

SOUTH EAST ENGLAND WILDFIRE GROUP RESPONSE TO FORESTRY
COMMISSION ENGLAND'S OPEN HABITATS CONSULTATION

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INTRODUCTION

1. The South East England Wildfire Group is grateful for the opportunity to respond to the Forestry Commission's Open Habitats consultation. The group's Terms of Reference are defined in Appendix A. The group would welcome the opportunity to further discuss this consultation on specific points.
2. The views expressed in this response reflect the collective view of the SEEWG but not necessarily that of all the individual partner organisations.
3. In this response we have sort to define two key points; concerns and recommendations. The background provides scope and scale of wildfires, but should be read in conduction with Appendix B. We have then provided a response to the questions asks which are derived from the context of wildfire in *England's Tree, Woodlands and Forests Deliver Plan*.
4. As the policy is a consequence¹ of this document it is necessary to positioned wildfires in context of its structure (shown in Appendix B). This has been undertaken for the following reasons:

¹ Aim 3 – Natural Environment, Objectives NE 3: Wider Habitats, Activity 2.

- identify the strategic responsibilities of Forestry Commission England and Natural England defined in the plan,
- position the issue of wildfire given its multiple implications,
- define the impacts upon other cross cutting aims, objectives and activities.

SUMMARY OF KEY POINTS

Concerns

5. The increase of open habitat creation from woodland is of considerable concern to the South East England Wildfire Group. The group is aware that only a limited consideration has been made of vegetation fires (wildfire incident and prescribed burning operations) within the evidence currently considered. Therefore we would like to make you aware of our following concerns:

- A) Priority should be given to ensuring that **existing open habitats are managed more effectively** to reduce the severity and likelihood to wildfires. Until this is achieved, then creating new habitats is not advisable, especially whether these sites will be adjacent to existing open habitats.
- B) We are concerned that a **national policy might not be flexible enough to reflect the local diversity of circumstances** (social, economic and environment) that cause wildfires across the England.
- C) That predicted climate change **provides the potential for wildfire on open habitats to become a more significant problem** especially on lowland heaths.
- D) The consultation does **not consider enough information on the impact of wildfires** upon open habitats and woodlands for evidence based decision making.

Recommendations

6. The group recommends the following to ensure that the risk of wildfires is reduced by this consultation:
 - A) It priorities **better management of existing open habitats**, especially heathland, before creation to reduce the impacts of wildfire.
 - B) A **wildfire risk assessment process is used on any proposed creation of open habitats**. This should take into account locality, major infrastructure, social demographics, adjacent area of high risk, appropriate management etc.
 - C) A joint government department approach to reducing the risk of wildfires on open habitats is adopted. This may be via a **policy, strategy, action plan and programme for wildfire incidents**. This should promote better land management for open habitat and be focused on preparedness, prevention, response and recovery.
 - D) **Further research and data collection is undertaken on wildfires on open habitats** to provide sufficient evidence of the impact of any proposed policy.

BACKGROUND

7. Wildfires are natural hazard identified by the Department for Communities and Local Government. Fire is a natural part of our environment, able to provide benefits as well as threats to the biodiversity, society and the economy. As shown in Table 1 the data collected by Department of Communities and Local Government depicts a considerable number of wildfire incidents in the United Kingdom and especially primary fires England (accepted as an under estimate) between 1995 to 2004.

Table 1 – Outdoor fires by type and location in between 1995 and 2004

	Primary fires²	Secondary fires³
United Kingdom	26,935	833,328
England	17,419	339,561
Average total per year in England	1,935	37,729

8. Primary fires recorded during the warmest summers (1995 and 2003) disproportional account for just fewer than 40% of all fires during this nine-year period. By 2040 these will be average temperatures and the climax for fuel loadings of open habitats species. We are concerned that there is no data on current numbers of ignitions (potential of wildfires), the area burnt and the impacts and benefits of vegetation fires.

9. For Fire and Rescue Services and their partners, wildfire poses a direct and indirect risk of the communities they protect. Directly there is the risk to life, property and the environment. Indirectly large wildfires can seriously reduce emergency resilience to other incidents, especially during critical periods (e.g. school holidays, periods of sustain high temperatures, rush hours etc.).

Prevention focus

10. The focus for the United Kingdom is now on prevention-based approach, embracing a more holistic vision than previously employed (DCLG, 2004). The European Commission (2008) focuses on crosscutting work to provide; information of the risk situation to priorities needs, long-term strategies and action plans, assessment of effects and costs of alternative actions. In England the Department for Communities and Local Government (2008) supports the approach of developing a performance management framework for wildfire. It is critical that an increase in poorly managed open habitat will be contrary to a

² Known as Primary Grassland and Heathland Fires (FDR1). Those involve more than four fire appliances to the incident. Includes metropolitan Fire and Rescue Services.

³ Known as Grassland Fires (FDR3). Those involving less than four fire appliances to the incident. Excludes metropolitan Fire and Rescue Services.

prevention-based approach if the likelihood and severity of wildfires is increased.

Risk management

11. Wildfire incidents have had a significant impact on Fire and Rescue Services, land managers and their communities. Fire organisations use a risk-based approach to the problem. The two risk factors, likelihood and severity define the impact of wildfires (DCLG, 2008). The likelihood of wildfires is determined by; meteorological, social and land management factors. The severity is determined by; vegetation fuel, location, proximity, availability of fire fighting resources and sensitivity of habitats and species. The majority of wildfires are deliberate or accidental started by people and occur in forests, grassland, agricultural & horticultural land, heathland / moorlands as well as green infrastructure (in rural and urban areas). There are two key factors that have to be addressed together to decrease wildfire incidents, reducing the risk and correctly managing vegetation fuels.

Fuel management

12. Land management defines the severity by management regime, vegetation types and fuel loadings as well as site factors. Without continued management species such as heather (*Calluna vulgaris*) can become more vulnerable to meteorological effects (Davis *et. al.*, 2006). Considerable concern should be given heather's unique retention of dead material and low moisture content on vulnerable occasions (Kitchen *et. al.*, 2006). Therefore management, along with fragmentation of high-risk habitats and integrated prevention measures should be promoted.

Managed landscapes

13. Portugal, where the wildfire problem has worsened due to socio-economic reasons, points to where England may be in the near future. Inappropriate land use changes along with the abandonment of rural land (Martínez, 2004; Vélez,

2002) has decreased their resilience to wildfire incidents. Given predicted climate change this is of concern to England and especially the South East. If we do not evolve our current policies now to the wildfire risk it will have considerable future impacts. Policies such as open habitats and fire exclusion and/or suppression (Naveh, 1990; Agee & Skinner, 2005; FAO, 1999), combined with inappropriate land management, will transfer the wildfire risk to habitats not currently considered vulnerable (e.g. broadleaves tree and mature conifers). The European Union agrees that continuing our current policies of fire exclusion and/or suppression is now not ecologically and economically feasible (Myers, 2006 Agee & Skinner, 2005; Gould, 2006; Williams, 2005). Therefore an open habitats policy must fully considerate of wildfires.

RESPONSE TO QUESTIONS

Question 1 – The proposed restoration of between 5,600 to 30,000 hectares over 10 to 15 years, without full consideration of wildfires in this policy is of considerable concern to the group. We believe this would increase the risk to life, property and the environment.

Question 2 – We support an additional outcome on ensuring ‘resilience of managed resources’. This would include wildfires, storms/high winds, flooding as well as pests and diseases.

Question 3 – We would urge an additional indicator on the ‘*net change on natural hazards*’ including effects of wildfires, flooding and high winds/storms. In particular it must monitor; the number of wildfires, the area burnt by habitat and full cost of wildfires. This would provide an effective evidence based approach to policy development.

Question 4 – We urge Forestry Commission England to give careful consideration to the role of trees, woodlands and forests in wildfires when considering increasing the area of open habitats.

Question 5 – No comment.

Question 6 – We are concerned that if mature native woodlands are defined what are the future impacts upon the sector in relation to wildfires.

Question 7 – We would like to discuss with the Forestry Commission how wildfire risks will be reduced.

Question 8 – Yes, regional prioritisation is important given due consideration to wildfires.

Question 9 – We agree with the framework for evaluation if wildfires are recorded in the outcomes, indicators, baselines and targets.

Question 10 – The cost of the framework should be imposed on the practitioners.

Questions 11 & 12 – No comment

Question 14 – We are concerned that if management practices such as prescribed burning, grazing etc. are used as restoration and management tools, there should be suitable guidance, control and proceeds are in place. Such mechanisms should have provision for the varieties of site specific needs and requirements (i.e. scope, scale, demographics, habitats, land use, business, access etc.). Inappropriate or poorly planned operations may result in unnecessary losses of carbon.

Question 15 & 16 – No comment

Questions 17 & 18 – We are concerned that Public Service Agreement 28 on SSSI target may have increased the likelihood and severity of wildfires. This may be due to Common Standards of Monitoring guidance not fully considering the impact of wildfires during recording, if detected. We would welcome all approaches that promote the active management of habitats that reduce the risk of wildfires.

Question 19 – We suggest the following information is used:

- Forestry Commission Forest Fire Statistics (up to 2004) on the Public Forest Estate
- Department of Communities and Local Government – Fire Statistics 2008 (Outdoor Fires).

Questions 20 & 21 – We would support approaches and roles that are proven to provide reductions in the likelihood and severity of wildfires.

Question 22 – Reference our response to Question 2 we would like to add the following to Table 6.

Outcome	Question
Resilience of managed resources	Does the policy reduce the number of ignitions and wildfires in the short and long term?
	Does the policy increase losses in ecosystem services, green house gases and carbon?
	Are the management practices fully effective in reducing wildfires?
	Have wildfires adversely impacted upon business, markets, access and biodiversity?
	Does the policy reduce the resilience of Fire and Rescue Services?

Question 23 – We would like to open a discussion with the Forestry Commission on developing a delivery mechanism to reduce the risk of wildfires.

An example could be a tariff upon landowners who create open habitats. This would provide sufficient funds to prepare, prevent, respond and recover from wildfires as a result of this policy. This is a similar approach successful taken by the Dorset Urban Heaths Project in gaining section 106 from developments between 400m and 5km of housing of Natura 2000 sites.

In the example a tariff is composed of an initial flat rate and maintenance in perpetuity⁴. Both charges would be based on restored open habitats per hectare, along with additional charges with high-risk areas. Example of management it would provide is:

- planning at a strategic, regional and site level
- management guidance and advice

⁴ The use for '*in perpetuity*' has been accepted within the Thames Basin Heaths for the mitigation of housing development on European Special Protection Areas / Special Areas of Conservation.

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- review of proposals and management plans
- monitoring and evaluation of ignitions and wildfire incidents
- finance partnership working at regional and landscape level
- conduct prevention measures that not undertaken by owners (fees then recovered from the landowner)
- specialist resources and equipment to respond to incidents
- post incident fire investigation by specialists
- research and development

Additional considerations:

- We note that likely impact of increased wildfires (Consultation, Table 4) has not been considered within the climate change theme.

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APPENDIX A – TERMS OF REFERENCE OF THE SOUTH EAST ENGLAND WILDFIRE GROUP (V5)

Aim:

“To create a forum between fire services, land management organisations and government that will provide strategic direction, planning and best practice to reduce the risks and hazards in the South East of England”.

Objectives:

1. Reduce the number, area burnt and impact of wildfires on:
 - **Environment** – heritage, natural and built,
 - **Infrastructure** – property, wayleaves and transport,
 - **Climate change** – reduce the loss of greenhouse gases and CO₂,
 - **Social** – recreation, cultural, aesthetics, life, health and well being and community,
 - **Economic** – food, fibre, fuel, sporting, tourism.
2. Provide a framework for partnership working and ensure that all partners are able to contribute to an integrated approach including; management, education, training, strategic planning, incident recording, regional policy, tactics, doctrine.
3. Reduce the amount of resources and risk to safety that exists for major wildfire incidents by; sharing resources, tools, vehicles, equipment, knowledge and experience.
4. To advise the Regional Fire Management Board, via the South East Response and Resilience Group, and the English Wildfire Forum of key issues that effect the South East England region.

SEEWG ACTION PLAN

Strategic priorities:

1. Develop an action and business plan for the forum.
2. Provide Wildfire management awareness training to Fire and Rescue Services, land managers and land management bodies (Environment Agency, Forestry Commission and Natural England).
3. Plan a half-day Wildfire training event in co-operation with 'Wildfire 2009' conference promoting the groups achievements.
4. Identify operational training opportunities for FRS and Land Managers.
5. To development and agree a standardized fire plan and fire maps template for the region, and then promote to fire and rescue services and land managers.
6. Develop and agree Standard Operating Procedures (SOP's) between FRS and land managers in the event of Wildfires.
7. To identify areas of high risk within the region where there is a need to promote partnership working.

First year outcomes:

1. Standardised Fire Plans and Maps
2. Operational and Awareness Training
3. South East England event for Wildfire 2009

ORGANISATION

Lead Organisation: Gavin Watts for Surrey Fire and Rescue Service
Programme Manager: Kate Hutchinson (Rural Development Initiatives)

TERMS OF REFERENCE IS SUPPORTED BY

- Natural England (South East)
- Environment Agency
- Hampshire Fire and Rescue Service
- Surrey Fire and Rescue Service
- West Sussex Fire and Rescue Service
- Royal Berkshire Fire and Rescue Service
- Defence Training Estate (MoD)
- Defence Fire & Rescue Service (MoD Defence Fire Risk Management Organisation)
- Crown Estate Commissioners
- Government Office of the South East

APPENDIX B – WILDFIRE CONTEXT IN ETWF DELIVERY PLAN

1. Our response is made in the terms of the Forestry Commission England's and Natural England's *England's Trees Woodland and Forests (ETWF) Delivery Plan* aims and objectives in relation to the questions asked in the consultation.

Aim 1 – Sustaining the Resource (SR)

Objective SR1 – A sustaining resource

2. England collects only a limited data on wildfire incidents, providing restricted application on calculating its impacts. An example is Forestry Commission Great Britain who in 2004 stopped collating wildfire statistics for the Public Forest Estate. Most data collected was considered an under estimate of the true number of incidents and area burnt. As there is no interagency agreement on national wildfire monitoring and evaluation. Therefore we are not able to determine the impact of the open habitat creation upon the sustainable development assets. Department for Communities and Local Governments new Incident Reporting System (IRS, 2008), does report wildfire elements to fires attended by Fire and Rescue Services. This system has only just started collating data and does not record non-Fire and Rescue Services fires.
3. Forest Enterprise does provide guidance for the Public Forest Estate in the form of *Operational Guidance Booklet 17 – “Planning for the expected”*. This document defines Forest Enterprise guidance to wildfires and is considered industry best practice. It has been accepted that this document requires reviewing to adapt it to the terms used in Civil Contingencies Act (2004) and to improve data collection. This need has developed data needs and typologies. This has been undertaken in partnership⁵ with the Department of Communities and Local Government IRS team and the Fire and Rescue Statistic User Group (FRSUG). This has evolved into the United Kingdom Vegetation Fire Standard

⁵ Partnership working between Forest Enterprise England and Department of Communities and Local Government on the development of the Incident Reporting System. Gazzard (2008) and (2009) unpublished.

(UK VFS) applicable to both private and public landowners and the Fire and Rescue Service.

Objective SR2 – Policy, strategy and programmes

4. The Forestry Commission England and Natural England have not provided policy, strategy and programmes on open habitats and forestry for wildfire incidents, despite being statutory agencies. Forest Enterprise does host the Forestry Commission Fire Forum but it is presently focused upon the Public Forest Estate and has no Forestry Commission England policy representatives. Similarly both the Forestry Commission England and Natural England have fail to effectively engage with the Planning Policy, Land Use and Land Management Planning to reduce the impact of natural hazards (fire, storms and drought) for current and future generations.

Objective SR3 – Better understanding and engagement

5. Despite national⁶ and local⁷ engagement by Forest Enterprise there has been limited commitment by Forestry Commission England to wildfires. As our group is a member of England Wildfire Forum we are concerned why this key stakeholder⁸ not been involved. In doing so its national partners have had no opportunity to discuss policy and strategic needs beyond the Public Forest Estates mandate.

⁶ English Wildfire Forum

⁷ Landscape working groups such as Northumberland, Cumbria and South East England Regional and Local Wildfire Groups

⁸ Open Habitats Consultation, Annex 4: Stakeholder organisations.

Objective SR4 – Sustainable management and economic viability

6. As highlighted in the English Forest Industries Partnership response (2009) we have concerns that the loss of jobs, skills and markets will have a significant impact upon wildfires, increasing the likelihood and severity of incidents. Please see our comments under Aim 5 – Business and Markets.
7. We note that Forestry Commission England does not provide specific preparedness and prevention policies within the English Woodland Grant Scheme and Forestry Environment Impact Assessments (EIA). We are concerned that the conversion of forestry to open habitats will increase the likelihood and severity of wildfire with no long-term management constraints or financial commitment.
8. Forest Enterprise has been an important partner and catalyst for the development of wildfire resilience in England. Due to its front line experience across the United Kingdom it provides significant experience and knowledge with a long-term approach to management. Therefore the role of the Public Forest Estate in wildfire developments is an important consideration.

Aim 2 – Climate Change (CC)

Objective CC1 – Increasing resilience of trees and woodland

9. Wildfires are a critical indicator of climate change events and form a symbiosis with other extreme weather events; storm/high wind, drought and flood. As identified by Broadmeadow (2002) the United Kingdom, and especially the South East, will see more variable rainfall in spring and warmer summers, causing an increase in fire season. The Met Office (2005a) and Stott (2004) highlight that the United Kingdoms warmest and worst wildfire year 2003, will be the norm by 2040 and continuing to increase thereafter.
10. The UK Climate Impact Programme (2009) specifically identifies wildfire incidents increasing in the future. If the open habitats policy was to be

implemented this would coincide with restored lowland and upland heaths reaching maturity at the same point. This correlation is of significant concern to those in the wildfire sector.

11. Although identified by the ETWF Delivery Plan (p17 para 18, 2008) wildfires are erroneously stated as being researched, monitored and evaluated. The work is being undertaken is limited because it; has no financial resource, largely voluntary, highly fragmented, has limited policy buy in/understanding.
12. We are presently unable to inform the development of robust adaptation measures or value the impact of fire. This includes our commitments for recording greenhouse gases and CO² emissions under the Land Use, Land Use Change and Forestry (LULUCF) defined by the Centre for Ecology and Hydrology (Thomson and van Oijen, pp36, 2007).

Objectives CC2– Adapting the rural & CC3 – Adapting urban landscape

13. There is a strong need to have '*planned adaptation*' as defined by the UK Climate Impact Programme (2009), a result of deliberate policy decisions, rather than reactive to the effects of climate change (i.e. reaction to extreme wildfire events e.g. 1976, 1990, 1995, 2003, 2004 and 2006 etc.). In supporting of this approach, Forestry Commission Scotland has increased the risk rating from '*tolerate*' to '*treat*' (Forestry Commission Scotland, 2008). It defines action in providing closer partnership working between fire and land management sectors and controls through the development of preparedness and prevention measures.
14. Along with the Scottish approach another such adaptation in England should be the successful connection between rural landuse/land management and urban landuse/planning policy to reduced wildfire impact.
15. Depending upon the severity of a wildfire (i.e. radiant heat emitted and particulates) it can affect air quality, water quality and soil function. Significance impacts can occur to major infrastructure and people. Air quality provides a risk to public health, communications, power lines and transport visibility. Water quality can affect the storing / extraction of water by the discoloration of water

under the Water Framework Directive. This comes with considerable costs of cleaning and purification. The impact on soil is subtler, sufficient radiant heat can adversely affect fertility and water retention. This can increase the stress to trees increasing the success of pests and diseases.

Aim 3 – Natural Environment (NE)

Objective NE1 – Ecosystem Services

16. Within both the ETWF strategy and the delivery plan there is a constantly focus on maximising ecosystem services, especially to protect both soil and water resources, along with biodiversity. To do this then there must be measurement of wildfires. The need for a fire indicator has been identified for regulating service it has not be agreed (Haines-Young, R. and M. Potschin, p28, Table 6, 2008). Our concern is that unless this is resolved before the implementation of this policy, the baseline that will be established will not provide an accurate or long-term assessment of impacts.

Objective NE3 – Wider habitats

17. We are concerned that the only habitat defined by the Forestry Commission (p19, 2008) evidence as threatened by wildfires are lowland heath. All open habitats listed are susceptible to wildfires. The Department of Communities and Local Government and Peak District National Park have recorded considerable fires on grassland and moorland. Of note is that fire has a more detrimental effect on wet heath and bog species (Tucker, p76, 2003).
18. As Rogers (2005) points out the species associated with open habitats are more susceptible to wildfires due to the high quantity of fine fuels in their composition and close proximity to the ground. He continues by stating that fine fuels gain and lose moisture more rapidly and are more combustible. The RSPB (Symes and Day, 2004) define lowland heathland as being highly flammable, especially in early spring and during dry summers. The Department for Communities and Local Government's (2008) guidance defines open

habitats most at risk. For example Symes and Day (p14, Table 1.3, 2003) of the RSPB define the effect of wildfires on lowland heath as;

- destruction of seedbank,
- local extinction's of sedentary species,
- large homogenous stands of even age heather,
- invasion by bracken and birch
- risk to public health and safety.

19. Considerable biodiversity may well be lost, an especial risk for priority habitats if wildfire incidents are frequent and pioneers (e.g. bracken, birch, pine etc.) out compete open habitat species. Nesting birds are at further risk due to predicted dry summers.

20. To illustrate the need for site by site risk assessment, wildfire can have a positive effect on species and habitat on certain sites. Dartford Warbler have been reported in greater densities on burnt sites in comparison to unburnt areas within six years (English Nature, 2005). Heather (*Calluna vulgaris*) has been noted as being more competitive with Scots Pine (Whelan, 1986) after fires.

21. It is important to remember that broadleaves and mature conifers are at considerable less risk from wildfires and are therefore less likely to burn unless during exceptional conditions.

Aim 4 – Quality of Life (QOL)

Objectives QL1 – Attractive and inspiring places & QL3 – Active, Strong and more Sustainable Communities

22. With reference to Points 11 and 20 we believe the impact upon and from Green infrastructure and wildfires has not been addressed.

Objective QL2 – Recreation, enjoyment and health lifestyle

23. The promotion of recreation upon open habitats without consideration for wildfires we believe would increase the likelihood of incidents. Wildfires are rarely natural and the RSPB (Symes and Day, p172, 2003) and Met Office (2005) state that they are accidental or deliberately started, a key factor being access.
24. Wildfires directly and in-directly can have a significant effect upon health. This may be as a direct result of exposure to smoke and particulates, especially near urban areas or infrastructure (Kemp, 1998) or the indirect reduction in emergency resources to deal with sustained high temperatures upon vulnerable people as in 2003 (Johnson *et. al.* Figures 1 and 2, 2005). Consideration should also be given to the human injuries, in terms of health and medical costs to fire fighters (DCLG, p22, 2006a) and members of the public.
25. Additionally we note the increase access conflicts with prescribed fire operations if used as a management regime for new open habitats (Forestry Commission, p46, 2008).

AIM 5 – Business and Markets (BM)

Objective BM1 – Woodland and timber sector and & BM 5 – Recruitment, skills and retention.

26. We are concerned by the conclusions of the England Forest Industries Partnership (2009) report. The reduction in the skills base and the markets could impair management opportunities to reduce wildfire incidents:
 - **Preparedness and Prevention:** remaining woodlands will be more liable to fires due to reduced management i.e. limited partnerships working to prepare for incidents, the build up of fine fuels and promotion of fuel ladders the subsequent promotion of increased of crown fires risk.

- **Response:** the reduction in rural labour and skills could serious effect availability of competent persons to work with Fire and Rescue Services to effectively extinguish fires. This includes land management operations e.g., construction of fuel/fire breaks during incidents, lifting of canopies, knowledge of vegetation and local area.
- **Recovery:** the reduction in labour, flexibility of skills and markets to salvage timber and increased costs associated with restoring landscape negatively impacted upon by wildfires i.e. birch, pine and bracken removal.

Objective BM3 – Leisure and tourism businesses

27. If this consultation is adopted as policy then significant resources should be made available to reduce the likelihood of wildfires. We note that despite increasing open access to the public in the Countryside and Rights of Way Act (2000) the same policy provided ineffective control (FTA, 2006) to prevent wildfires.

Objectives BM4 – Business models

28. We support the evidence (Forestry Commission, p14, 2008) that wildfire provide significant costs and complexity to the landowner. This would have considerable impact upon the resulting smaller and/or fragmented woodlands. We strongly urge that the following costs and loss are taken into consideration open habitats:

Preparedness and Prevention (if undertaken by the landowner):

- Development of fire plans.
- Partnership working.
- Liaison and communication between Fire and Rescue Services and land manager.
- Protection measures; fuel/fire breaks and access points.
- Improving road/track networks and water sources (hydrants and ponds).

Responding (possible costs to the incident):

- Cost to the Fire and Rescue Services attending.

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- Cost to land managers attending.
- Cost of injuries / fatalities sustain by fire fighters, land managers and general public.
- Loss of property and reduced savage costs.
- Loss of income (short, medium and long term, time scales dependent upon land use/product).
- Impact on local and national economies.
- Loss of landscape, amenity, access etc.
- Loss of biodiversity (soil, animal and plant) and heritage (monuments etc.).
- Cost of heavy metals and other toxic chemicals sequester in soil and vegetation released by fire (particularly near present and future industrial centres).
- Green house gases and carbon.
- Cost incurred by disrupted, damaged and destroyed major infrastructure.

Recovery (dependent upon the severity and environment)

- Cost of restoration
 - Cost of continued restoration management
29. We note that the costs borne by the public and resources of the Fire and Rescue Services are not considered in your evidence, along with indirect costs incurred to major infrastructure (transport, wayleaves etc.), landscape, amenity, biodiversity etc.