire to occur and risk to people and property.

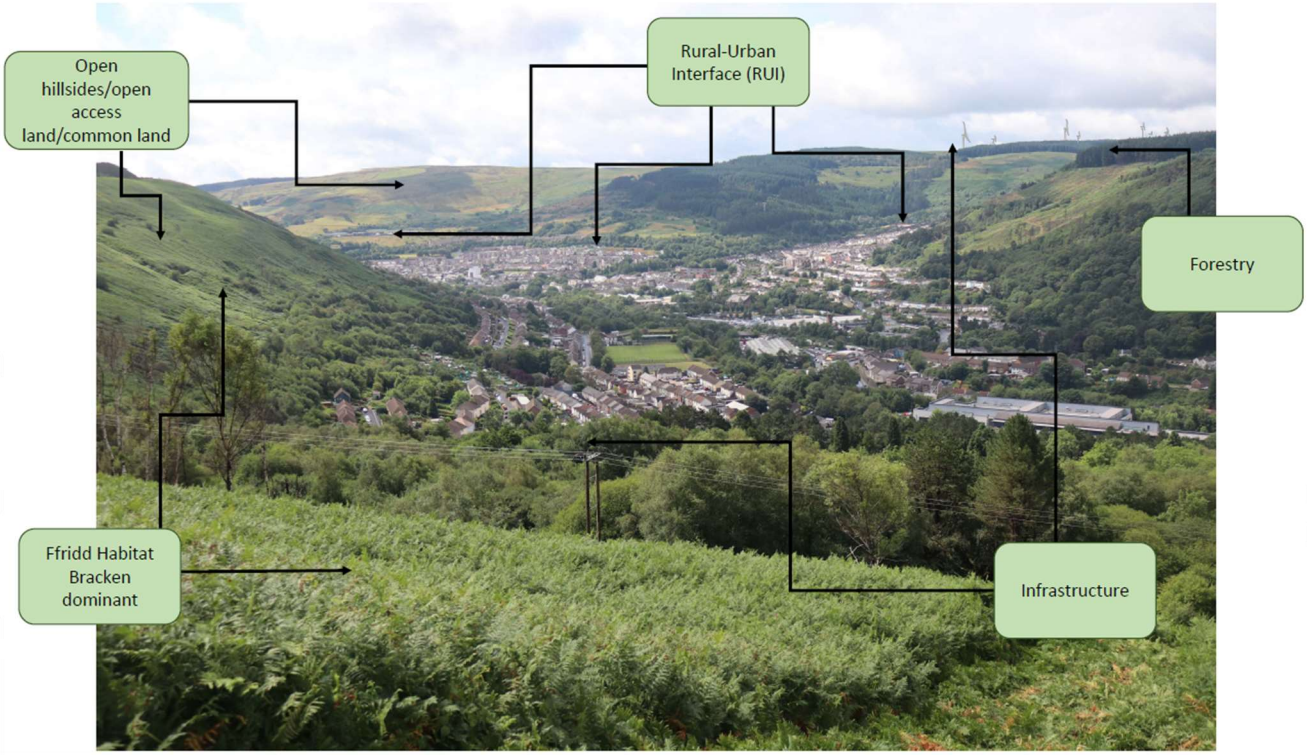


Fig. 1: The valleys landscape has high rural urban interface risk as a defining wildfire risk.

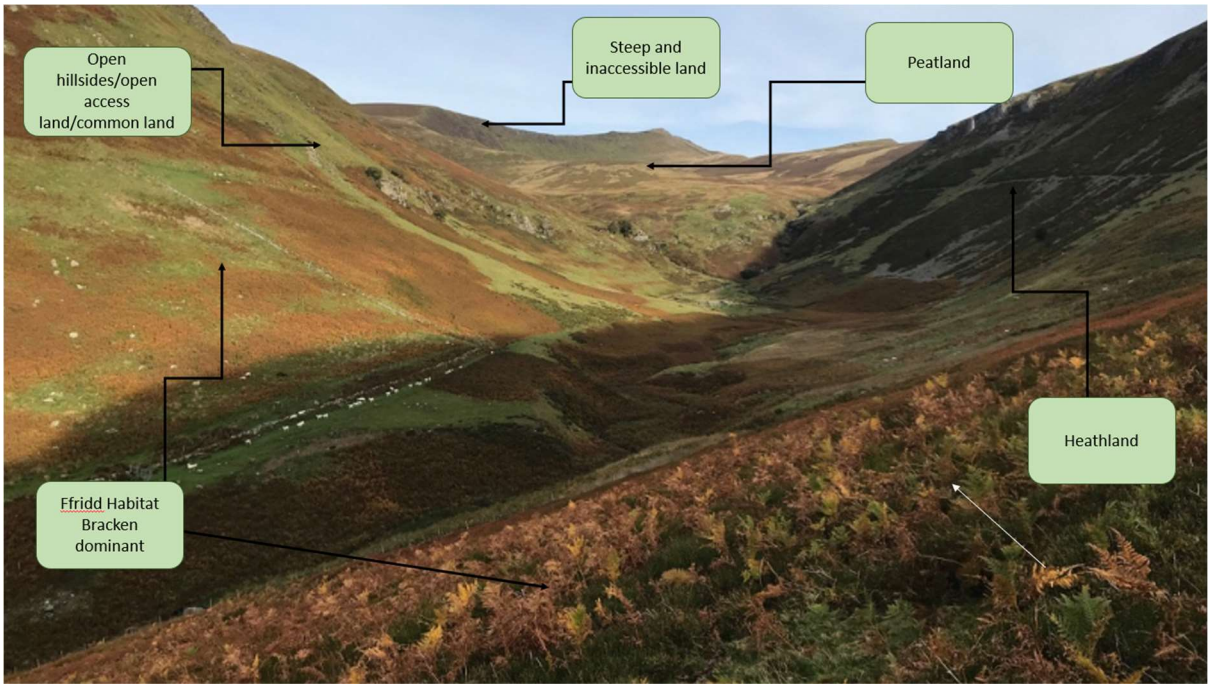


Fig. 2: Open, expansive landscapes have large areas and significant areas covered by conservation designations.

4. Habitats with high wildfire risk- Wales.

- **Ffridd (Coedcae)**

Ffridd is the mosaic of habitats that occurs on the valley sides above the enclosed agricultural land of the valley bottoms and below the upland farms and unenclosed common land. It is essentially the transitional zone between these two areas. The ffridd is a complex mosaic of heath, bracken, woodland, scattered scrub, acid grassland and wet flushes. As an important semi-improved habitat and as a linear feature in the landscape, it is particularly important in supporting ecological resilience for priority habitats and designated sites and offers refuge for species movement in response to land use changes and climate change.

In South Wales particularly coal spoil can also be a feature, areas of exposed spoil from the industrial past has created ecologically and geologically interesting and diverse habitats, further increasing the ecological value of the ffridd habitat.

Ffridd provides a refuge for birds such as Yellowhammer and Whinchat and many other bird species. Bracken provides cover for swathes of Bluebells and Violets which in turn support rare butterfly species such as the Small pearl-bordered Fritillary. The acid grassland and marshy flushes can be flower rich and also support nationally important assemblages of Waxcap fungi and invertebrate species.

- **Moorland and blanket bog**

Moorland generally refers to open upland landscapes and maintained through human management. It is found above the limit of enclosed agricultural land. Moorland is generally used for hill farming. Traditionally these areas had prescribed burning, which promotes the growth of young, fresh grasses or heather shoots for livestock grazing.

Where on a slope and being well drained, soils are mostly shallow peat or mineral soils. These drier areas are mostly dominated by dwarf-shrub species such as heathers and bilberry. On flatter, poorly drained ground, these wetter areas are generally blanket bog and mire habitats, heather may be present, but not dominant, with more Molinia, deer grass and characteristically sphagnum species. Blanket bog forms peat and over hundreds and thousands of years deep peat can be found.

When the land is not managed traditionally, through low intensity grazing and some prescribed burning to facilitate grazing, the habitats can change favouring species such as Molinia, bracken and gorse. Where peatland is drained for alternative land use, Molina often becomes dominant, and drying out and exposure of peat.

Peatlands extend over at least 4% of the Welsh landscape and comprise one of our principal natural resources. They support a rich suite of important habitats and species. Approximately 50% of all Welsh peatlands are designated and peatlands occur on 250 Welsh SSSIs. There a large areas of drained and undermanaged peatlands across Wales.

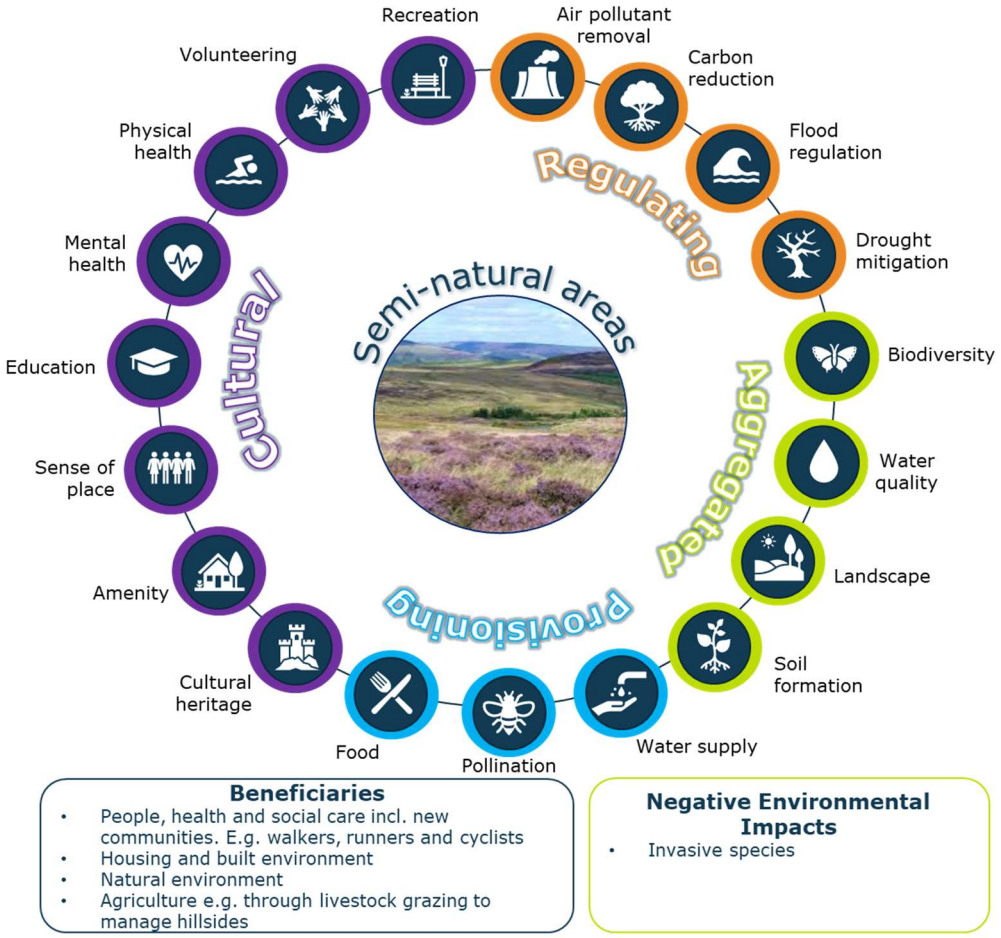
- **Threats to habitats**

The following can all lead to the loss/degradation of these habitats:

- Burning - both intentional and accidental.
- Abandonment and neglect of management - encroachment by bracken and scrubbing over (commonly with willow, birch, gorse).
- Inappropriate levels of grazing - typically too intensive and with sheep which prevents flower growth and regeneration of woody species.
- Lack of understanding and appreciation of habitat value, particularly the value of mosaics.
- Recreational and anti-social behaviour pressure causing erosion and disturbance.
- Tree planting.
- Air quality – nutrient and acid deposition.
- Drainage – cut drains for forestry or agricultural intensification.

- **Ecosystem Services of Ffridd and Moorland.**

Semi-improved habitats have a significant natural capital, providing ecosystem service benefits and have the potential to deliver more with appropriate value afforded them and appropriate sustainable management delivered.



- Ffridd

In particular ffridd habitat has an untapped value in its agricultural potential, particularly through low level conservation grazing, delivering local sustainable food sources, which reduces pressures on the ecosystem services, like wildfire and soil protection.

The biodiversity value of ffridd is not widely understood or appreciated. There is a lack of evidence and protection afforded the ffridd mosaic habitat for specific feature such as coal spoil biodiversity or it's role in supporting wider ecological resilience across the landscape, including protected sites and priority species and habitats.

The recreational potential of ffridd is significant, particularly in areas close to communities. Most ffridd is classed as open habitats, being unenclosed lands, which under the Countryside and Rights of Way (CRoW) Act provided access rights. This alongside an extensive network of public rights of way provide free recreational opportunities to people, to support their physical and mental health.

- Moorland and blanket bog

Moorland also has undervalued agricultural potential, where traditional agricultural practices have been largely lost in favour of more intensive lowland agricultural practices. Restoration of peatland and the associated hydrology has the significant opportunity to stop the bog being a Carbon source, but to become a Carbon sink, this requires peat building sphagnum species.

Particularly in wetter areas, blanket bog, the management of drainage and long-term traditional management through grazing and as appropriate; prescribed burning to facilitate grazing, can improve water management and catchment resilience. This can restore drought and flood resilience. Peatlands, in particular, can deliver water quality benefits through improved filtration, especially when in good condition and natural processes are restored.

4.1 Primary vegetation fuels:

The amount of available fuel, such as trees, bracken, grass, and dead plant materials affects the likelihood and severity of fires. Denser vegetation leads to more intense fires that can spread quickly and burn for longer. Some types of vegetation are more flammable than others. Fine, dry material such as grasses and twigs can catch fire and burn very easily.

There are some plants within the wider landscape which are a particular problem in the Valleys landscape. Bracken, Molinia and Gorse/Broom and problem fuels in Wales, these are the species which are part of a healthy and resilient ffridd and moor habitat, but due to changes in management have become dominant species and problem fuels.

- Bracken

Pteridium aquilinum or bracken is a common and widespread soft fern. Bracken is a single fronds grown from a rhizome at a height 0.3–1 m (1–3 ft) tall through spring. Bracken matures and spores in summer before dying back through autumn. At this point all the energy gained through summer is stored in the deeply buried rhizome. The deep rhizome and size of the rhizome leads to its biological success being protected from pressures like wildfire, giving them a biological advantage in quick growth post fire.

The dead bracken material takes a long time to breakdown with no additional management. Without management (mechanical, grazing or recreational footfall), the dead bracken can build up over years with impenetrable area 4, 5 or 6 foot in height. This produces a high fuel loading on the hillsides.

Bracken is an important component of ffridd, and a valuable feature within this mosaic habitat, creating some shade for woodland species like bluebells and dog violets and creating a micro climate through winter, supporting invertebrates, nesting birds and small mammals.

Bracken can become be problematic if unmanaged, causing a fuel build up and becoming dominant, reducing open grassland and heathland areas, over shading and reducing opportunities for diverse flora. To reduce bracken growth there are short and long-term management prescriptions:

- For best results, roll/flail/cut Bracken twice a year in May/June and again in July/August. Leave bracken on very steep slopes or gullies.
- Consider breeding birds that may limit/preclude work in May/June, if this is the case then control bracken by cutting or spraying after the bird-breeding season in late July/early August.
- Works by reducing the energy taken down to the rhizome, compromising the rhizome and reduces bracken vigour in time. A noticeable reduction will be achieved in 5 years. Through the Healthy hillsides project we observed reduction in height and vigour after only one year.
- Long-term, grazing is effective (particularly cattle for the multiple benefits), this acts to breakdown dead material through winter and bruise bracken during growth periods. Grazing action also promotes the growth of grasses and herbs.

Herbicide management of bracken is not advised in drinking water catchments and does not support the biodiversity enhancement of habitats, which is the goal of sustainable land management. Currently the only effective herbicide used on bracken is Asulox. This has not been given approval[3] for use in Wales as of 2023 by the Health and Safety Executive.

• Molinia

Molinia caerulea or Purple Moor-grass is a tussock forming grass. Molinia is distinctive with bright green new growth through spring, purple flowers in July to September, then dense yellow straw like appearance through autumn and then pale and white in winter.

Due to the thick tussock structure of the grass, it is hardy and can survive wildfires. It can thrive then become dominant in degraded and drained bog and wetland habitats. Traditionally Molinia was prescribed burned to promote the rapid new growth for grazing in the uplands.

[3] Microsoft Word - 2022_02174_Refusal_Wales_Scotland_Asulox_2023_web.docx (amazonaws.com)

Molinia is an important species in many natural and semi-improved habitats, providing structure and features within a habitat, increasing diversity and refuge for species in these wetland habitats with a fluctuating water table. Key species such as Marsh fritillary butterfly and upland water vole populations are associated with Molinia.

Molinia can become problematic where sites have been drained and grazing management has reduced diversity, allowing Molinia to become dominant and growth becoming rank and dense. This causes a fuel build up and further reduces other species and therefore diversity. To reduce Molinia growth there are short and long-term management prescriptions:

- Molinia can be successfully reduced through glyphosate herbicide treatment, burning, and cutting. However, the results are short term and require frequent or at least annual management. This can be effective if trying to maintain strategic firebreaks where long-term intervention is secured and possible. This isn't a long-term sustainable solution and glyphosate will not support long term biodiversity restoration. Herbicides can have a long-term negative impact on fungi assemblages.
- Raising/restoring the water table is an effective way to manage Molinia – this is seen through peatland restoration projects.
- Cutting Molinia then planting Sphagnum plugs will serve to diversify the Molinia stands, and in addition to physical raising of the water table, the growth of sphagnum will also begin to affect the hydrology enough to advantage for itself and to the detriment of Molinia.
- Long-term traditional land management is required to maintain these semi-improved habitats. These habitats were formed through grazing management and this is the most sustainable option long term.

• Gorse and Broom

Ulex europaeus or Common gorse and *Cytisus scoparius* or Broom are present a variety of habitats, particularly in heath, ffridd, coastal grasslands and along urban fringe areas. Gorse and broom are similar in habitat, ecology and size, being large evergreen shrubs providing structure to increase ecological and physical diversity of habitats. Gorse has spiney stems, with the flowers having a coconut scent, whilst broom being smooth whip like branches, with a vanilla scent. Grose and broom can regenerate from both the rootstock and from seed.

Gorse and broom generally flower through spring, but gorse in particular may flower sporadically throughout the year. Both provide shelter and food for many insects and birds. Gorse is a particularly good for invertebrates flowering for long periods, so is an important nectar source for pollinators in early spring and early winter, when little else is in flower. There are a number of scarce invertebrates and birds associated with it, such as Dartford warblers, stonechats and yellowhammers.

Gorse is a woody shrub, relatively short lived at approximately 25 years. If left unmanaged gorse and broom can lose their compactness after approximately 10 years, this reduces their biodiversity value and increases the fuel load in the landscape

Ideally gorse would be managed through physical and long-term grazing pressures to maintain their more compact nature, biodiversity value, and health. All shrub management should be undertaken outside of the bird nesting season (March to August inclusive):

- Breaking up large stands into several parcels and manage these through rotational cutting. Manage the most mature stands first.
- Cut gorse to ground level and remove the arisings. In high wildfire risk areas also remove the accumulated dead litter. Most cut stumps will regenerate within a year.
- Small patches and individual bushes within the hillside are usually best cut by chainsaw or hand saw. Gorse or broom hedges along roads or properties can be flailed as a more economical solution.
- Prescribed burning of small patches of gorse and broom can be effective, as they are very flammable and burning will remove all the dead litter, reducing the nutrient input to the soil and reduces available fuel.
- To remove gorse or broom completely from site can be achieved through cutting and treating the cut stumps with an approved herbicide.
- Livestock (and wild herbivores (rabbits and deer) will graze on fresh growth, so reduce fuel.
- Repeated cutting will eventually kill gorse but may take several years, so requires long-term resources.

4.2 Management considerations in high-risk wildfire landscapes.

There is no consistent approach to measuring fuel load, or the risk associated with different habitat types. It is recognised that some species or habitat types are more flammable, but

the underlying challenge in predicting wildfire risk in Wales is ignitions and given that ignitions are mainly deliberate it is a challenge to give accurate tools to predict wildfire risk.

There is a wildfire risk tools under development e.g., the Brecon Beacons Fire Risk Modelling Tool[4], and a tool developed through the Healthy Hillsides Project Healthy Hillsides Wildfire Risk Map, which looks at incident data and habitat type to give an indication of risk. However Currently, assessing fuel load for wildfires is best carried out using expert opinion of Fire and Rescue Service and building in resilience as per the guidance in this report.

The most sustainable long term management solution for open habitats is livestock grazing. Historically these semi-improved habitats have naturalised following long term livestock grazing, creating open landscapes, distinctly with a lack of trees. Change of management or removal of grazing will be visible in the vegetation. This can result in the succession to woodland. Whilst this may be the desired outcome, this will reduce the available land for sustainable food production, change the landscape and lose biodiversity in these long present habitats shaped through human intervention over thousands of years. Where this is the desired option, wildfire mitigation will still be required until trees are mature enough and neighbouring land is not at risk. Still management through grazing for livestock trampling bracken growth may be the best option.

Where land has been modified through drainage and agricultural abandonment, there are additional long-term challenges. Natural tree regeneration or succession to woodland is unlikely as the ground is still too wet and exposed for woodland, with blanket bog peatland being the natural habitats to the land.

There are additional challenges where grazing cannot be sustained, be economically viable or available graziers present. Where grazing is a challenge new and evolving technology can better support grazing, such as fenceless grazing technology, reducing the need for expensive fencing and better understanding how sites are being selectively grazed by animals, through the monitoring function of fenceless technologies.

However, even where grazing is available, the need to break up the landscape to reduce opportunity for wildfires to impact key assets (including ecological or economic assets) needs to be mitigated. This is particularly important in areas where there are high numbers of wildfire incidents from urban antisocial behaviours or loss of traditional prescribed burning skills in more rural landscapes.

There are key management requirements to be understood within the landscape depending on the biodiversity, habitat, heritage or agricultural interest. Firstly, a vision and outcome of the site or landscape or habitat is needed. This should consider:

- The natural capital and therefore required ecosystem services required within the area – is there key natural resources present or to be restored i.e., Peat.

[4] Brecon Beacons Fire Risk Modelling Tool (JNCC Report No. 701)

- The biodiversity value and importance of the area – is this a designated site, does it support the ecological resilience of priority habitats or species, is the evidence to demonstrate ecological importance despite no formal designation?
- Is this a landscape or heritage feature?
- Human pressures from recreation to antisocial behaviours, wildfire incidents or high wildfire risk.
- Are there key economic, infrastructure or community assets?
- Is there agricultural management on site? Is there potential to work with surrounding land managers or landscape scale management opportunities?

4.3 Firebreaks

Whatever the land use and management objectives the consideration of firebreaks/fuel breaks should be considered as part of the plan. Reference to a firebreak is defined as a break in the fuel, a control or mitigation measure to reduce the spread of fire. A firebreak in the landscape is a break, planned change or discontinuity in fuel that will reduce the likelihood of combustion, fire intensity and/or the rate of fire spread.
Note: This section discusses firebreaks, not wider fuel or land management, this is discussed in subsequent sections.

Firebreaks can act in 2 ways:

I. To break up fuel continuity so in the event of a fire, the firebreak can suppress the fire without the aid of additional active suppression (from the Fire Rescue Service (FRS) or land manager), therefore the wildfire is self-extinguishing.

II. Firebreaks support tactical fire management by the FRS – allowing the FRS to assess the wildfire to the firebreak and consider further intervention or to tactical burn from a firebreak to actively suppress a fire.

When designing wildfire mitigation, the site should be mapped and opportunities for firebreaks identified, planned and created. There are different levels of firebreaks offering different management requirements, success and tactical response:

- Firebreaks should be planned around existing landscape features already creating fuel breaks “naturally”. These are features which have already created the fuel break: well used and defined Public Rights of Way (PRoW), watercourses, roads, drystone walls.
- Landscape features or statutory features which require additional management, but are defined on a map and/or seen on the ground – additional cutting of PRoW to

Cronfa Amaethyddol Ewrop ar gyfer Datblygu Gwledig
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increase width or fence lines not breaking up vegetation. Cutting vegetation around these visible or mapped features supports the FRS and can improve access features or protect infrastructure.

- Firebreaks around key assets – whatever the asset may be – infrastructure, properties, conservation features, water sources etc… putting firebreaks around these features will help protect these assets.
- Strategic firebreaks based on classic wildfire behaviour, this will depend on slopes, prevailing winds – this is best informed by the FRS.

There are some principles to inform the creation and maintenance of firebreaks. This will depend on the vegetation that will fuel the fire, therefore dense or tall vegetation will produce high fuel loads and therefore higher flame length, more intense fires and more severe impacts.

- All firebreaks should be mapped and the map of firebreaks readily accessible by the land managers, those working on the estate/land or to the FRS in the event of an incident. You can proactively share your mapped firebreaks with the local FRS.
- Effective firebreaks need to be twice flame height. Flame height will be dependent on vegetation height, aspect, slope and weather conditions. A minimum of 5m is generally used for low vegetation.
- Firebreaks to mineral soil are most effective, however this requires significant long-term maintenance. Where this is the most appropriate firebreak, consideration of wider impacts need to be considered e.g., overland water flows, increased erosion, exposure of soils particularly peat, ecological impact, ongoing cost.
- As with any previous vegetation management, brambles, scrub and ground cover should only be cut out of bird nesting season (March to August inclusive).
- Firebreaks are best for both wildlife and livestock if they contain scallop shaped wiggles rather than straight lines which provide micro-climates for wildlife and sheltered areas for livestock.
- Flared entrances/exits support livestock movement with easy entry to the firebreak as an escape route or from pressures such as dogs or pedestrians. This reduces stress to the animals and allows easier access and passing for multiusers.
- Firebreaks can be cut with mechanical brush cutters/strimmers, remote control mower, tractor, or horse powered flail, hand cutting etc.

4.4 Habitat Management.

As with all habitats and landscapes and interventions the long-term sustainability needs to be considered and built into wider land management and use, incorporating management into wider benefits or goals.

The following is recommended land management techniques for our highest risk environments are highlighted in this section. This should be read in conjunction with the Healthy Hillsides Wildfire Wise Wales Prevention Strategy and as appropriate for land within the Rural Urban Interface (RUI) the Wildfire Wise Wales Community Approach.

Some habitat features present throughout habitats and require key management considerations:

- Scrub – it should be noted that scrub is an important component of many habitats, but can put pressure on ecologically important open habitats. Some scrub will add to the biodiversity value of the site, though too much can result in biodiversity loss. If the objective is to maintain open habitats control and management of invading scrub is needed. Removal of invading scrub between October to beginning of March (avoiding the bird nesting March to August inclusive). This can be done either by hand pulling or cutting. Removal of scrub will reduce shading which can result in out competing of open habitat grassland/heathland species. To prevent regrowth stumps should be spot treated with a suitable herbicide. To manage scrub long term regular hand or mechanical cutting is required or grazing.

- Invasive weeds – these are a challenge throughout the landscape and have implications for other habitat management measures and the habitat quality or biodiversity value of the site. Control the spread of highly invasive alien species such as Himalayan Balsam, and Japanese Knotweed. These can be controlled with minimum harm to wildlife.
    - Himalayan Balsam[5] can also be controlled by hand-pulling or cutting before it sets seed.
    - Japanese Knotweed[6] will require either digestive management from livestock, or spot treatment with a suitable herbicide[7].
    - Good biosecurity needs to be followed on any site with invasives, even if not dealing directly with them.

- Dry-stone Walling – By definition much of the ffridd is unenclosed so that features such as hedgerows, fence-lines and walling are largely absent. Old, dilapidated dry-stone walling can still be an important feature of this landscape even if it is no longer functional. The dry-stone walling adds to the ecological value of the area through the provision of a substrate for lichens, mosses and ferns. It also provides shelter for many

[5] Himalayan balsam: Public information on invasive species in Wales
[6] Information for community and voluntary groups in Wales: Practical control of Japanese knotweed
[7] Herbicide control require a permit: Natural Resources Wales / Invasive alien species

invertebrates and species such as Common Lizard, as well as nesting opportunities for birds such as the Wheatear.
Where present dry-stone walling should be retained and if restored can provide valuable shelter for livestock and be utilised to control grazing levels if so required. Particularly in a wildfire prone environment, drystone walls offer a more resilient infrastructure than fencing and can contribute to firebreaks.

4.4.1 Ffridd Habitat

Here we make a series of recommendations to ensure ffridd habitat is managed sympathetically for wildlife, particularly where there is a high wildfire risk. These recommendations have been formed from the Healthy Hillsides demonstration sites and extensive engagement and desk survey.

As ffridd is essentially a mosaic of different habitats, reference should be made to the specific management of key problematic species such as Molinia, bracken and gorse/broom as discussed above in section 3.1. However, it should be considered that scrub and bracken is ecologically important within the ffridd mosaic and efforts to eradicate are not needed, but the objective should be to reduce.

Management objectives for ffridd mosaic habitat:

- To reduce the fuel load and therefore wildfire risk.
- Restore and enhance the biodiversity value.
- Build in ecological and climate resilience.
- Value the community, landscape and heritage importance of the ffridd.
- Maintain and manage recreation and access appropriately.

The long-term management prescription ideally would be grazing management – however not all sites are suitable for grazing possibly due to antisocial behaviours, recreational pressures (particularly high levels of dog walking), roads, hazards (some coal tips, mining adits, past quarrying, waste), no water availability and access.

Ffridd habitats are generally within the Rural Urban Interface and therefore careful consideration needs to be given to the interaction and communication with local communities and the wider public. Therefore, in delivering any land management change, consideration of how the land is used, antisocial behaviours and the management of common boundaries.

4.4.2 Moorland and blanket bog Habitat

Here we make a series of recommendations to ensure moorland or blanket bog habitats which have become Molinia dominant to be managed sympathetically for wildlife, particularly where there is a high wildfire risk. These recommendations have been formed from the Healthy Hillsides demonstration sites and extensive engagement and desk survey.

As moorland and blanket bog habitats are semi-improved habitats and have evolved due to a number of human management interventions or have been impacted by human interventions, restoration of key features such as the hydrology or grazing regimes are required to reduce the fire risk from the dominance of key species like Molinia.

Management of key problematic species such as Molinia, is discussed above in section 3.1. However, it should be considered that Molinia is ecologically important within the moorland and blanket bog and efforts to eradicate are not needed, but the objective should be to reduce.
Management objectives for moorland and blanket bog habitats:

- To reduce the fuel load and therefore wildfire risk.
- Restore and enhance the biodiversity value.
- Build in ecological and climate resilience.
- Value the community, landscape and heritage importance of the open habitats.
- Maintain and manage recreation and access appropriately.

In addition to the restoration of the hydrology, the long-term management prescription ideally would be grazing management – however not all sites are suitable for grazing possibly due to antisocial behaviours, recreational pressures (particularly high levels of dog walking), roads, hazards (large ditches and pools, waste), no water availability and access.

There are large areas of moorland as part of the agricultural grazing network, but large areas have become under or overgrazed for a variety of reasons. Restoration of grazing patterns across the moorland will reduce fuel loading and enhance biodiversity, whilst contributing to local food provision.

There are peatland restoration projects in varying stages of development and delivery across Wales. This in the long term should reduce the Molinia fuel load within the landscape in favour of the wetter vegetation and the reduction in exposed peat. Reduction of wildfire risk should be incorporated into the long-term management of the site, this can be done through long-term grazing, which would be beneficial for the biodiversity recovery, but also targeted wildfire mitigation through strategic firebreaks, and drain blocking solutions. Where there is high fire risk, drain blocking through brash bundles, heather bales or other flammable materials should be carefully considered. Alternatives such as stone, plastic piles or peat dams may be more appropriate alongside vegetation management to reduce fuels. Where there is low fire risk, this may be more appropriate.

4.4.3 Management Interventions: Grazing

Through the Healthy Hillsides project, we commissioned a Report by PONT[8] looking at the "*Opportunities for Managing Fire Risk Through Grazing in South Central Wales*". This report is an annex to this report and provides detail on benefits, challenges and opportunities for livestock grazing associated with landscape management for wildfire.

Livestock grazing has shaped our landscapes across Wales. Changes in these grazing pressures is one of the reasons for increased fire risk alongside climate change. Changes in headage payments for sheep from the 1990s created high grazing pressure from sheep, however these ceased in the early 2000s and numbers dramatically reduced, particularly in South Wales.

Prior to 2016, cattle had to be within 60 days of a clear bovine TB test in order to graze land that was not part of the grazier's main holding. There is some hope for the reinstatement of grazing cattle with new rules introduced by WG in September 2016, with Temporary Land Associations (TLAs). TLAs allow land within a 10-mile radius of the keeper's main holding to be added and stock do not need a pre-movement test. This makes moving cattle locally less restrictive. In the Healthy Hillsides Project, we were able to apply this rule, working with a local grazier to graze new sites more freely under this provision.

The new Sustainable Farming Scheme (SFS) has the potential to change this and positively reinforce the important work farmers, graziers and their livestock do to manage the natural resources and build resilience into the landscape and the protection of our ecosystem service benefits, whilst producing food. The 2023 Landscape Fire Governance Framework 9 highlights the importance of valuing the role of traditional rural land management, recognising how integrated land management can both reduce exposure and vulnerability to wildfires and be a response to the Nature and Climate Emergencies.

- **Livestock choice.**

Livestock graze in different ways, the predominant livestock species used are horses/ ponies, cattle, sheep and goats. They can all be used to improve habitats and to reduce fuel load. Ideally grazing would be undertaken by cattle or mixed grazing with ponies and cattle, this provides the best ecological benefits due to how the animal's graze. For pure fire reduction sheep and goats provide effective fuel reduction, but over grazing by sheep and goats, can have a negative impact on biodiversity.

Whichever species is chosen, a native hardy breed is preferable to be able to cope with the harsher environments and eat the hardier vegetation, whilst needing less supplementation

[8] Home | PONT (pontcymru.org)
[9] Integrated Landscape Fire Governance Framework

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and therefore benefiting wildlife far more. Native tough breeds tend to include browsing of scrub species more.

Making grazing economically viable is an important aspect of landscape management, this can be achieved through food markets, targeted subsidies, and incentives to deliver ecosystem services through collaborative working with graziers throughout the landscape.

- **Cattle**

Cattle are the preferred choice of grazing animal for reducing fuel load and delivering biodiversity benefits. They are effective grazers of grasses and scrub, not grazing lower than 5 cm, due to their broad muzzle. They create a mosaic of sward heights and open up the sward through their grazing action, wrapping their tongue around vegetation and with their hooves, trampling, breaking down vegetation and creating opportunities for seed germination.

They effectively consume purple moor grass and scrub during the growing season, May to October. They are not able to readily consume gorse or heather to the same extent as ponies, sheep and goats.

They create extensive networks of paths and trample throughout, reducing the height and vigour of bracken over a number of years. Care must be taken that cattle do not succumb to bracken poisoning when consuming young bracken or the roots early in the grazing season (April-May).

The vegetation of most semi natural habitats have low nutritional value. Modern breeds of cattle are large and adapted to thrive on a high energy and protein diet, therefore this type of grazing is suited to native breeds adapted to a diet of natural vegetation and being hardier able to thrive in rough, steep landscapes throughout the year.

- **Horses and ponies**

Horses and ponies are adapted to eat large quantities of poor nutritional quality vegetation, eating for 14 – 20 hours per day, therefore surviving on semi improved low nutritional vegetation suits them. Weight for weight they consume 40-60% more vegetation per day than a cow and can graze vegetation down to around 3cm in height.

Ponies, particularly those which are raised in natural habitats with gorse present will readily browse gorse. Some will tenderise the gorse with their hooves before eating it. This approach has been used to reduce gorse dominance for habitat management on the south Gower cliffs, South Wales and for fuel load control by the Hen Harrier agri-environment scheme in County Galway, Ireland. Ponies will readily graze purple moor grass during its growing season from May to October and other rough grasses.

Ponies tend to create a limited number of paths through bracken to which they stick and so they will have a minimal trampling effect on the bracken and its rhizomes and the grass between it. Bracken is not palatable, however in drought conditions or if other vegetation is scarce ponies may consume it and succumb to bracken poisoning, which is often fatal. Horses and ponies will browse scrub but in a more limited capacity than cattle, they have a tendency to strip back from trees if there is little other food available.

Horses and ponies are not restricted by the same movement and traceability legislation as cattle, sheep and goats, therefore less onerous to keep and move from site to site.

- **Sheep and Goats**

Sheep and goats can be very selective due to their narrow mouths and nimble lips. When they graze, they have an impact on scrub and heather but a limited impact on purple moor grass as this does not have sufficient nutrition for sheep and goats to effectively utilise.

They have a negligible impact on bracken as they are too light to damage the plants and rhizomes, however bracken does tend to dominate once sheep have been removed from an area, this is evident in the South Wales Valleys, where there were once significant sheep grazing throughout the ffridd.

Goats have been used particularly for clearance work, extensively in Australia, USA and Europe to reduce fuel load. However, the target fuel load is largely comprised of mostly shrubby vegetation and there is a more connected cultural connection with goat keeping in Europe.

Goats have been proven highly effective on invasive species such as Japanese Knotweed and Himalayan Balsam. Though on many commons goats are not permitted, with different local restrictions and bylaws.

- **Public Management and Engagement**

Particularly in the rural urban interface, particularly ffridd habitats there is a need to consider people in re-establishing grazing. The increasing distance that the urbanised population feel from agricultural practices, the more difficult it is to reinstate grazing. Problems such as road traffic, dog worrying, arson and theft are difficult to overcome and occur in some of the areas, this issue is detailed within the case studies in annex 1.

Consultation prior to re-establishing grazing is important, raising awareness of the benefits of grazing and understanding potential community concerns is important. Building in additional passing spaces, clear lines of sight, stock watering and supplemental feeding in specific areas, and signage will all be important considerations.

PONT have produced a guide on grazing on sites with public access[10] which details the risk and mitigation required to re-establish effective grazing close to communities. We would recommend this guide is used.

- **Grazing Infrastructure**

Water

- water provision is essential. Assess natural water sources present on site – this could be rivers, streams ditches, springs, wells and ponds.
- Does the water flow year-round? Risk assess options for droughts.
- Are the natural water sources safe for access – good available access points
- Water quality safe?
- Pollution prevention – stock watering would not cause poaching or siltation of watercourses?
- Alternative sources of water – onsite bowser's, gravity fed troughs etc. Brining in a new water source from mains can be costly, depending on access and proximity to mains water – but this would secure a constant and good quality water source.

Access

- Can livestock be walked on from neighbouring land/common
- Does this go over anyone else's land? Permission needed.
- Are the livestock well trained enough to be walked in hand or herded? Does the grazier or landowner have resources for herding?
- Is the walk contained without risk of fast roads, cliffs or large open spaces to traverse?
- Is there road, parking and turning space for vehicle and trailer to move livestock?
- This can be costly to install, depending on the difficulty of the site and may need special permissions, only suitable access at certain times of year, or not be possible.
- Is the site close enough to be counted within the graziers existing land holding <10 miles. Needs to be registered and added to holding.

Fencing

- Fencing is expensive and requires long term maintenance. There are additional considerations on fence durability where there are high antisocial behaviours.
- Is the site a common? If so, boundary fencing is sometimes permitted, but fencing within the common is generally not permitted and would be subject to common bylaws.
- Fenceless technology – this is particularly effective at target grazing areas or managing stock from roads or conservation features.
- Relatively cost effective and provides data on grazing patterns and reduces the need for on site stock checking.
- Fenceless technology is adaptive and supports flexible landscape grazing.

[10] https://www.pontcymru.org/wp-content/uploads/2011/05/grazing_on_sites_with_public_access.pdf

- Fenceless technology is effective for cattle. It is not permitted for horses and ponies and has mixed success with sheep.
- There is still a requirement of some additional fencing whilst using fenceless technologies.
- Are there roads across the site? Fencing off roads may be required for stock safety.
- Fenceless collars have an annual service charge.

Livestock handling

- If a site is a common, commoners handle their livestock on their own holdings
- Stock handling pens and gates for safe access on and off the site may be required.
- Stock checking – grazier, land manager of community/friends of stock checking.
- Train local volunteers, land managers to undertake stock checking.[11]

• Livestock Management

As with so many habitats the control of grazing is of vital importance to maintaining the habitats in good condition. Grazing at a low intensity, particularly with cattle or mixed livestock is likely to be beneficial. Without grazing, hillsides would become dominated by dense bracken and gorse and eventually succeed to woodland and therefore loss of the open habitat mosaic. Conversely, too much grazing is likely to result in the lack of regeneration of any scrub or heather and loss of species diversity in grassland.

- The vegetation can be maintained by light grazing with cattle, horses, or sheep not exceeding 0.05LSU/ha/yr[12].
- Grazing should ideally (primarily) be between April and September.
- Efforts should be made to avoid localised overgrazing or under-grazing by shepherding the sheep to the required areas, particularly on larger sites
- Target areas for supplementary feeding of hay or silage bales for cattle on bracken dominated areas during winter to increase trampling pressure.

[11] Training | Rare Breeds Survival Trust (rbst.org.uk)

[12] Livestock Units (LSU) - Various breeds will effect a different unit value: 1 Dairy Cow = 1.0LSU, 1 Beef Animal (less than 24 months) = 0.6LSU, 1 Suckler Cow = 1.0LSU, 1 Breeding Ewe (with or without lamb) = 0.15LSU, 1 Horse = 1.0LSU

- Using feed or mineral blocks to encourage livestock into desired areas to graze and trample vegetation. Care must be taken on the source of any additional feed, not to introduce unwanted weed or invasive species.
- Using virtual fencing or electric fencing to concentrate grazing to aid creation of firebreaks and reduce fuel load.
- Cutting or burning paths into scrub or gorse to encourage livestock into new areas while simultaneously creating a firebreak and escape route for livestock

It may be necessary to prepare the land for grazing as current site is not suitable – due to lack of available food or water or stock management. Where there is a need to improve grazing potential there are several management activities designed to improve available grazing, as described in following sections.

4.4.4 Management Interventions: Mowing/cutting – of heather, bracken, Molinia

- Mechanical or hand cutting/mowing should ideally be on a rotational basis to create a mosaic of different age structure to benefit wildlife.
- Brush cutters, scythes and rakes, towed mowers or remote-control mowers all appropriate – consideration should be given to the site gradient and uneven ground and obstructions which can prevent different tools and require additional risk assessment.
- Cuttings should ideally be removed to prevent the suppression of new growth and reduce nutrient input.
- The cutting should avoid the bird breeding season (March-August inclusive).
- For heather restoration or expansion is a desired objective - cutting to be undertaken in November/December then the cut heather and its associated seeds to be collected and spread finely in other areas – care to be taken to not increase fuel loading.

4.4.5 Management Interventions: Bracken Bruising


- Bruising bracken using a mechanical bruiser – towed or remotely managed, horse towed or volunteers bracken bashing (hitting bracken fronds with sticks).
- Bracken bruising (or cutting) twice a year in May/June and again in July/August.

4.4.6 Management Interventions: Liming

- Using lime to create strips across grassland and bracken dominated habitat can alter the grass quality, making more palatable grasses which are more readily grazed, resulting in effective firebreaks.
- Consideration needs to be given to the underlying habitat, liming is considered agricultural improvement and may be subject to the Environmental Improvement Assessment Regulations[13] (EIA Regs). Where there is dense under-grazed Molinia, this is ecologically poor, therefore low-level liming could be considered appropriate and not have a significant negative impact.
- Consideration as part of a wider management plan would come into consideration in an EIA regs assessment.
- Liming can be particularly effective to create firebreaks where there is only sheep grazing. Sheep do not tend to be effective on Molinia, but like fresh growth post prescribed burn, this can be an effective way of encouraging sheep grazing.

4.4.7 Management Interventions: Prescribed burning


- Cool prescribed burning of small areas or strip burning can be effective in reducing several years of dead bracken build up, where other management is not an option.

[13] EIA Agriculture a4 document (gov.wales)

- Prescribed, targeted "cool" burning of heather can encourage heather regeneration.
- Wholesale and uncontrolled burning is not advised as it can burn deep into the ground, killing grass and herb root systems and the seed bank, reducing potential for regeneration of a diverse vegetation. Bracken rhizomes are very deep, being protected from fire and will not prevent regrowth, but rather facilitate bracken dominance.
- Prescribed burning should adhere to the Heather and Grass Burning Code[14] with prescribed burns only permitted between October and March. There is training available from Farming Connect[15] to inform and reduce risks to practitioners. Out of control prescribed burns can be avoided by following the advice of the local Fire and Rescue Service[16] - who should be notified if undertaking prescribed burns.
- Prescribed burning is very dependent upon dry weather. Wet weather can prevent prescribed burning within the permitted dates. An application for a licence to burn in the restricted period can be made to Welsh Government. As part of a prescribed burn plan, consideration for a licence to burn outside the windows should be considered where there is wildfire mitigation as a primary consideration. A license application should mitigate impact to breeding birds and therefore appropriate vegetation management to facilitate this can be undertaken as appropriate to the ecological interests of the site. Out of season prescribed burning is most suitable for wildfire mitigation firebreak strip burning to reduce the wildfire risk in an otherwise high risk fuel loads and sites.

4.4.8 Non recommended activities

- Tree planting should not be undertaken. Woodland is the natural succession of ffridd through natural regeneration. If woodland is the desired end habitat, grazing management is also important to facilitate natural tree regeneration, to reduce bracken and therefore reduce shading, promoting natural regeneration.
- Regenerating trees or planted trees are at high risk from wildfire – fuel management is required to reduce risk - trees over 8 years old/6-8 foot are more resilient to fires.
- Fertilisers should not be used as they will increase soil fertility and encourage the out competition of wildflowers by vigorous coarse grasses and weedy species including bracken.
- Additional feeding of hard feeds counts as fertilisation. If additional sustenance is necessary in winter, it should only be low nutrients hay, preferably from wildflower meadows rather than rye grass hay.
- Large scale liming of habitats is not recommended and would be classed as agricultural improvement and would be subject to an EIA.

[14] Heather and Grass Burning Code
[15] Farming Connect Online Training and Guidance
[16] South Wales Fire and Rescue Service, North Wales Fire and Rescue Service, Mid and West Wales Fire and Rescue Service

5. Case Study Billy Wynt, Y Graig, Llantrisant, South Wales.

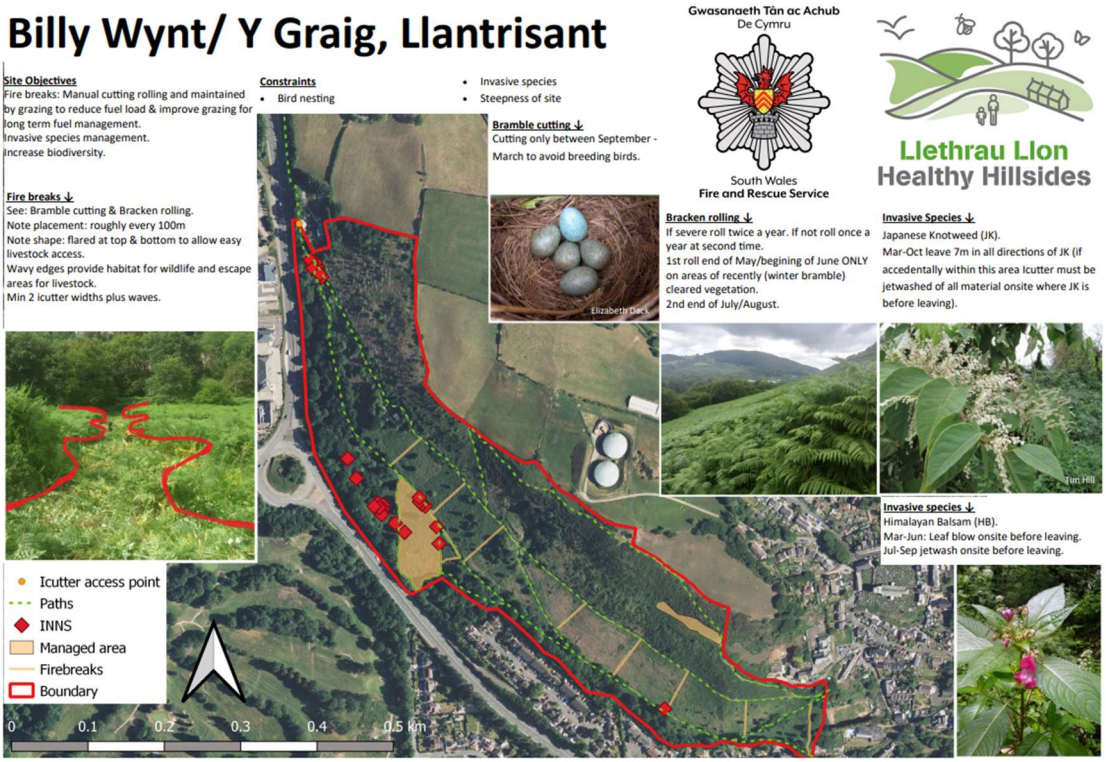
Y Graig or locally known as the Billy Wynt in Llantrisant, Rhondda Cynon Taff was one the Healthy Hillsides demonstration sites. This site was chosen due to past wildfire incidents and close proximity to community and high fuel loading. The site historically has burned regularly. Though there have been few large fires until 2017, when there was a significant wildfire, then there was another fire in 2020, during the project.

The site is approximately 15ha, steep, south facing ffridd slope near the village of Llantrisant. The site is part of Llantrisant Common and managed by the Llantrisant Town Trust. The site would be described as ffridd, covered in dense bracken, gorse and broom, with pockets of species rich acid grassland along a series of Public Rights of Ways and permissive paths.

The site had colonies of two Section 7 species Small Pearl Bordered Fritillary *Boloria selene* and the White-spotted Sable moth *Anania funebris*. Whilst there are only small areas of suitable habitat, the site has been identified as having potential for High Brown Fritillary.

This site gave us the opportunity to explore challenges of high access and close proximity to communities, high biodiversity value, Invasive Non-Native Species (INNS) presence, classic ffridd habitat and re-establishing grazing opportunities. As part of Llantrisant common, there are readily available graziers and stock for the site. Whilst graziers are keen to graze, engagement and some site management was needed to prepare the site for grazing.

- **Management Objectives**
  - Improve and enhance areas of open acid grassland – for improved grazing and biodiversity value.
  - Reduce INNS – ensure biosecurity
  - Reduce fuel load and fire risk
  - Maintain and improve access



- **Site Management**

To improve areas of open acid grassland, reintroduce grazing with low numbers of cattle and/or ponies was the goal. To prepare the land for grazing we did 2 years of bracken bruising in the lower section highlighted as managed area in the map above. We also cut firebreaks throughout the site, breaking the site up into different cells and cut along all the footpaths to both open up the paths to aid recreation access, open up sight lines for grazing animals and improve grazing. We installed a holding pen to facilitate safe stock movement on and off the site.

There are Invasive Non Native Species (INNS) considerations on the site. We treated an area of Japanese knotweed and cut Himalayan Balsam. Biosecurity measures are required on removing machinery on site to reduce the risk of spreading INNS.

To support grazing, we held an introduction to grazing session – a guided walk through the site highlighting the management and the measures people could take to avoid cattle. The cattle and pones chosen to graze the site are native breeds, chosen specifically for their

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gentle temperament. No bulls or calves will graze the site due to recreational use. The introduction session promoted a follow up stock checker's course to raise awareness within the community and promote community participation and confidence around livestock.



- **Incident**

This site was chosen due to past wildfire incidents and concern that there was high fuel load in close to properties. There is known anti-social behaviours in the area. There were fires in 2015, 2017 and 2020 – this demonstrates the fuel fire cycle; where 2-3 years vegetation growth provides sufficient fuel to increase fire risk, particularly when there is potential of antisocial behaviours.

In 2020 a fire started at the northwest corner of the site. The fire spread to the first firebreak. The fire self-extinguished at the first firebreak, preventing the fire spreading and raising the fire severity and risk to communities and environment. These firebreaks demonstrated the importance of building in fire mitigation in high-risk sites and how this can reduce the resources needed to manage incidents, protect assets, community and environment.



6. Recommendations

From the learning of the Healthy Hillsides Project there are a series of recommendations which apply to land managers, landowners and those informing policy on land management. There are a number of on the ground interventions which can be applied across individual sites which can support wider management objectives and requirements of the site, which will build wider resilience to the site not only for wildfire, but other biodiversity, social and economic benefits. There is a clear need to ensure that to build resilience within the landscape this is promoted, incentivised and rewarded through local, regional and national policy and funding opportunities.

- Recommendation 1: Undertake a Fire Risk Assessment to identify and mitigate the risks of the individual assets on site, whether they are ecological, economic, cultural or social.
  A Wildfire Risk Assessment should be written following the guidance and recommendations in this report and wider guidance written for specific habitat types, such as the Forest Research guidance on Forest Management Planning [17]. Advice and guidance from the appropriate Fire and Rescue Service should be sought. There are dedicated Land Management FRS roles in both the South Wales and the Mid and West FRS.

- Recommendation 2: Build wildfire resilience through an integrated approach to wildfire management.
  This highlights the essential approach to wildfire is that there is no one solution to wildfire management. Wildfire resilience can only be built through a combination of physical interventions, collaborative working, long term sustainable land management and supporting effective wildfire suppression by the appropriate authorities. Whilst this is reliant upon individual land managers, it requires a common understanding by wider stakeholders, including public services to support and value the role of integrated landscape management in building wildfire resilience and wider environmental and social benefits.

- Recommendation 3: Land managers should work with others to achieve wildfire resilience.
  This can be achieved through a practice of collaborative working, sharing knowledge, resources, learning and skills. Formation of local Land management groups or wildfire groups can support effective management on the ground and a landscape more resilient to wildfire. This also helps build relationships and networks to support more effective wildfire response or proactive management from grazing networks to prescribed burning and also funding bids to manage climate change impacts and environmental improvement.

  Wildfire Groups should be set up with members appropriate to scale and landscape. These groups should include land managers, FRS and other public bodies or non

[17] Building wildfire resilience into forest management planning (forestresearch.gov.uk)

government organisations as appropriate. Joint working across public, charitable and private organisations and enterprises can offer many benefits and opportunities. For example the Pembrokeshire Wildfire Group[18].

- Recommendation 4: Where there is high risk to wildfires, ecosystem service management within the landscape should recognised and integrated wildfire management should be suitably protected and rewarded.
  Sustainable management of the landscape through integrated land management protects, restores and enhances ecosystem services. This natural capital will vary depending on habitat or location within the landscape, but understanding the opportunities linked to the management of the land is essential for building landscape wide resilience to climate change, reducing the impacts and pressures and restoring ecological resilience. This should be led by Welsh Government and the management of public land through appropriate grant funding, subsidies and public land management.

  In response to climate change from the local and regional impacts and challenges, rural landscape management should be valued, and land managers of all kinds should be encouraged to actively manage the land through the appropriate publicly funded schemes and grants. The Sustainable Farming Scheme (SFS) is a key opportunity to demonstrate the value of land managers building resilience within the landscape. If not managed appropriately the SFS could serve to raise wildfire risk without appropriate consideration of local wildfire risk factors.

- Recommendation 5: More training, guidance and awareness across all land managers of wildfire resilience and integrated Wildfire management.
  Loss of traditional management of prescribed burning and a change in grazing pressures across the landscape has resulted in increased fuel loading. This alongside a problem with arson in the rural-urban interface and climate change pressures, is increasing our wildfire risk across the landscape.

  Understanding the challenge and site risk to wildfire is essential. Reskilling land managers in prescribed burning alongside a year-round integrated approach to wildfire can be beneficial to restoring the land, building wildfire resilience and reducing out of control agricultural burning. Training for safer prescribed burning, undertaking wildfire risk assessments and integrated wildfire management needs to be better shared across the land management community. Farming Connect[19] has a prescribed burning safety online training course. Training courses and guidance for other aspects of integrated wildfire management needs to be developed along side cultural change within land management communities in both private and public services.

- Recommendation 6: A greater legislative driver to ensure land does not increase wildfire risk (and other environmental risks).

[18] Pembrokeshire Wildfire Group - Pembrokeshire Coast National Park
[19] Using Fire to Manage Vegetation | Farming Connect (gov.wales)

At present there are no legal requirements for land managers to act where the land poses increased wildfire risk to community, environment, or people. There are legislative drivers for where a building has increased fire risk; the FRS have powers to ensure buildings are made fire safe, removing risk to communities and people. At present there are areas of land and land management activities which are increasing the risk to wildfire and possibly the connected environmental hazards such as landslips. As wildfire risks increase under climate change scenarios how can this risk be managed? Who's responsibility is it? Internationally there are countries where legislation has been written or adapted to take this into account, providing legislative drivers to require land owners to undertake action to reduce wildfire risk. For example the South African National Veld and Forest Fire Act of 1998[20], requires landowners to prepare and maintain firebreaks, which can be enforced through the ministry of Agriculture, Forestry and Fisheries. A review of the Welsh legislative drivers and powers should be undertaken to build in climate change and adaption to ensure wildfire risks and other environmental hazards are appropriately mitigated.

7. Wildfire Risk Assessment

Recommendation 1 is to "Undertake a Fire Risk Assessment to identify and mitigate the risks of the individual assets on site, whether they are ecological, economic, cultural or social." To support land managers to do this we have developed a step-by-step guide, which will guide land managers through a process to control the likelihood of harm caused by the hazard of wildfire. This guide seeks to inform land managers of all kinds and can be done initially by individual land managers. However it is advised that further advice and guidance from local Fire and Rescue Service is sought and use guidance online (a list of resources can be found at the end of this report).

The steps are:

1. Identify the hazards
2. Assess the risks
3. Control the risks
4. Record your findings
5. Review the controls

Step 1. Identify the Hazards

Consider yourself, people, animals, community and look around your land/external property/site and consider the hazards if a wildfire was to happen.

Wildfire hazards include (not exhaustive):

- Direct Fire Threat: The immediate danger of being caught in the path of a wildfire can lead to physical harm; burns, smoke inhalation, or risk to life.

[20] National Veld and Forest Fire Act [No. 101 of 1998] (www.gov.za)

Cronfa Amaethyddol Ewrop ar gyfer Datblygu Gwledig
Ewrop yn Buddsoddi mewn Ardaloedd Gwledig
European Agricultural Fund for Rural Development: Europe Investing in Rural Areas
Llywodraeth Cymru
Welsh Government

- Smoke Inhalation: Smoke from wildfires contains harmful pollutants and can cause respiratory problems, especially for those with pre-existing conditions.
- Evacuation Challenges: Evacuating during a wildfire can be chaotic and dangerous, with the risk of accidents or getting trapped in traffic.
- Property Damage: Homes and infrastructure can be destroyed by wildfires, leading to financial losses and displacement.
- Service/Infrastructure disruptions – Electricity disruption from damage to power lines. Water Supply Issues: Fires can disrupt the local water supply. Communication disruption from damage to broadband and phone line infrastructure.
- Long-Term Health Effects: Exposure to wildfire smoke can have long-term health consequences, including respiratory problems and heart issues.
- Psychological Impact: The stress and trauma of dealing with wildfires and their aftermath can have lasting psychological effects.
- Economic Impact: loss of productive agricultural land, impacts to management of your business model, loss of assets or infrastructure, disruption to business continuity, reduced tourism, and increased firefighting and recovery costs impacting services.
- Ecosystem Changes: Wildfires can alter ecosystems, affecting wildlife habitats and water quality.

Step 2. Assess the risks

Now decide how likely it is to occur and how serious the impact could be. This is assessing the level of risk and you will need to consider: the **cause, likelihood,** and **impact**.

- **Cause** – The "spark" that can start a wildfire. South Wales has one of the highest numbers of wildfire incidents within the UK. Since 2010 there have been over 75,000 wildfire incidents in South Wales. This is primarily an antisocial behaviour problem, with wildfire being started deliberately. When considering the site, you are assessing, think of potential causes of fire, here are some common potential ignitions (not exhaustive).
    - Arson
    - Burning waste
    - Equipment and vehicle use
    - Fireworks and sky lanterns
    - Antisocial behaviours
    - Power generation, transmission, and distribution
    - Railway operation & maintenance
    - Recreation – barbeques (BBQ) & campfires
    - Smoking
    - Electric fences
    - Littering and fly tipping
    - Structural fires

- **Likelihood** – Due to the majority of wildfire being set deliberately or accidentally, the likelihood of wildfires starting can be persistent where there is a local history of wildfires. There are factors which can increase the chance of a wildfire occurring and/or make it worse. You might want to consider the following factors:

  - **Access** - Who has access to the surrounding land or the land in your management? Are there public rights of way, access tracks, permissive or informal paths, open access land?
  - **Rural-Urban Interface (RUI)** - Are you on the rural urban interface where there is open landscapes or high fuel loads directly onto properties?
  - **Anti-Social Behaviours –** is there a history of antisocial behaviour of any kind on the site or surrounding land? Is there a history of wildfire? Are there areas of fly tipping, waste or people gathering/camping?
  - **High fuel Loads** – Fuel is anything that can be burned and increases fire severity and cover. Fuel can be vegetation within the landscape (trees, bracken, gorse, tall grass), but also fencing, rubbish (litter, fly tipping, stored waste), composts/cut vegetation, Invasive non-native species (particularly dead Japanese knotweed), flammable infrastructure or property (sheds, out houses).
  - **Weather** – fire risk increases in dry weather and high temperatures. This weather dries out vegetation and increases flammability. Strong winds can increase spread of fire and flame length, increasing fire intensity
  - **Climate** – under climate change predictions more frequent episodes of dry weather and drought are predicted. Prolonged periods of drought increase the likelihood of wildfire. Climate change also predicts warmer wetter winters and springs, this can increase growth of vegetation increasing fuel loads.
  - **Fire behaviour** – this is affected by the environment which influences the fire intensity, rate of spread and flame length. Fires tend to spread more quickly uphill due to increased heat and wind. Fires are more likely to take hold on south facing hills travelling uphill – therefore assets and communities on these hills are more likely to experience fires.

- **Impact** – who or what might be affected and how will this happen.

  - People – acute and chronic health impacts including burns; smoke inhalation; reduced air quality.
  - Property – damage to buildings, vehicles, and personal possessions.
  - Livelihoods – damage to buildings, vehicles; equipment; stock.
  - Livestock.
  - Nature & biodiversity.
  - Historical & cultural sites.
  - Infrastructure - Community services - healthcare, education; local government services.
  - Transport Infrastructure – road, rail, public rights of way.
  - Utilities Infrastructure - electricity grid, gas networks, water supply, sewage system, communications networks.

Step 3 - Control the Risks

Can you eliminate risks identified altogether? This is difficult with wildfire especially due to the nature of wildfire being started by people. So, how can you control the risks so that harm is unlikely, and the impact lessened?

- How do you control risks? Behavioural challenges? Physical interventions?
- What are you already doing to control the risks?
- What further actions you need to take to control the risks?
- Who needs to carry out the actions?
- When the actions are needed to be completed by.

Controls are very specific to the hazards and risks identified for the site. Controls can be physical and on the ground interventions as highlighted throughout this report, land or habitat management interventions can reduce impacts and risk. Particularly where you do not have control of all the risks, ways of working, getting the right people/stakeholders around the table may be the key control mechanism to support to manage risks. Controls maybe simple and quickly delivered whilst others may require additional funding, assessment or strategic in nature. A combination of scale of controls is likely.

Some examples of controls:

- Creation and maintenance of firebreaks around assets and identified risks – such as PRoW or known antisocial behaviour sites.
- Fuel management – bracken bruising, vegetation cutting, reduce fuel.
- Responsible waste removal, storage of habitat management arisings.
- Use of non-flammable materials for boundaries, dry stone walls, fenceless technology.
- Long term redesigning or building in management of your land to reduce fuel and/or exposure to causes. E.g. mowing firebreaks; livestock grazing.

Step 4. Record your findings

Ideally, you should record your findings, including:

- Who and what might be harmed or damaged by wildfire and how?
- What are you doing to control the risks?
- What you plan to do to further control the risks?

To help you, we have a Wildfire risk assessment template you can use in Annex 2. This should drive local discussion, behaviour change, and build potential future planning or strategic direction to build resilience to wildfire. The assessment should influence day to day behaviours and support on the ground control of the risks.

Step 5. Review the controls

You must review the controls you have put in place to make sure they are working. You should also review them if:

- you think they may no longer be effective.
- there are changes that could lead to new risks you haven't considered before.
- new risks or hazards have been identified.
- you receive additional advice and/or support.

Update your risk assessment record with any changes you make.

N.B. Please note that the information in this guide is not exhaustive. You need to consider you own personal circumstances, the spectrum of risks, features and history of the land you manage and adapt the risk assessment accordingly. Seeking advice from your local Fire and Rescue Service will support more effective risk assessment.

8. Further useful documents

Healthy Hillsides Partnership Project pages
Healthy Hillsides - South Wales Fire and Rescue Service (southwales-fire.gov.uk)
https://www.facebook.com/HillsidesWales/
https://twitter.com/Hillsides_Wales
wales-wildfire-board_charter_eng.pdf (mawwfire.gov.uk)
#Dawnsglaw - Mid and West Wales Fire and Rescue Service (mawwfire.gov.uk)
Habitat management guides/advice (Wildlife Trust of South and West Wales)
A guide to management planning (welshwildlife.org)
Upland fringe (Ffridd) - Farm Wildlife
Habitat in Focus; Ffridd | PONT (pontcymru.org)
What is Conservation Grazing | PONT (pontcymru.org)
Building wildfire resilience into forest management planning (forestresearch.gov.uk)
CCRA3 wildfire FINAL.docx (ukclimaterisk.org)
Forest Research 2011: Wildfire in Wales
Landscape Wildfire Management Framework

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Appendix 1: Wildfire Risk Assessment template

Site name: **Assessment carried out by:**

Date of assessment **Date of next review:**

Who or what might be impacted by a wildfire and how? Or what is the cause?	What are you already doing to control the risks?	What action(s) do you need to take to further control the risks?	Who needs to carry out the action?	When is the action needed by?	Done

Who or what might be impacted by a wildfire and how? Or what is the cause?	What are you already doing to control the risks?	What action(s) do you need to take to further control the risks?	Who needs to carry out the action?	When is the action needed by?	Done

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