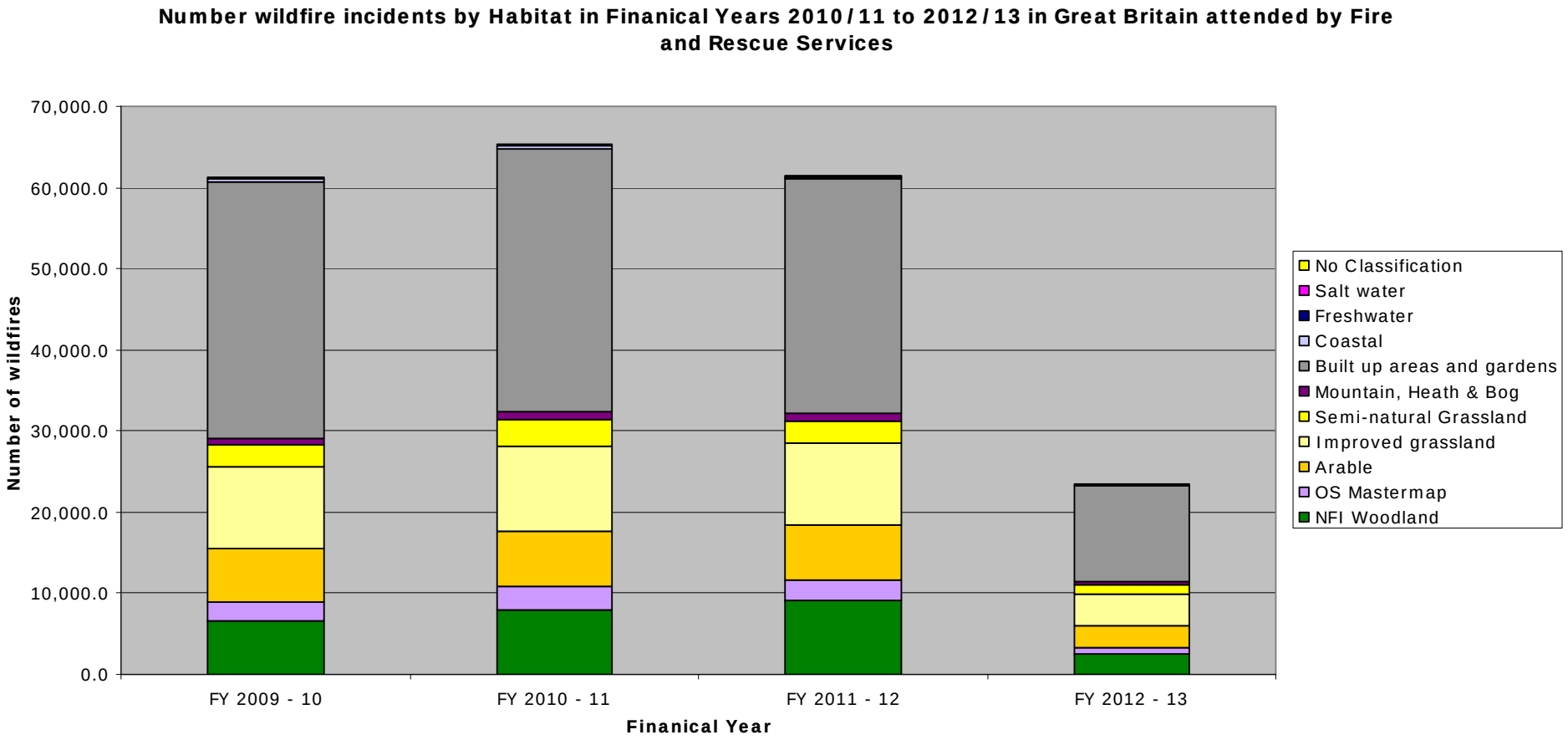
Forestry Commission England

Forest Plans & Wildfire

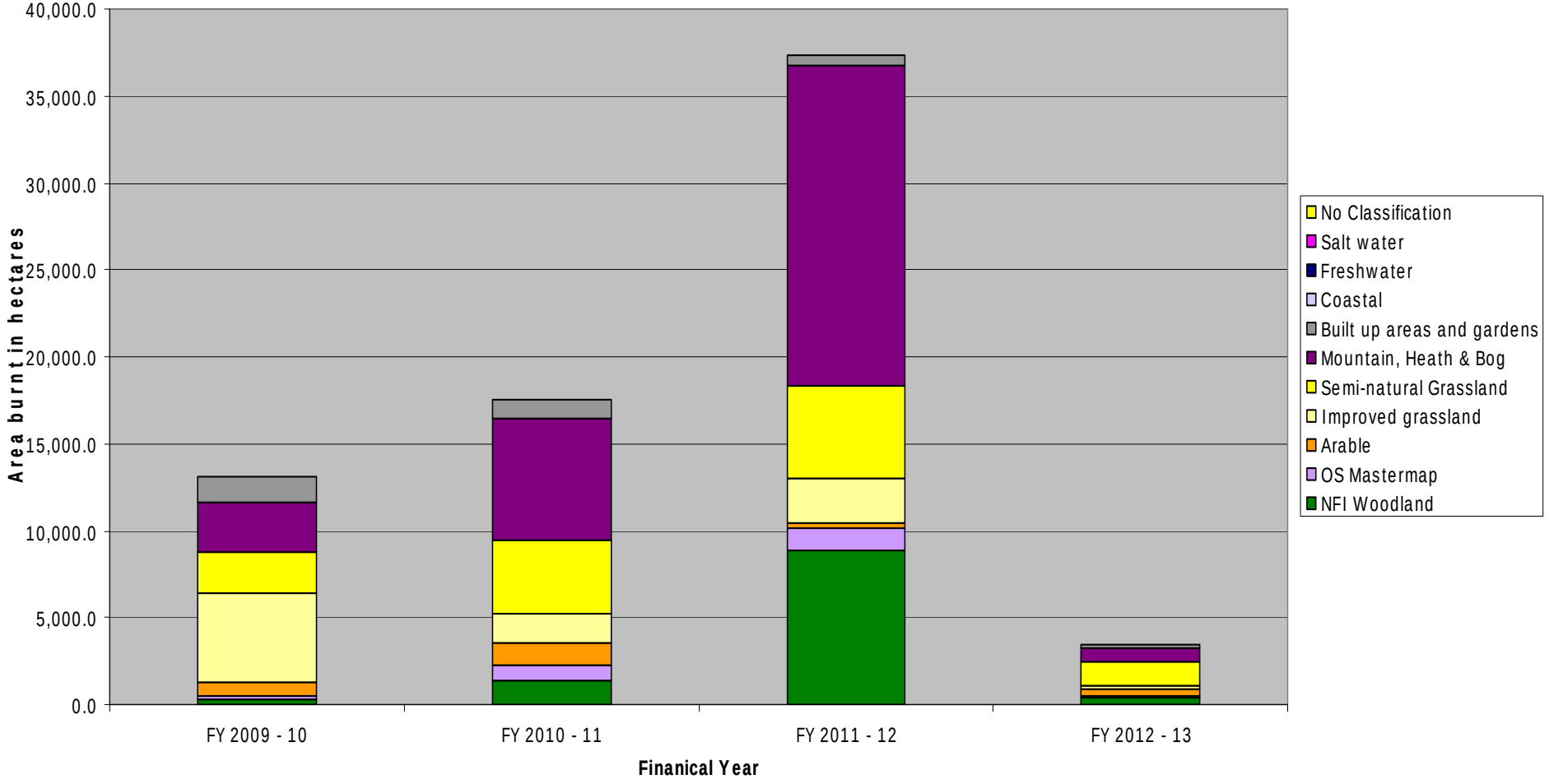
Rob Gazzard
Forestry Commission England

Number of GB Wildfires

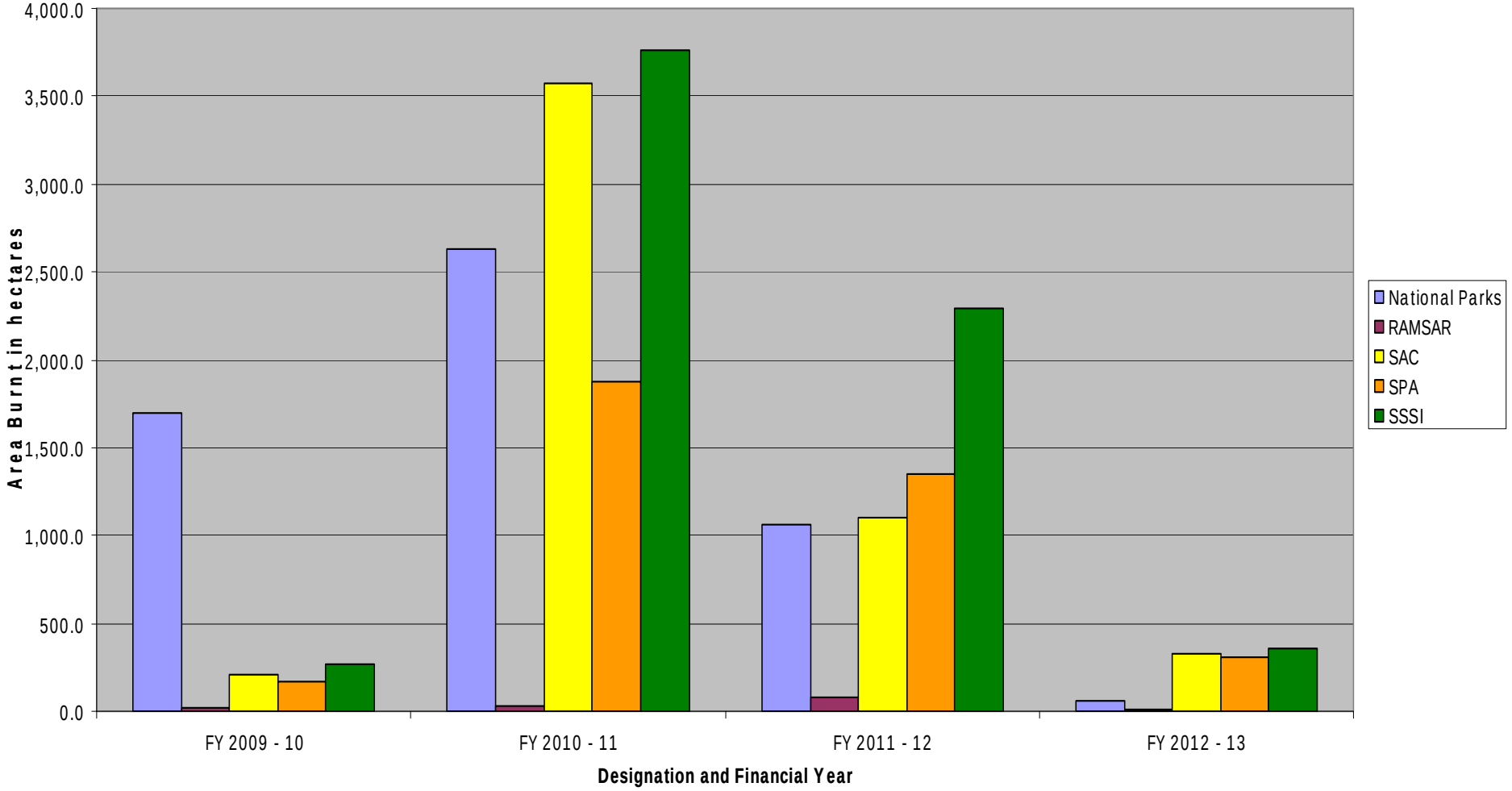


Area burnt during GB Wildfires

Area burnt of habitats due to wildfire in Finanical Years 2010/11 to 2012/13 in Great Britain attended by Fire and Rescue Services



Area Burnt of EU and UK Designations due to Wildfire in England in Financal Years 2009/10 to 2012/13 attended by Fire and Rescue Service



GB Wildfire Statistic Summary 2009/10 to 2012/13

- +71,000 hectares burnt between FY2009/10 to 2012/13
- +37,000 hectares burnt in FY2011/12 alone
- +211,000 wildfire incidents between FY2009/10 to 2012/13
- +65,000 incidents in FY2010/11 alone

Wildfire Policy

Wildfire is defined as a risk in the following policy documents in the United Kingdom:

- National Risk Register (2013 and 2015)
- Climate Change Risk Assessment (CCRA)
  - High risk in both Natural England's and the Chief Fire Officers Association (CFOA) response to CCRA
- National Adaptation Programme (NAP)
- National Planning Policy Framework (NPPF)

- UK Forestry Standard, Guidelines and Practice / Technical Guidance.

Locally:

- Community Risk Registers
- Fire and Rescue Service's Integrated Risk Management Plans
- Forest Management / Design Plans

UK Forestry Standard

Requirements

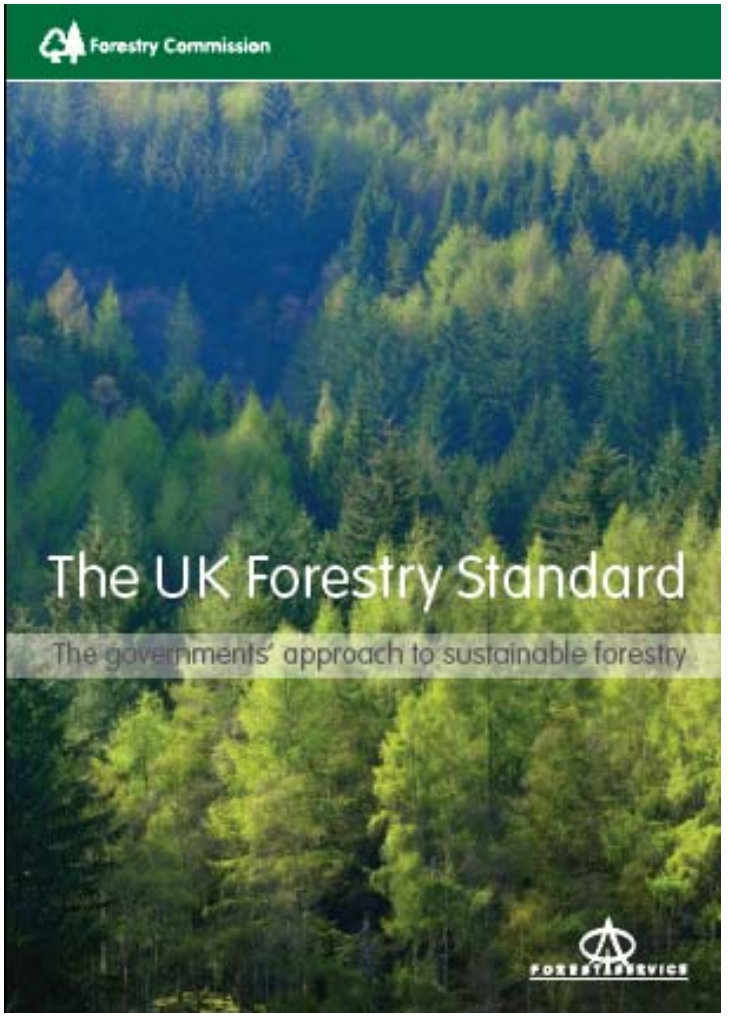
- Legal – “must”
- Good practice – “should”

Guidelines – “avoid”

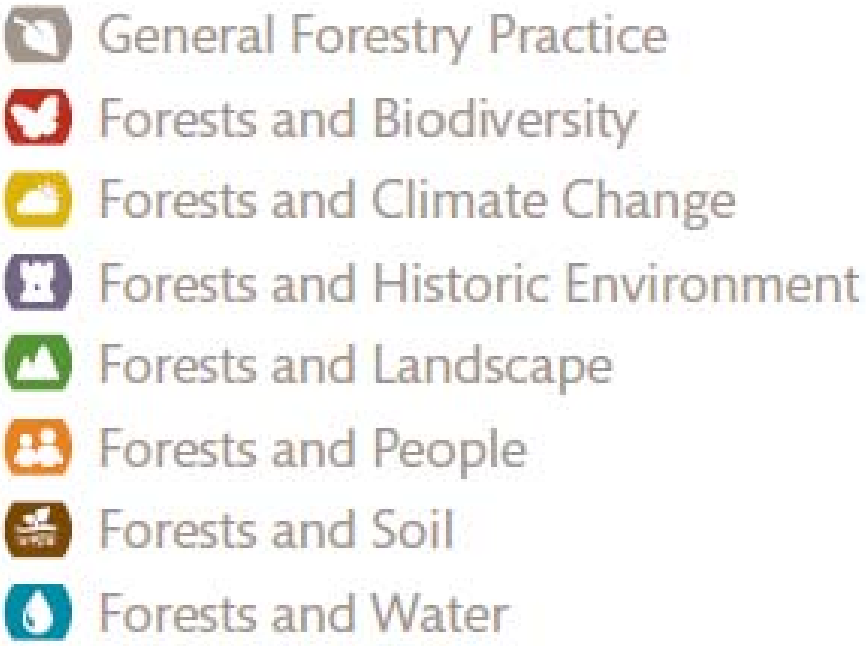
Forest Plans

- Forest Management Plan
- Operations Plan
- Contingency Plans

Public and private woodlands



UKFS – Topics & Adaptation



Adaptation - Forestry Planning:

- Plan for forest resilience using a variety of ages, species and stand structure; consider the risks to the forest from wind, fire, and pest and disease outbreaks
- Fire in Contingency Planning

Forest Plans

Definition:

- The **forest management plan** is the reference document for the monitoring and assessment of forest holdings and forest practice.
- It is also used for communicating proposals and engaging with interested parties.
- The plan itself should be proportionate to the scale, sensitivity and complexity of the Forest Management Unit (FMU).
- Can considers requirements forestry for 70 to 120 years but only provides details plans for approx. 10 years.

Forest Management Plans

FMP Considerations:

- Forestry productivity
- Forest structure
- Silviculture
- Felling and restocking
- Mammal damage
- Pests and diseases
- Use of chemicals
- Fencing
- Forest roads and quarries
- Harvesting operations

FMP Process:

1. Scoping
2. Survey
3. Analysis
4. Synthesis
5. Implementation
6. Monitoring
7. Review

Forest Plans

Definition:

- **Operational plans** can make forest practice more efficient and ensure that important site features are known about and protected in advance.

Definition:

- **Contingency plans** address potential threats to the forest environment [i.e. wildfires] and accidental events, such as spillages, and help prevent or remedy environmental damage.

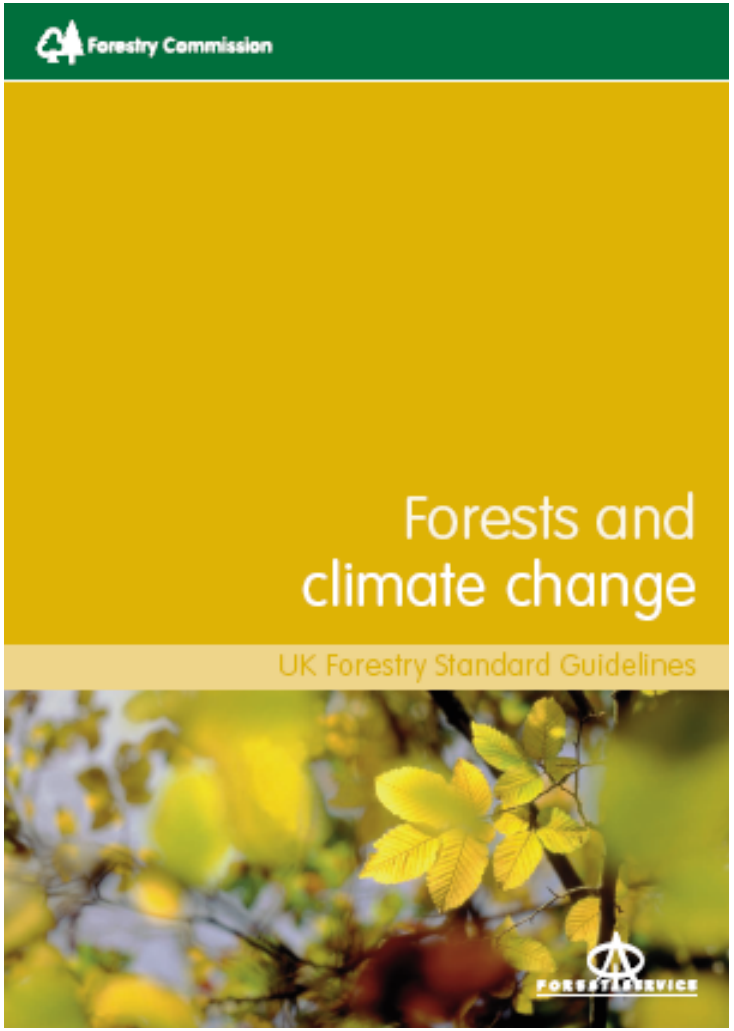
UKFS Guidelines – Climate Change

Mitigation

- Carbon in forest products
- Carbon in soils
- Carbon in forest ecosystems
- Operational carbon footprint

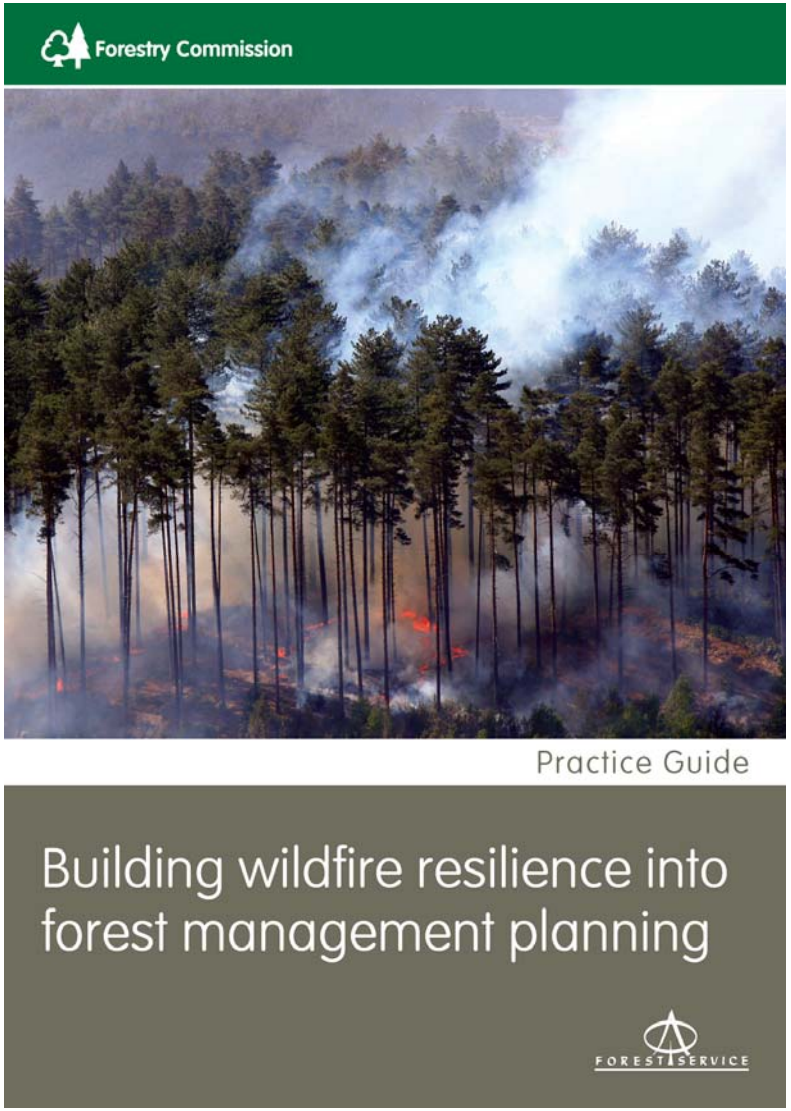
Adaptation

- Tree and species selection
- Forestry Design Planning
- Adaptive Management
- Landscape ecology
- Environmental protection



Practice Guide Contents

- Wildfire in the UK
- Fire behaviour
- The importance of planning
- Forest management plans
- The planning process
  - Scoping
  - Survey
  - Analysis
  - Synthesis
  - Implementation
  - Monitoring
  - Review
- Forest management techniques
  - Managing vegetation and fuels
  - Creating fire breaks and fire belts
  - Improving forest design
  - Building silvicultural resilience
  - Planning for people
  - Planning for an incident response



Guidance objectives

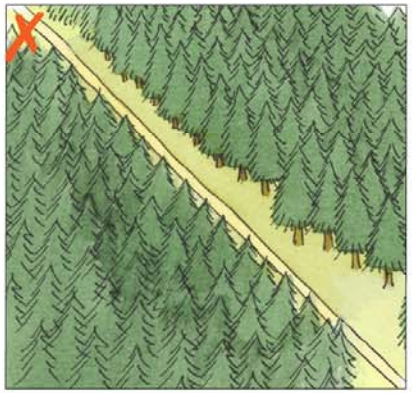
Objectives:

- Proportionate and evidence based
- Research, evidence and professional experience based (national and international)
- Apply to private and public forest estate
- Move from ‘fire breaks’ to ‘whole site and landscape’ prevention measures
- Focus on preparedness and prevention to improve response and recovery
- Apply to both new woodland creation and existing woodlands
- Applies to upland, lowland and Rural / Urban Interface (RUI)

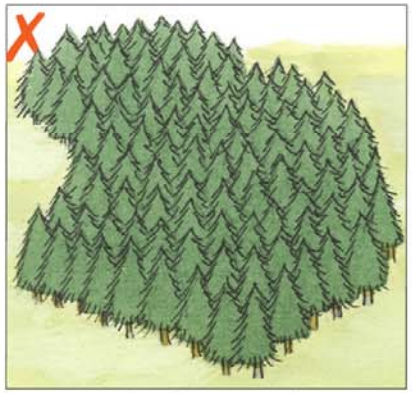
Synthesis - principles of good wildfire design

Figure 10 Principles of good planning for building wildfire resilience in forest design.

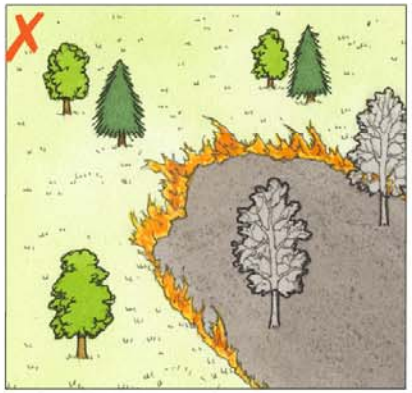
Fire breaks improve wildfire resilience but should not be the only control measure.



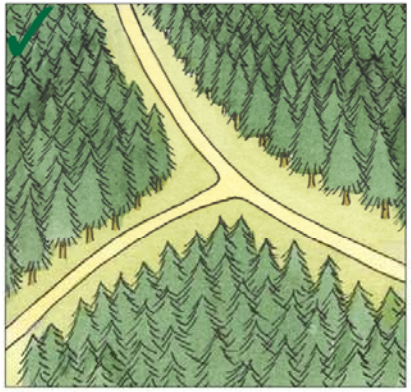
Greater risk of fire spread/crown fires in these stands managed using a single silvicultural system.



Greater risk of fire spread/crown fires in this large, uniform stand with no breaks in tree cover.



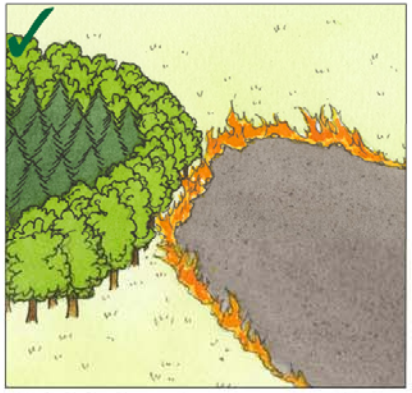
Isolated/scattered trees are more vulnerable to wildfire, especially where is a build up of surface fuel.



Consider managing vegetation to reduce fuel across an entire site, e.g. along the edges of roads and rides.

Use an appropriate mix of silvicultural systems to create a diverse woodland structure.

Fragment high-risk species and habitats into smaller areas to reduce the risk of fire spread.



Maintain trees in groups, such as woodlands or copses, where surface fuels are suppressed.

Land use and vegetation type

Land-use type	High-risk habitats	Low-risk habitats
Forests and woodlands	Young coniferous woodland of pine, spruce or fir. Plantations of eucalyptus/cypress.	Broadleaves, mixed and yew woodlands.
Heathland, moorland and semi-natural grassland	Dwarf shrub heath, gorse, bracken, grasses.	Bogs (unless in drought conditions).
Agriculture and horticulture	Arable crops nearing and immediately after harvest. Grasslands nearing harvest.	Grasslands after harvest.
Agroforestry	Christmas tree plantations.	Short rotation coppice (excluding eucalyptus).
Urban greenspace	Roadside and railway side vegetation (dependent upon season and species).	Gardens in built-up areas.

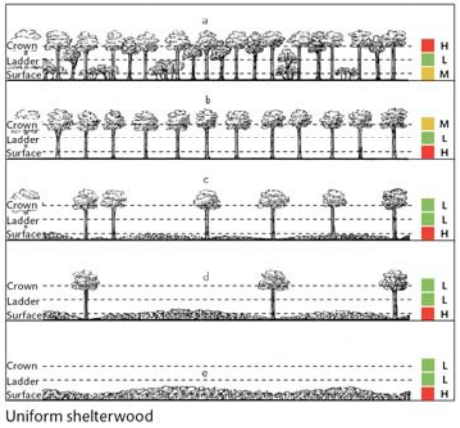
Surface Fire in Forestry

Forestry Commission England

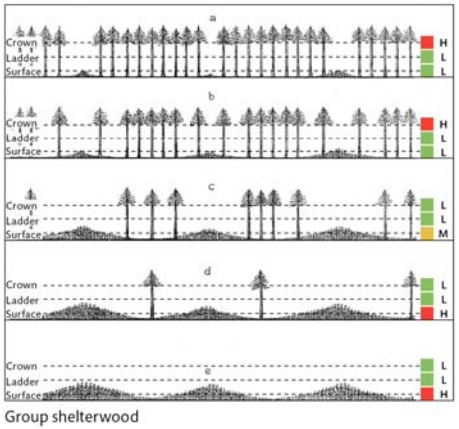
Surface fires in mature plantations

Building silvicultural resilience

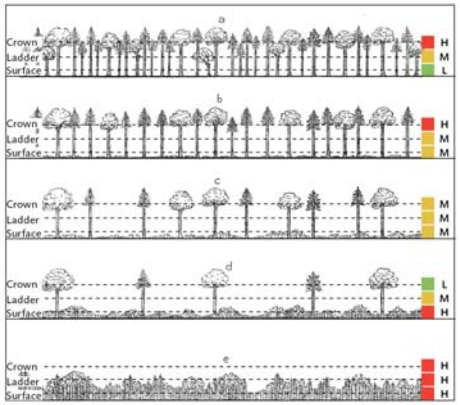
Figure 17 The likelihood of surface, ladder and crown fire in continuous cover systems: green = Low; yellow = Moderate; red = High.



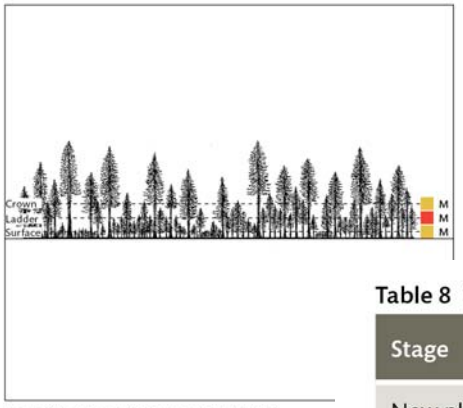
Uniform shelterwood



Group shelterwood



Irregular shelterwood



Selection system (group and single tree)

Covers:

- 5 x Continuous Cover Forestry (CCF) systems
- Clearfell and Restock system

Table 8 Clearfell and restock system showing likelihood of fire.

Stage	Likelihood of surface fire	Likelihood of crown fire	Likelihood of ladder fires
New planting	M	N/A	N/A
Pre-thin	H	H	H
Post-thin	L	L	L
Fell and restock	M	N/A	N/A

Conifer species choice

Tree	Age at highest risk	Stage at highest risk	Notes
Pines	5–20 years	Thicket	If unthinned
Spruces	5–20 years	Thicket	If unthinned. More resistant to ignition in wetter locations
Firs	5–20 years	Thicket	If unthinned. More resistant to ignition in wetter locations
Eucalyptus	All ages	All stages	Do not plant in high-risk areas
Cypress	All ages	Thicket	Avoid planting near property

Survey - Wildfire Risk Assessment

Appendix 1 – Wildfire risk assessment

A wildfire risk assessment is based on evaluation of the likelihood of a wildfire starting and the severity of damage it might cause. It uses the formula:

Wildfire risk = likelihood x severity

Details of the risk assessment should be recorded using the Wildfire risk assessment template (see overleaf) and kept with the forest management plan for reference.

Likelihood of a wildfire starting

Scale	Likelihood	Chance (%)	Description
1	Very unlikely	0–20	Event may occur only in exceptional circumstances
2	Unlikely	21–40	Event could occur at some time
3	Moderate	41–60	Event will occur at some time
4	Likely	61–80	Event could occur in most circumstances
5	Very likely	81–100	Event will occur in most circumstances

Severity of a wildfire

Scale	Severity	Chance (%)	Description
1	Negligible	0.005	Life: Minor local first aid treatment (e.g. minor cuts/abrasions) Property/business: No financial loss or damage. Environment: Minor damage; habitats and species will recover in less a year.
2	Minor	0.05	Life: Injury requiring first aid treatment Property/business: Minor: financial losses (up to 1% of profit), disruption or damage Environment: Minor damage; habitats and species will recover in 1–5 years.
3	Serious	0.5	Life: Medical treatment required. Property/business: Serious: financial losses (up to 5% of profit), disruption or damage Environment: Serious damage; habitats and species will recover in 5–10 years.
4	Major	5	Life: Permanent or life changing injuries. Property/business: Major financial losses (up to 10% of profit), disruption or damage. Environment: Major damage; habitats and species will recover in 10–20 years.
5	Fatalities	50	Life: Single or multiple deaths Property/business: Destruction of the property (total loss) or business. Environment: Irreversible impact on habitats or species.

Calculate the wildfire risk and assess whether the risk is Low, Moderate, High or Unacceptable by using the matrix below. A Moderate, High and Unacceptable risk rating will require the use of control measures to reduce the risk rating to Low.

Calculating the wildfire risk rating

Severity \ Likelihood	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

1–5	Risk rating 1	Low
6–10	Risk rating 2	Moderate
12–16	Risk rating 3	High
20–25	Risk rating 4	Unacceptable

GRID TEMPLATE 37

Wildfire risk assessment template with worked example

Forest/woodland name: Monk's Heath Wood Location: Thetford, SE England

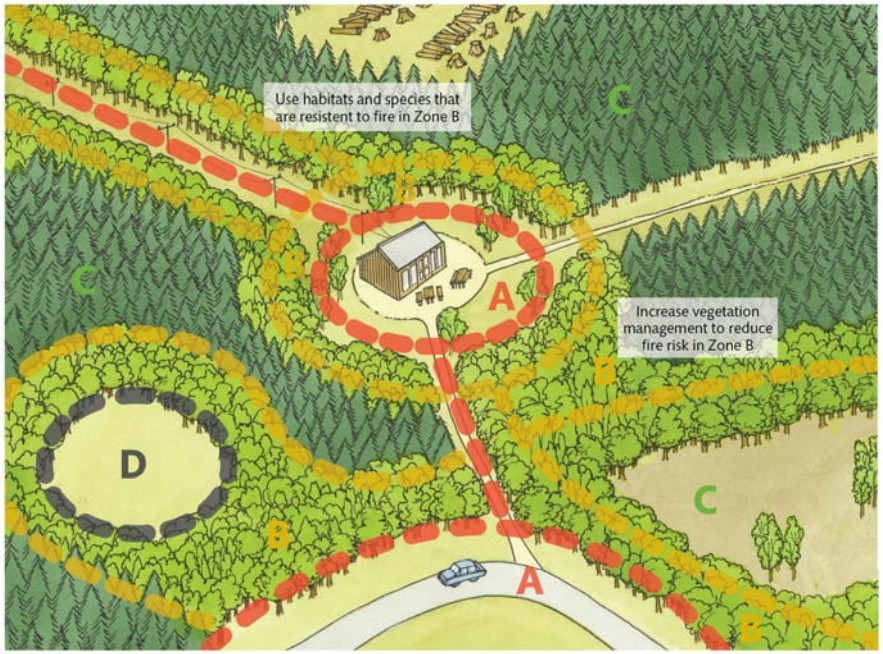
What are the fire hazards?	Who/what might be harmed?	Existing control measures	Initial risk rating L	Initial risk rating S	Initial risk rating R	Additional control measures	Revised risk rating L	Revised risk rating S	Revised risk rating R
Fire spread from lowland heath SSSI next to Monk's Wood	General public Fire fighters	First thinning at year 20	4	4	16 H	Implement fire belts around high-risk sub compartments	3	3	9 M

Completed by: R Gazzard Date of assessment: 1/10/2013 Review date: 1/10/2023

Survey - Wildfire Management Zones

Zone A is the asset zone, where health and safety and important assets and infrastructure must be protected from wildfire. This zone requires a high level of fire prevention such as fuel management. To achieve this Zone A can be broken up into smaller zones with appropriate vegetation management regimes (see diagram overleaf).

Zone B is the buffer zone, where increased fuel management is carried out in areas at a high risk of wildfire to protect Zone A. The aim should be to reduce the rate of spread and intensity of a fire. The width of Zone B should be proportionate to the level of risk and the potential impact of radiant heat, smoke and spot fires on Zone A. In low-risk areas of forest it may be as narrow as a fire belt. In higher-risk landscapes, the width will be increased.



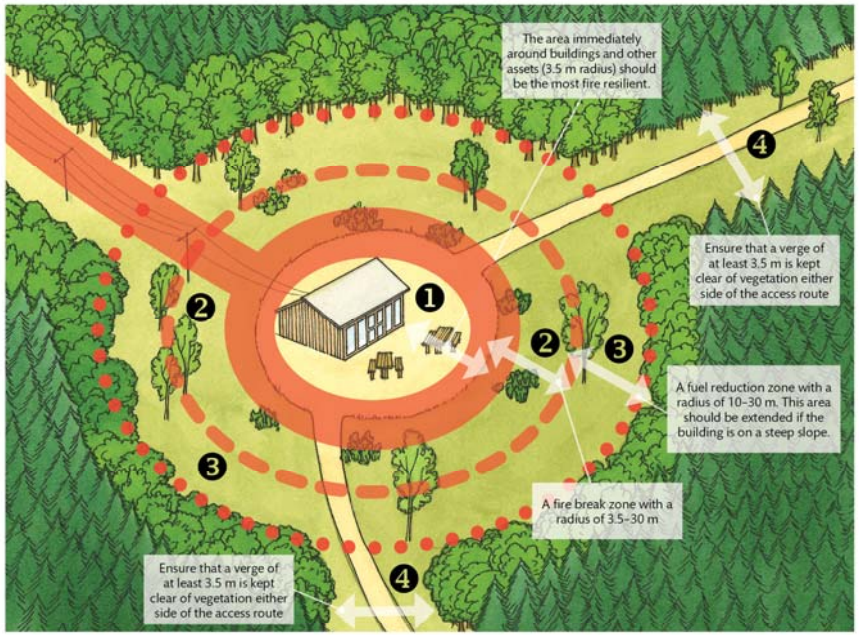
Zone C is an area of low wildfire risk where normal land management activities are carried out. However, it is recommended that wildfire fire prevention measures are considered where Zone C is adjacent to, or could threaten Zone B.

Zone D is a fire exclusion zone, where operations such as prescribed burning or suppression fires should not be permitted as they could damage important ecosystems and habitats such as deep peat, heaths and wetlands.

Landscape scale

❶ Keep vegetation sparse and well irrigated and use fire resistent species. Carry out annual maintenance before the start of the fire season. Do not burn cleared vegetation in this area – cut, chip and remove. Regularly clear the area of deadwood and remove leaves and needles from rooftops and gutterings.

❷ Trees and shrubs in this area should be comprised of fire resistent species and kept at a low density. Larger areas of forest or woodland should be fragmented to increase resilience and trees thinned or pruned to minimise ladder fuels. Areas of grassy open space should be increased and deadwood kept to a minimum.



❸ Larger areas of forest or woodland should be fragmented in this outer area. Plant fire belts of fire-resistent tree species and manage the undergrowth so that it remains suppressed. Bonfires and prescribed burning (with appropriate control measures) take place here outside of the fire season.

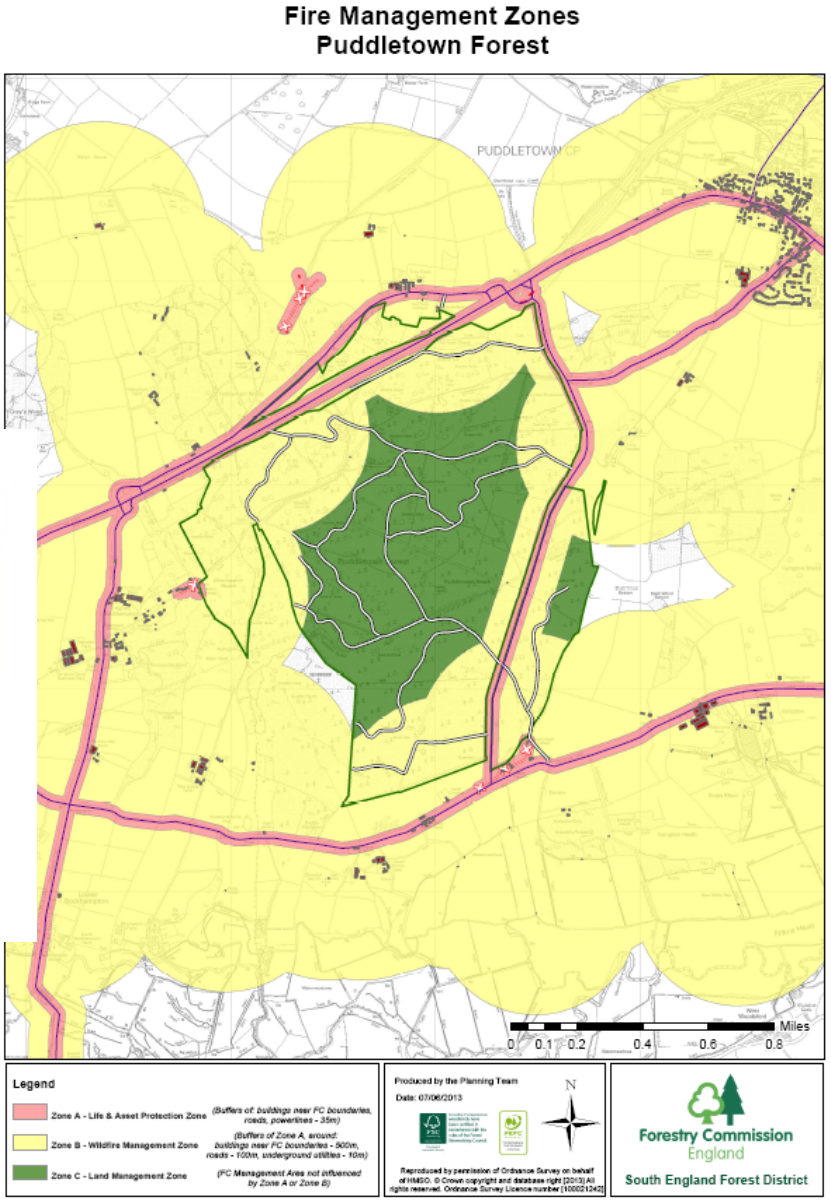
❹ Trees and shrubs should be kept at low volumes along access routes and all vegetation should be composed of fire resistent species. All ladder fuels should be removed. Ensure that trees and other vegetation does not grow too large and close in across the zone.

Assets

Survey - Wildfire Management Zones

Table 3 Wildfire management zones.

Zone	Name	Purpose
A	Life and asset protection zone	To protect human life and important assets and infrastructure from wildfire
B	Wildfire management zone	To provide a buffer zone around Zone A where the focus is wildfire prevention measures
C	Land management zone	To identify low–medium risk areas where normal land management activities can occur.
D	Fire exclusion zone	To protect vulnerable habitats and species.



WMZ and National Planning Policy Framework

121. Planning policies and decisions should also ensure that:

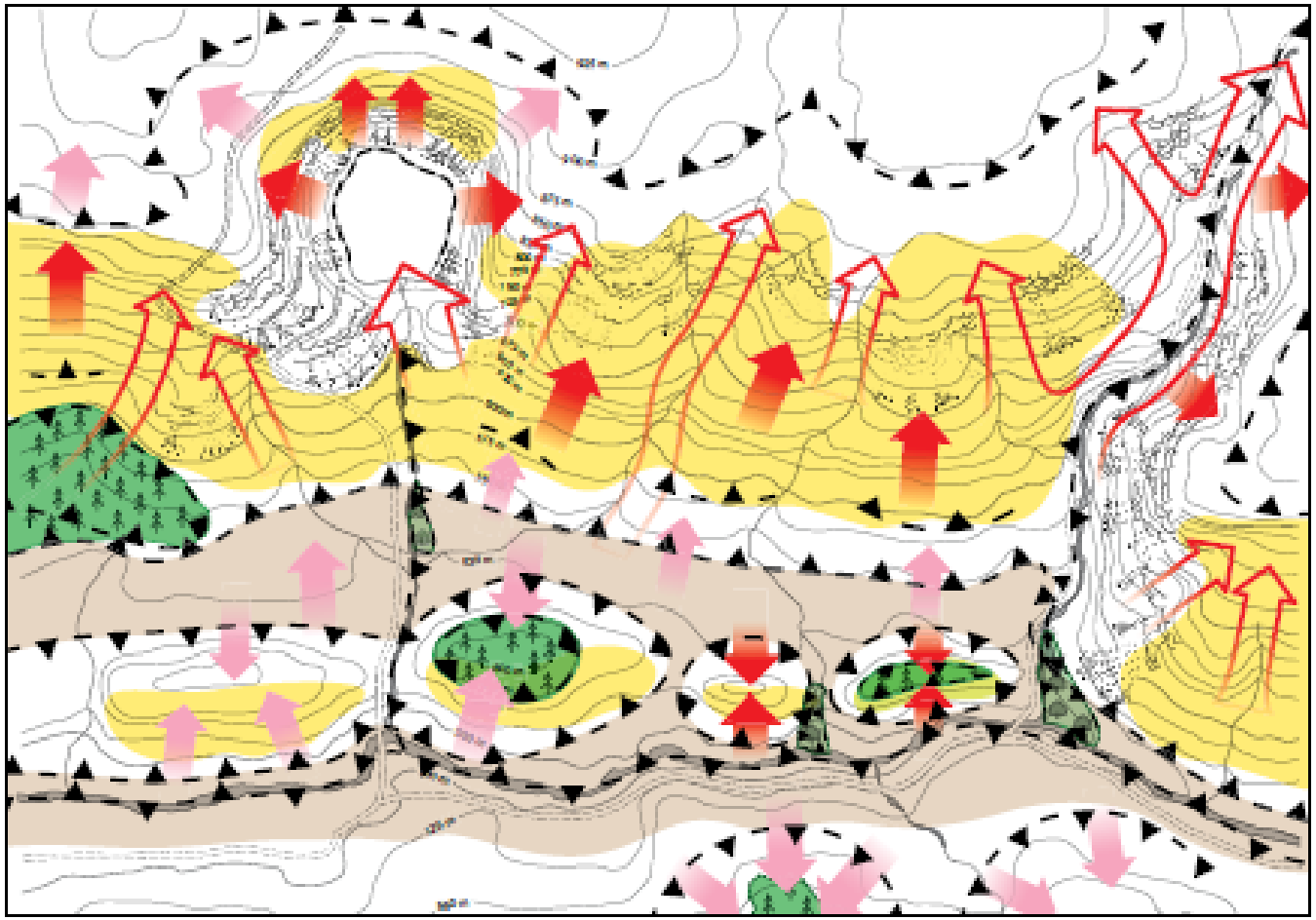
- the site is suitable for its new use taking account of ground conditions and land instability, including from ***natural hazards*** or former activities such as mining, pollution arising from previous uses and any proposals for ***mitigation*** including land remediation or impacts on the natural environment arising from that remediation;

164. Local planning authorities should:

- ***work with local advisors*** and others to ensure that they have and ***take into account the most up-to-date information about higher risk sites*** in their area for malicious threats and ***natural hazards***, including steps that can be taken to ***reduce vulnerability and increase resilience.***

94. 99. 156. Climate change adaptation, mitigation and resilience

Analysis



Key to topography

- Valley/gully
- Slope >10%
- Slope >20%
- South-facing aspect

Key to vegetation/fuel type

- Conifers
- Broadleaves
- Moorland
- Grass/bracken

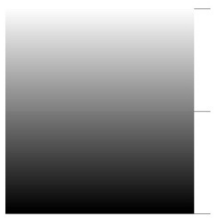
Critical points

- Change in behaviour

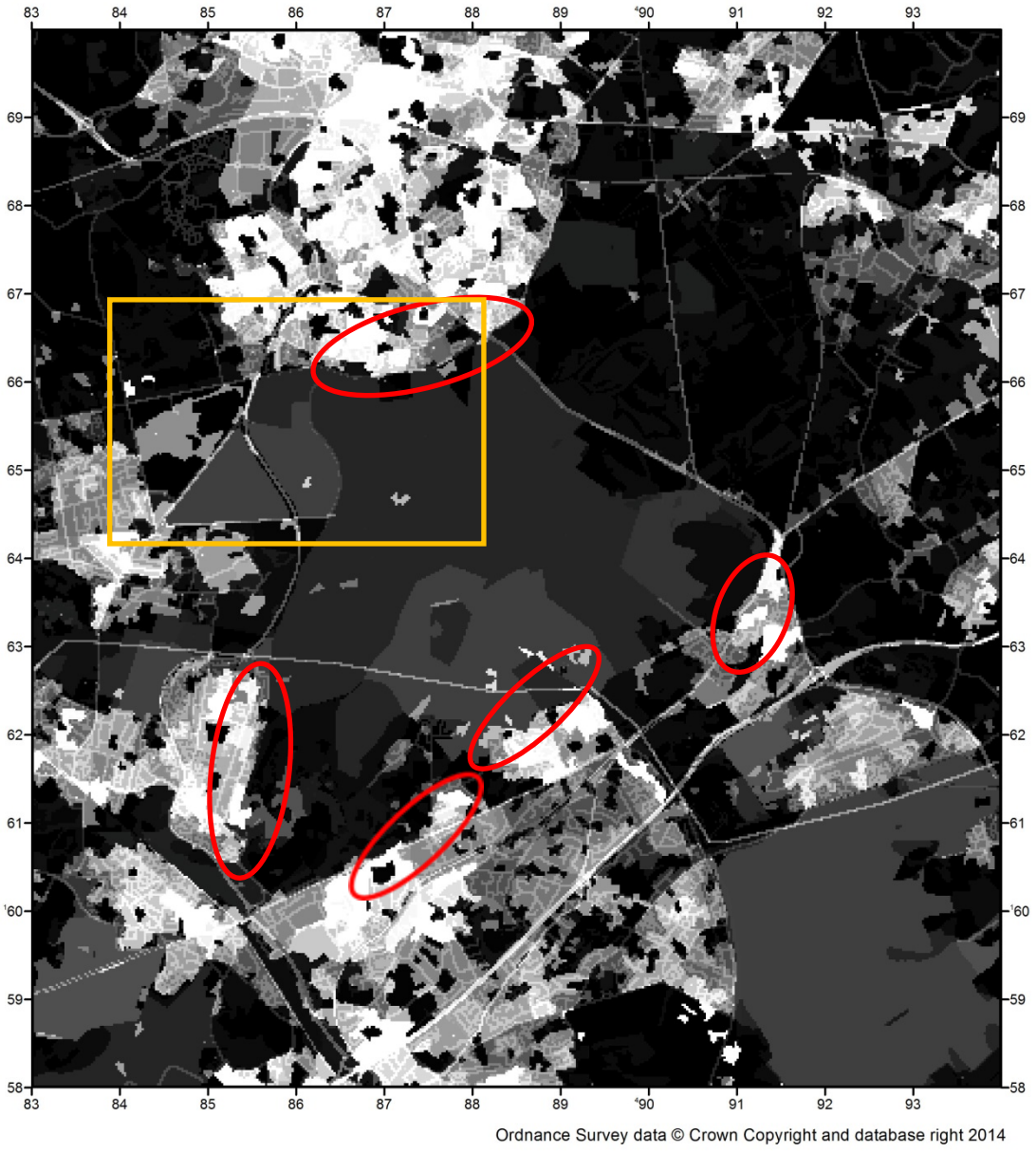
Wildfire Threat Analysis - Values at Risk map to target forest management

Weighted combination of:

5. Health & well-being
3. Property & infrastructure
1. Ecosystems services



Overlay actual or simulated fire perimeter to quantify values at risk….



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Thank you

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