Forest Research

Planning to reduce the future risk of fire in Swinley Forest

Swinley and Crowthorne Forest is in south east England, near Bracknell, Berkshire, south west of London. Swinley Forest includes a mixture of rotational forestry plantation, secondary woodland, lowland heathland, ponds and bare earth habitats. It falls within the Broadmoor to Bagshot Woods and Heaths Site of Special Scientific Interest and Thames Basin Heaths Special Protection Area. It is also located close to major infrastructure and residential areas, which makes it particularly popular for recreation. The forest is owned by The Crown Estate but at the time of the fire was owned and managed by Forestry England.

In 2011, a wildfire in the forest led to a 10-day fire control operation. Fire spread quickly in dry conditions, and in some stands young pine trees acted as 'ladder fuels', enabling a surface fire to move up to the tree crowns and, at one point, jump across the main road. The operation cost the Fire and Rescue Services more than £500 000, with over 50 fire appliances attending at the height of the incident. The fire led to the closure of the Swinley bypass for 10 days, the closure of schools, the evacuation of homes, and damage to the forest, infrastructure, property and conservation areas.

The fire damaged large areas of the forest and reduced the quality of some of the timber stands. Seed trees that had been retained for conifer rotational forestry using clearfelling to support nature conservation efforts were damaged. Several of the environmental benefits provided by the forest, including biodiversity, carbon storage and recreation opportunities, were negatively affected. For example, the forest remained closed to recreation for some time after the fire so that safety checks could be made. Other impacts of the fire included clear-up costs and damage to equipment. Following the fire, the future climate was an important consideration in redesigning aspects of the forest.

Management objectives

Swinley and Crowthorne Forest is important for a number of objectives, including improving biodiversity and providing recreation, as well as increasing carbon storage and ground water supply. Following the fire, an additional management objective was to increase resilience to wildfire without compromising the wider management objectives for the forest.

Find detailed information in UKFS Practice Guide *Adapting forest and woodland management to the changing climate*.

Information on the UK Forestry Standard and supporting guidance is available at www.forestresearch.gov.uk/ukfs

Risks and opportunities

Main climate change risks

The likelihood of wildfires occurring may increase by between 10 and 50% by the 2080s due to projected warmer, drier spring and summer conditions for many areas of the UK, particularly the south and east of England. Wildfire outbreaks are strongly weather-related, so these future changes increase the risk of ignition, spread and severity of wildfires. Risks are higher where there are heavy visitor pressures.

Vulnerabilities

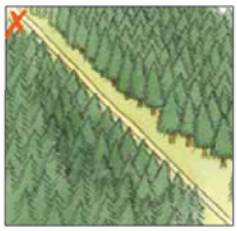
Young coniferous woodland on heathland (and moorland) is particularly vulnerable to fire damage. More frequent and more severe vegetation fires would lead to significant loss of biodiversity in this nationally important habitat. Fires would reduce the benefits of carbon storage in heathland and tree stands, cause loss of timber and damage to soil and seed trees. As well as the fire itself, smoke poses a significant risk to humans due to reduced visibility and an increased risk of traffic accidents and respiratory concerns.

Identifying and selecting measures

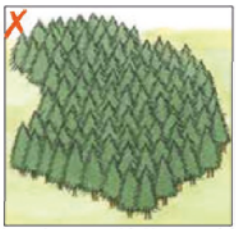
Records suggest there were about 900 small fires in Swinley and Crowthorne Forest during the four-year period up to 2011; the 2011 wildfire is an example of what can happen when one of these small fires takes hold. The incident helped evolve guidance now contained within the Forestry Commission Practice Guide *Building wildfire resilience into forest management planning*, informing the identification and selection of measures to reduce the risk of wildfire damage. The aim was to increase resilience to wildfire without compromising management objectives and the Forest Design Plan was modified accordingly.

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

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



There is greater risk of fire spread/crown fires in stand managed using a single silvicultural system.



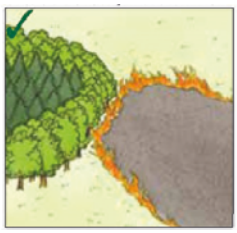
There is greater risk of fire spread/crown fires in large, uniform stands with no breaks in tree cover.

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

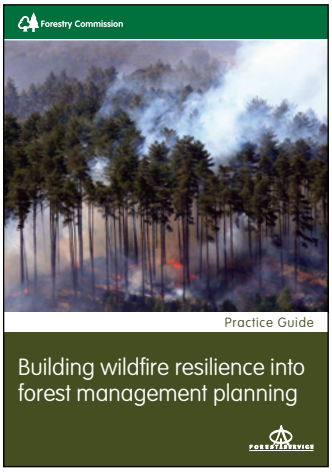
Manage vegetation to reduce fuel across an entire site (e.g. along the edges of roads and rides).

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 woodland or copses, where surface fuels are suppressed.



Forestry Commission Practice Guide *Building wildlife resilience into forest management planning.*

Implementing adaptation measures

Following the fire three key actions were undertaken; adaptation planning, species selection and active management. The site was planned to be more resilient adapting to features such as topology, habitats and high recreation use. Broadleaved and coniferous tree species diversity was significantly increased, including the installation of new fire belts of sweet chestnut, birch and oak to fragment conifers and reduce potential intensity in future fires. Species that can be actively managed were selected so that timber can be harvested on a regular basis to reduce fuel loading and so that, in the event of another incident, fire intensity is reduced. New rides have been created to act as fire breaks, which have additional benefits for wildlife, creating a gradual transition from open space to woodland areas to increase plant diversity and attract butterflies. Planting plans have been adjusted to take into account wind direction and topography, to reduce the risk of any future fires spreading and improve fire suppression opportunities.

In late winter/early spring 2011, a series of new ponds and associated wetland habitats were created in and around the historic drainage infrastructure in collaboration with the then Pond Conservation Trust. It was evident that in certain localities the presence of standing water had affected the advance of the fire. The localised re-wetting of open habitats within the forest landscape mosaic, where standing water can persist well into the summer months, may contribute to the adaptation of our forest systems in respect of the increased occurrence of forest fires (boosting habitat for biodiversity and functioning as a potential firebreak).

Monitoring and assessment

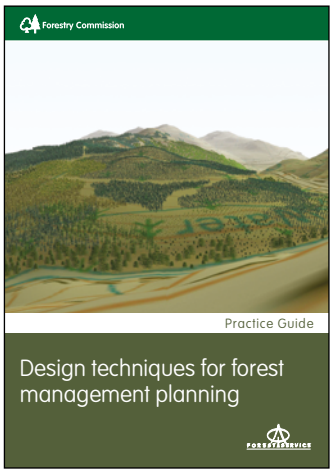
Adaptation and contingency planning for fire will be reviewed each decade as part of the Forest Design Planning Process. A number of collaborative projects are working on understanding wildfire risks and assessing prevention, as well as spreading available knowledge (see 'Knowledge for Wildfire' at **www.kfwf.org.uk**).

Lessons learnt

Numerous lessons were learnt from the Swinley Forest fire and the incident stimulated research into wildfire prevention and adaptation. The results of this research include: the Forestry Commission Practice Guide *Building wildfire resilience into forest management planning* (2014); the Natural Environment Research Council (NERC) PURE funded ***Wildfire Threat Analysis*** (2015), which was undertaken with over ten partners in the local area; and the development of Forestry Commission LANTRA accredited training (Vegetation Fire Foundation, Vegetation Fire Operator, Wildfire Management Plan, and Prescribed Fire Manager) (2021).

Intended future outcomes

As this part of England continues to warm and experience longer, hot and dry spells with less annual rainfall, the risk of fires starting is increasing overall. At Swinley and Crowthorne Forest, when a fire does start it is less likely to spread to large areas because the woodland design has taken wildfire risk into account. The re-established woodland has a reduced frequency of fire damage and has better fire resilience. Well-established contingency plans mean that the response to fire events is swift and effective and impacts on the forest and the local community are lower than they were before adaptation measures were put into place.



Forestry Commission Practice Guide *Design techniques for forest management planning*

This case study is one of a number supporting the UKFS Practice Guide on *Adapting forest and woodland management to the changing climate*

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