

Building wildfire resilience into Forest Management Planning: Practice Guide

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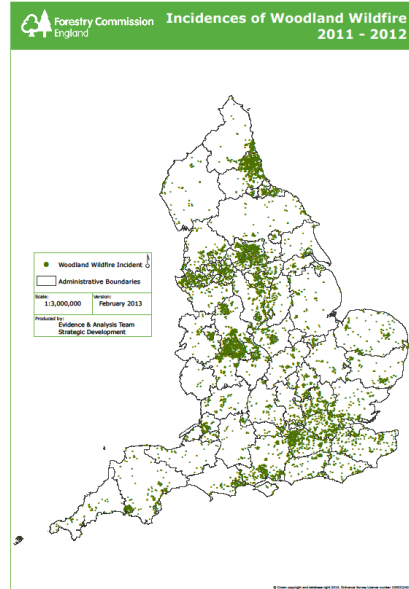
Presentation contents

- Background
- Fit in Forest Management Plans
- Aims and objectives
- FMP process
- Woodland Risk Factors
- Scoping
- Survey – examples of tools
- Analysis – examples of tools
- Synthesis – examples of tool
- Forest management techniques

In FY2011/12 forest fires accounted for: 8.9% of all wildfires or over 7,847 incidents

3.4% of the area burnt or approx. 479 hectares

Number and area burnt of forest fires is set to increase



Practice Guide

Building wildfire resilience into forest management planning





Example themes within Forest Management Plans:

- Timber production (Economic)
- Biodiversity (Environmental)
- Heritage (Cultural)
- Access and Recreation (Social)
- **Wildfire Management Plan**

Wildfire is not just a stand alone theme, it must integrate into all themes to build effective resilience.

Helps inform mitigation and adaptation



Aim:

- Build on the direction provided by UK Forest Standard for adaptation and mitigation
- Uses existing framework for Forest Management Planning guidance
- Integrated 'Forest Management Planning' and 'Contingency Planning'

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)

Process:

1. **Scoping**
2. **Survey of the area**
3. **Analysis of information**
4. **Synthesis**
5. Implementation
6. Monitoring
7. Revision

Use real life example from Dorset to highlight the above



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Woodland Composition

- **Habitat** (i.e. coniferous woodlands or open habitats)
- **Species** (i.e. eucalyptus, pine, spruce and fir as well as heather, gorse, purple moor grass etc.)
- **Age class** (i.e. young and even aged coniferous crops)
- **Silviculture systems** (i.e. certain stages in Clearfell and/or Continuous Cover Forestry)
- **Standing and fallen deadwood** (i.e. inappropriate build up of deadwood in risk areas).
- **Windthrow** (i.e. increasing ladder fuels from the surface to the crown)
- **Management and maintenance** (i.e. lack of or inappropriate management)
- **Tree health** (especially pests and diseases)
- **Design and layout** of woodlands, especially in the landscape

- Setting objectives and priorities (life, property and environment)
- Identifying stakeholders - for consultation from the wildfire sector (Fire and Rescue Service, adjacent landowners, Wildfire Subject Matter Advisers, Wildfire Groups, local community etc.)

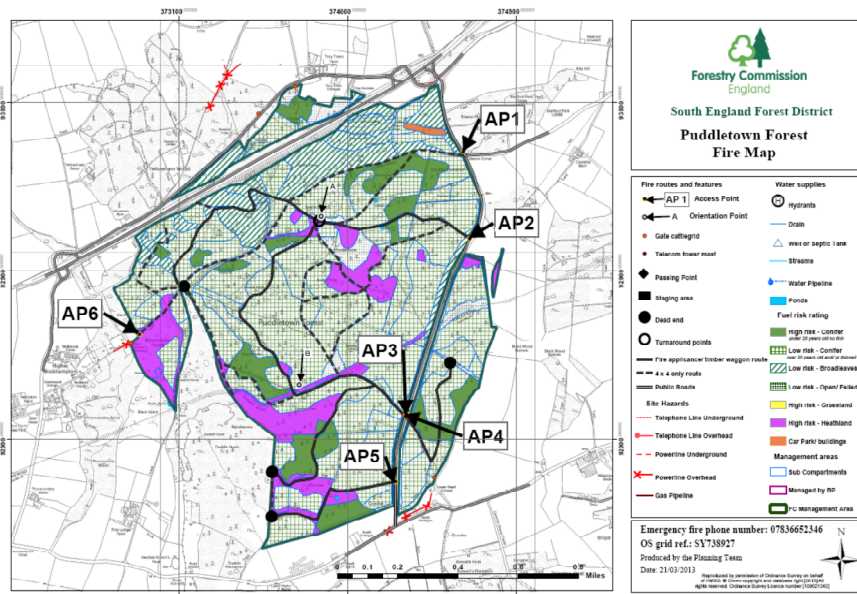
Wildfire Management Plan

Making the link between 'Contingency planning' and 'Forest Management Planning'

- Contingency planning: Anticipate, assess, prepare, prevent, response, recovery

Components:

- Wildfire Risk Assessment
- Fuel Management Zones
- Wildfire Response Plan (Fire Plan and Map)



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 in a given case. It uses the formula:

Wildfire risk = likelihood x severity

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

Likelihood of wildfire starting

Grade	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 wildfire

Grade	Severity	Chance (%)	Description
1	Negligible	0.005	Life: Minor local fire and treatment (eg. minor rick/strawstack) Property/Business: No financial loss or damage Environment: Minor damage. Habitat 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 profits), disruption or damage Environment: Minor damage. Habitat 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 profits), disruption or damage Environment: Serious damage. Habitat 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 profits), disruption or damage Environment: Major damage. Habitat and species will recover in 10-20 years
5	Catastrophic	50	Life: Single or multiple deaths Property/Business: Destruction of the property (total loss) or business Environment: Irreversible impact on habitat or species

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

Calculating the wildfire risk rating

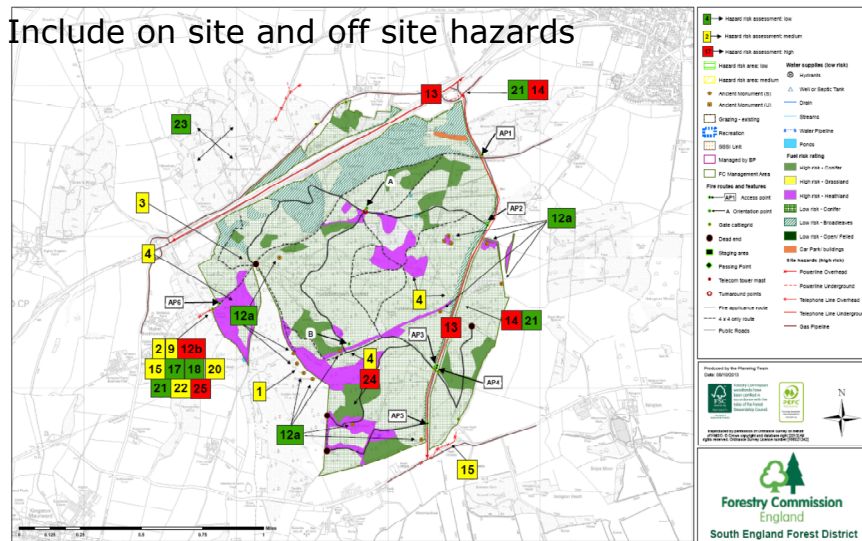
Severity	Likelihood					Risk rating
	1	2	3	4	5	
1	1	2	3	4	5	1-5 Risk rating 1: Low
2	2	4	6	8	10	6-10 Risk rating 2: Moderate
3	3	6	9	12	15	12-16 Risk rating 3: High
4	4	8	12	16	20	20-25 Risk rating 4: Unacceptable
5	5	10	15	20	25	

Wildfire risk assessment template with worked example

Area on the site hazard?	Area on site hazard?	Control measures	Living control measure	Control measure	Additional control measure	Control measure
Yes (spread from boundary/health/road to North's Wood)	Controlled public: Firefighters	First thing at year 20	4	16	Implement 1 by habitat and/or high-risk sub-parameters	5 5 9 M

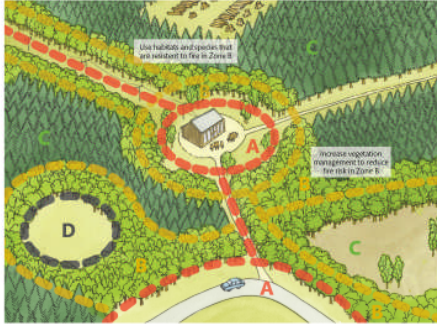
Present Wildfire Risk Assessment Puddletown

Include on site and off site hazards



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 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 risk 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 B may be as narrow as a fire belt. In higher-risk landscapes, the width will be increased.



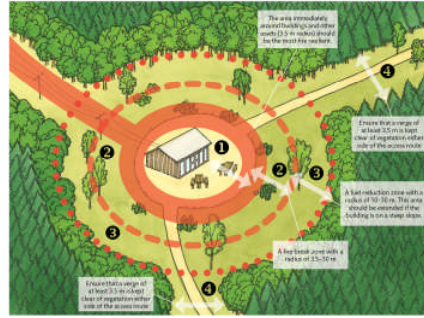
Zone C is an area of low wildfire risk where normal land management activities are carried out. However, it is recommended that wildfire fire prevention measures are considered where Zone C is adjacent to, or could threaten Zone B.

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

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

2 Trees and shrubs in this area should be comprised of fire resistant 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.



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

4 Trees and shrubs should be kept at low volumes along access routes and all vegetation should be comprised of fire resistant 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

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.

Fire Management Zones
Puddletown Forest

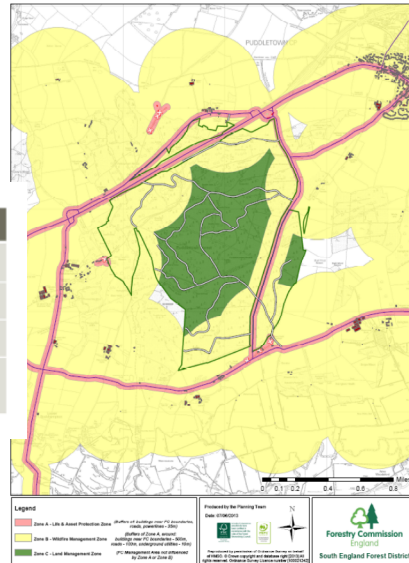


Table 4 Example constraints, opportunities and threats matrix for analysing survey information (see Figure 9 – Monk's Heath Wood).

Factor	Constraint	Opportunity	Threat
Wildfire risk to woodland	<ul style="list-style-type: none"> Adjacent heathland poses a high wildfire risk. Inability to effect management on heathland SSSI. Lack of open ground and structural diversity in woodland. 	<ul style="list-style-type: none"> Develop an integrated wildfire management plan with adjacent landowner. High-prune adjacent conifers. Manage open ground. Retain mature conifers next to heath. 	<ul style="list-style-type: none"> Risk of high-intensity fire spreading from heathland into coniferous woodland. Risk of extreme fire behaviour from large surface fires spreading into canopy.
Health and safety	<ul style="list-style-type: none"> Residential properties and access track surrounded by woodland. 	<ul style="list-style-type: none"> Use Wildfire management zones to prioritise vegetation management and provide an emergency escape. Involve residents/neighbours to aid early detection of fires. 	<ul style="list-style-type: none"> Risk to human life and properties from fire, smoke and heat.
Access for fire and rescue service response	<ul style="list-style-type: none"> Boundary of heathland restricts access by fire and rescue services. Car park security gates also restrict emergency access. 	<ul style="list-style-type: none"> Improve access to boundary of lowland heath SSSI. Provide access to the site using gates with 'quick cutting' padlocks. 	<ul style="list-style-type: none"> Limited effectiveness of initial fire fighting attack.
Access to water	<ul style="list-style-type: none"> Remote location means long distances to hydrants. 	<ul style="list-style-type: none"> Request increase in hydrant pressure. Locate fire ponds/ temporary dams near lowland heath SSSI. 	<ul style="list-style-type: none"> Reduced effectiveness of fire suppression activities resulting in prolonged incident.

Analysis - Spatial representing Constraints, Opportunities & Threats (COT)

Wildfire Constraints & Opportunities Map
Puddletown

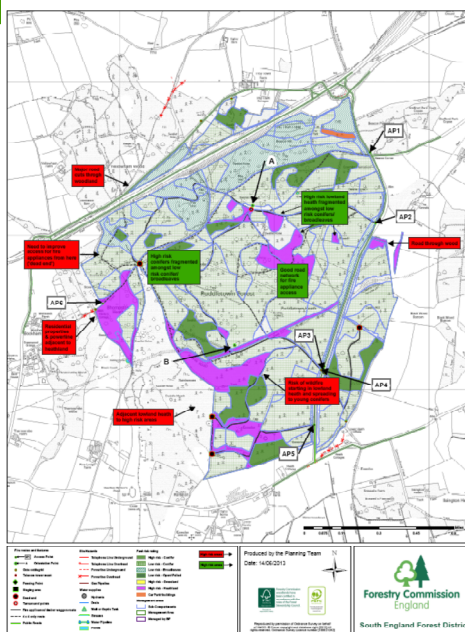


Figure 10 Principles of good planning for building wildfire resilience in forest design.

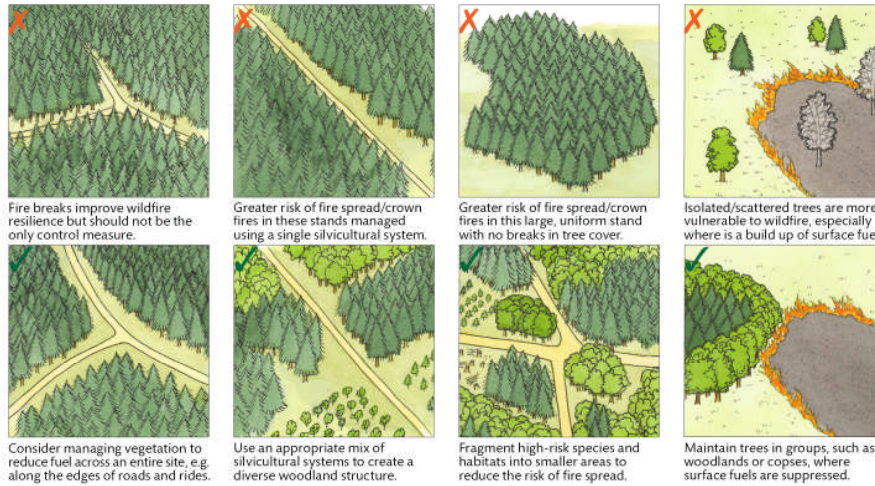
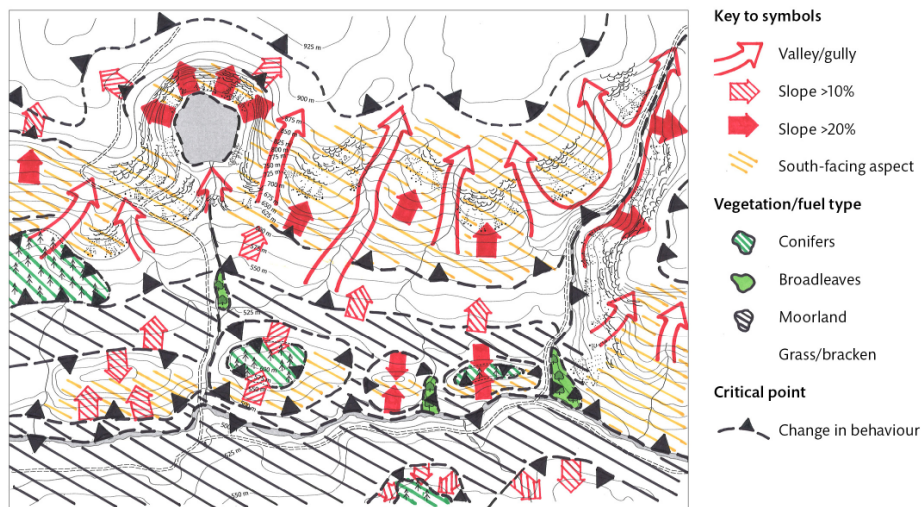


Figure 8 Map showing predicted fire spread and critical points where factors such as topography and fuel loading may trigger a change in fire behaviour.



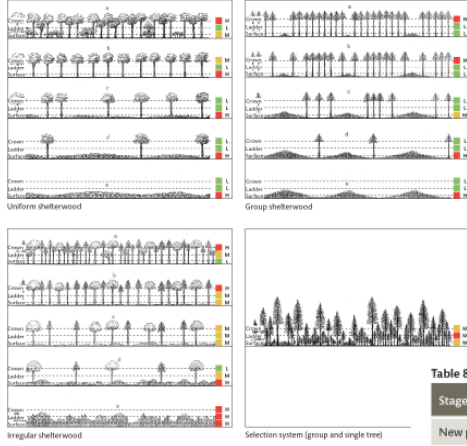
Synthesis – Design Sketch



Using forest management techniques to increase resilience

- Managing vegetation and fuels
- Creating fire and fuel break & fire belts
- Improving forest design
- Building silvicultural resilience
- Planning for people
- Providing access to water sources
- Allowing access for fire fighting

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



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

Figure 22 Planning to facilitate an incident response. All such features should be marked on the Wildfire response plan.

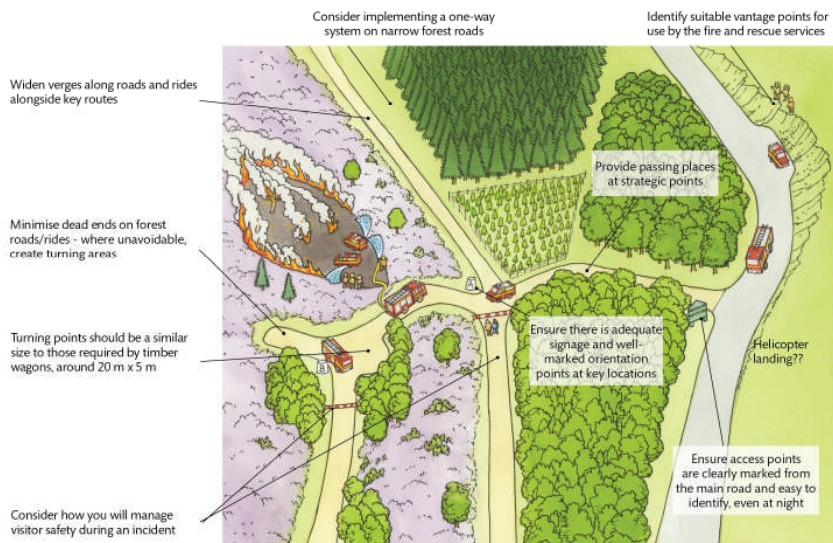
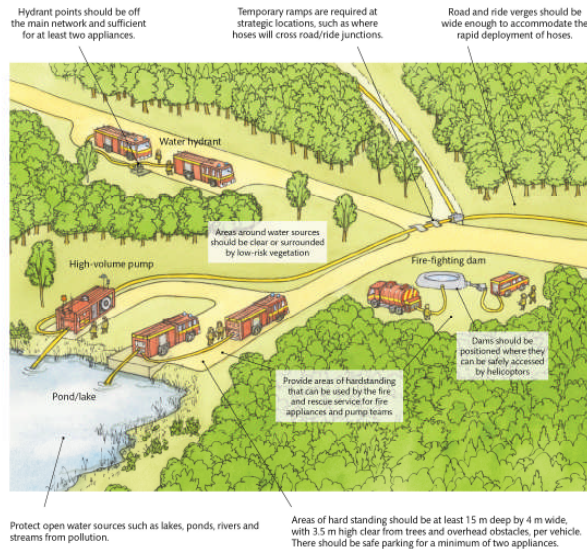


Figure 20 Diagram to show different types of water sources and an 'ideal' water supply layout.



- Forestry Commission England and Scotland
- Natural Resources Wales
- Northern Ireland Forest Service
- Forest Research
- Confederation of Forest Industries (CONFOR)
- Institute of Chartered Foresters
- 'Eurofire Project' and funders Leonardo da Vinci
- Chief Fire Officers Association
- Fire Brigades Union
- England and Wales Wildfire Forum
- National Fire Protection Association (USA)
- Dept of Sustainability and Environment (Australia)
- National Rural Fire Authority (New Zealand)
- Natural England
- Cabinet Office (Civil Contingency's Secretariat)
- Northumberland, Dorset, Surrey and Hampshire FRS

I'll circulate the URL address for the practice guide in a few weeks time using the Wildfire 2013 email list!

Thank you

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