

Wildfires in Wales

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Information

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Funders and supporters

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Terms used in the report

ASB – Anti-Social Behaviour

FCW- Forestry Commission Wales

FR- Forest Research

FRS- Fire and Rescue Service

LSOA- Lower Super Output Area

MAWWFRS- Mid and West Wales Fire and Rescue Service

PACT- Partnership and Communities Together

RaFT- Rural and Forestry Team

SWFRS – South Wales Fire and Rescue Service

WIMD- Welsh Index of Multiple Deprivation

GIS- Geographic Information Systems (Sciences)

Technical Terms

FDR1 (Primary Fire) – An FDR1 fire is either one in an occupied building, or an outdoor fire that requires the attendance of five or more fire ‘appliances’ (fire engines or other vehicles)

FDR3 (Secondary Fire) – FDR3 fires cover the majority of grassfires. They are outdoor fires, or fires in free standing farm buildings or vehicles that require fewer than five appliances to attend.

District – When used with reference to Forestry Commission Wales this means a management area. There are four districts in Wales. This report focuses on one – Coed y Cymoedd

Executive Summary

The 'Wildfires in Wales' project sought to characterise and understand the problem of wildfires in the South Wales Valleys region and to offer recommendations for appropriate management and policy responses. The project was delivered by Forest Research and funded by the Forestry Commission, South Wales Fire and Rescue Service, and Mid and West Wales Fire and Rescue Service. This Executive Summary outlines the issue, gives an overview of the research findings and sets out the resulting recommendations. A full report is available online at: www.forestry.gov.uk/fr/wildfiresinwales.

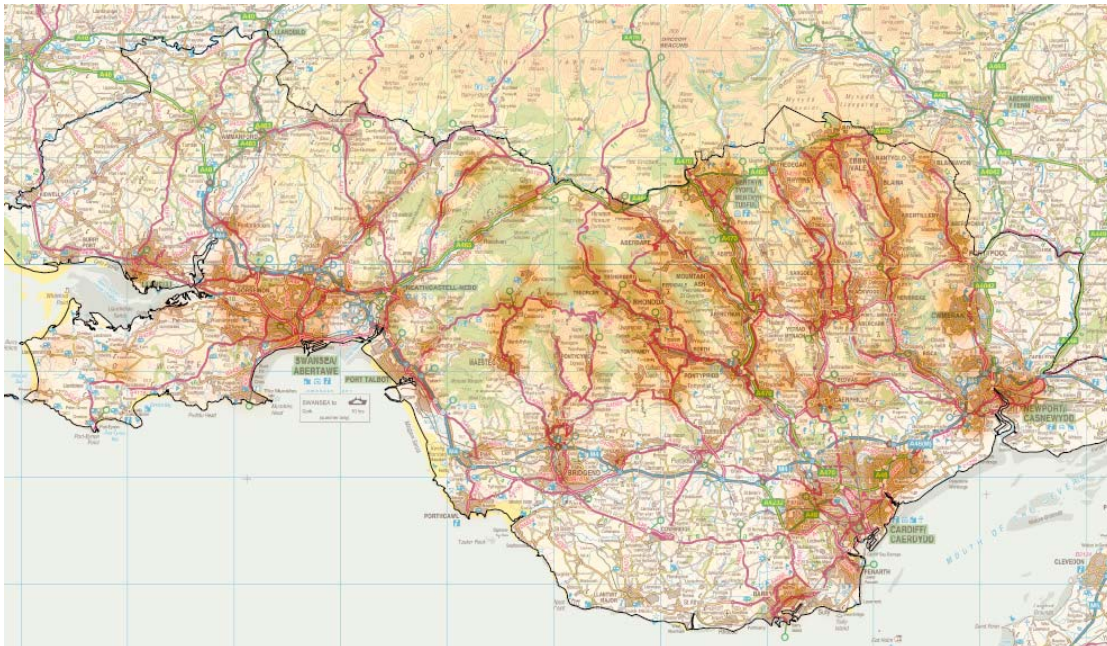
Scope of the problem

Wildfires are a persistent, widespread, costly and dangerous issue in South Wales. Between 2000 and 2008 there were over 55,000 recorded grassfires and nearly 550 forest fires in South Wales; this equates to eight times more per unit area than in the United Kingdom as a whole.

It is estimated that each wildfire costs between £1,000 and £1,950 in Fire and Rescue Service time and resources. South Wales Fire and Rescue Service estimate an annual cost in their service area of around £7m due solely to wildfires. Added to this is the fact that firefighters engaged in extinguishing wildfires are unavailable to respond to other emergency calls, meaning lives are potentially put at risk.

Location – where do wildfires occur?

Year-on-year there are predictable patterns to areas of wildfire occurrence. The map overleaf shows the locations of wildfires that occurred in South Wales between 2000 and 2008, based on data provided by South Wales Fire and Rescue Service and Mid and West Wales Fire and Rescue Service. The darker areas represent higher incidence. Recorded fires include all outdoor fires in vegetation.



Locations of wildfires 2000–2008

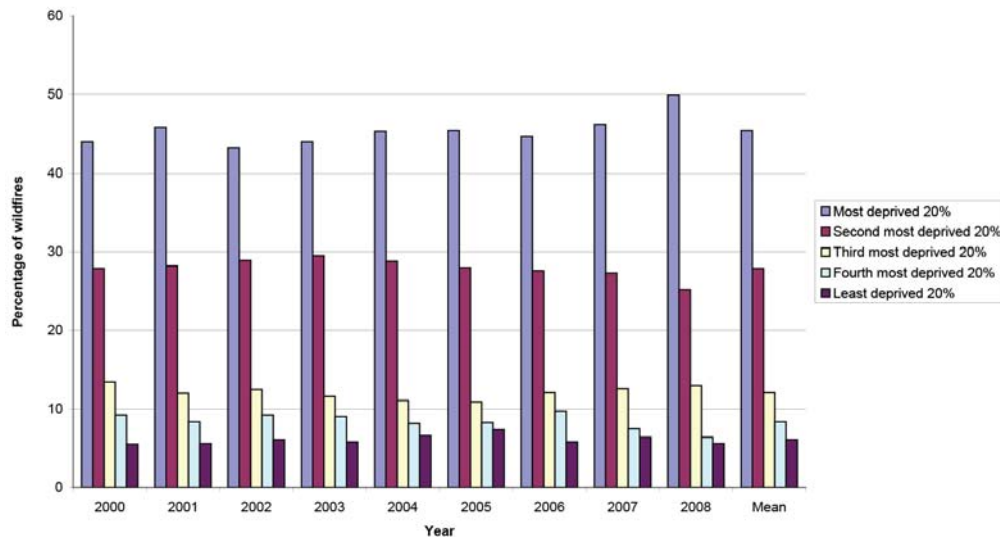
Our research indicates that the areas of South Wales that are particularly prone to wildfire arson are:

- Rhondda Valley, especially:
 - Tonypanddy
 - Treorchy
 - Porth
 - Treherbert
- Afan Valley, especially:
 - Cymer
 - Glyncoirwg
 - Maesteg

The Unitary Authorities most prone to wildfires are (in order of decreasing total number of wildfires between 2000 and 2008):

1. Rhondda Cynon Taff
2. Swansea
3. Caerphilly
4. Neath Port Talbot
5. Bridgend

Wildfires are more likely to occur in the most deprived areas of South Wales, as measured by the Welsh Index of Multiple Deprivation. Patterns of incidence in relation to deprivation indicators are shown below.



Wildfire occurrence by area of deprivation 2000–2008.

Facts

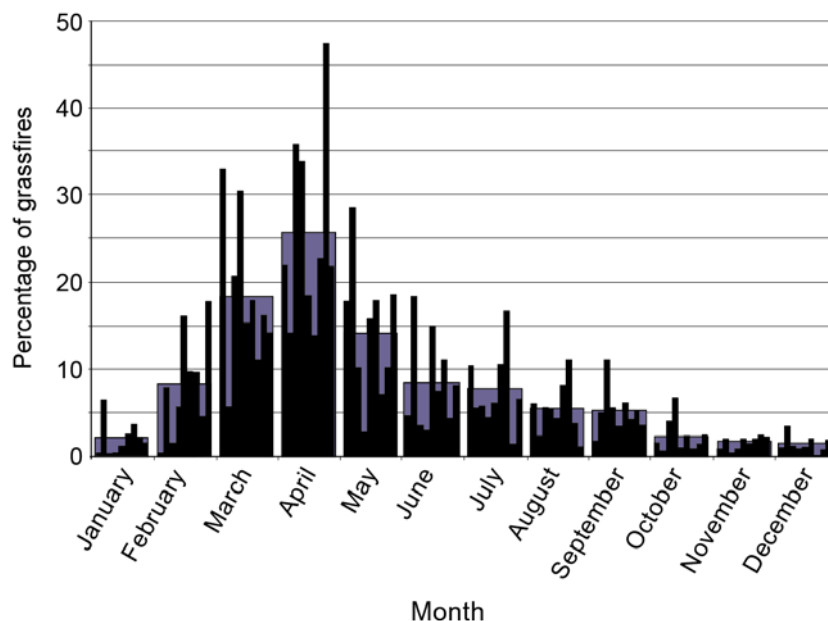
- The 20% most deprived areas in South Wales are nine times more likely to experience wildfires than the 20% least deprived areas.
- Over 90% of grassfires are recorded within 100 m of a road or public right of way (PROW); 99% occur within 500 m of a road or PROW.

Timing – when do wildfires occur?

As well as following a predictable geographic pattern, wildfires also follow a temporal pattern. The majority happen in March, April and, to a lesser extent, May. There is some variation between years, which is a result of external factors, namely rainfall and temperature. The figure overleaf shows the distribution of grassfire incidences throughout the year based on eight years' data. The black bars show yearly variation and the blue bars represent monthly averages.

Facts

- Over 60% of wildfires occur between the hours of 1600 and midnight.
- On average 44% of wildfires occur in March and April.
- 18% of all wildfires occur on Sundays



Incidences of grassfires by month 2000–2008

Perceptions of wildfires

As part of this research, we investigated community and institutional stakeholder perceptions of wildfires. Over 1000 residents of South Wales were surveyed about wildfires and related issues. The survey revealed that there is low public awareness of wildfires in South Wales, with most people not recognising them as posing a problem to themselves or their communities.

All of the stakeholder groups interviewed considered that wildfires are deliberately caused, yet this did not translate into them perceiving wildfires as being an important issue.

Facts

- Only 33% of respondents believe that South Wales has a problem with wildfires.
- Only 18% of respondents believe that wildfires are a problem in their local area.
- 65% of respondents believe that wildfires are deliberately caused.

Who is perceived to be responsible?

Young people are regarded as primarily responsible for committing wildfire arson in South Wales, although in areas to the west of Coed y Cymoedd, stakeholders are more likely to blame farmers or land owners.

Motivations for wildfire arson

There are a variety of motivations for wildfire arson in South Wales and recognition of this is key to finding a solution. As a result of interviews and literature research, we have compiled a list of motivation types. The primary motivations for wildfire arson are that it is carried out:

- as a method of relieving boredom;
- as a result of socio-economic factors;
- as a method of land clearance;
- for fun;
- as part of associated criminality;
- as an act of rebellion;
- due to psychological pressures, i.e. mental health issues;
- with an unclear motive.

Understanding these categories will help inform future mitigation strategies. Firesetting in South Wales appears to be tied to wider socio-economic problems and should be seen as part of broader issues around deprivation and a comparative lack of financial and service investment in the area.

Current strategies to mitigate wildfires

Mitigation strategies currently employed in South Wales take different forms and can be categorised as 'educational' or 'operational'. These strategies can be either proactive (prior to an incident of wildfire arson) or reactive (in response to an incident of wildfire arson). All strategies evaluated as part of this research had both positive and negative outcomes.

There is little strategic planning involved in the majority of attempts to mitigate vegetation fires. However, there are individual examples of good practice that should be taken into consideration before engaging in any new interventions. Our research highlights the need for a coherent and over-arching mitigation strategy that takes into account all aspects of wildfire arson; this could then form the basis for the design of individual projects.

Recommendations

For all key stakeholder organisations

Short term

- Awareness of wildfires among the general public should be increased.
- Partnership working between organisations should be encouraged and adequately resourced.
- Preventative measures should be focused on areas of high incidence rather than as a blanket approach across the region.
- Low-key approaches to tackling wildfires may reduce the thrill factor for some perpetrators.

Long term

- Financial partnerships should be created between landowners and the fire service to share the cost of helicopter provision.
- Community organisations, with support from stakeholder organisations, are well placed to deliver anti-wildfire education and messages.

Forestry Commission Wales

Short term

- Forestry Commission Wales (FCW) should consider different approaches to the management of areas that are prone to wildfires.
- FCW should maintain and increase their partnership working, especially with the Fire and Rescue Services.
- Educational initiatives need to be more focused and integrated into FCW's wider skills and educational programmes, and should undergo monitoring and evaluation.

Long term

- FCW should seek to better integrate their forest management decisions with the desires of local community groups through improved consultation procedures.
- The Forest District planning team should incorporate fire risk into their long-term forest design plans to reduce the risk of fires spreading in a changing climate.

Fire and Rescue Services

Short term

- Helicopters need to be available for firefighting earlier in the year.

- Greater co-operation between the agencies in South and mid and West Wales, especially on the border, will improve the ability of both organisations to fight wildfires in a co-ordinated manner.

Long term

- Working with the Police should be improved, such as during the South Wales Fire and Rescue Service 'Bernie' project (see page 12). Adding the Police's legal backing to mitigation strategies will improve them.

Welsh Assembly Government

Short term

- The Welsh Assembly Government should be kept more fully informed of the problem of wildfires in South Wales.
- Any mitigation strategy that is funded with public money should be properly evaluated. Failure to do so could result in wasted resources and a reduced capacity to learn from experience.

Long term

- All mitigation measures should be integrated into projects and programmes for the wider regeneration of the South Wales region.
- The National Farmers Union and Farmers' Union of Wales should be integrated into research and decision-making regarding wildfire prevention. This should be encouraged by the Welsh Assembly Government.

Research

- There is a need for empirical research into wildfire ignition causes in the UK and Northern Europe to better understand the environmental context in which it is most likely that wildfires will occur.

South Wales Fire and Rescue Service 'Bernie' Reports

This work was carried out in conjunction with a project by South Wales Fire and Rescue Service entitled 'A social marketing project to reduce the incidence of deliberate grass fires in Wales, UK', which aimed to reduce wildfire occurrence in the Valleys town of Tonypany. The project was nicknamed 'Bernie' after the cartoon sheep mascot used as a marketing tool. Progress in the social marketing project was well documented and reports on this work can be found at:

<http://tinyurl.com/6kv5x55>

There are five reports covering all stages of the project:

1. Summary Report of Scoping Phase
2. Summary Report of Development Phase
3. Summary Report of Implementation Phase
4. Evaluation
5. Follow up

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1. Introduction

Why are wildfires such an issue in South Wales?

Between 2000 and 2008 inside the Forestry Commission Wales district *Coed y Cymoedd* there were 527 outdoor fires recorded as forest fires and 55331 that were recorded as grassfires. The South Wales Fire and Rescue Service (SWFRS) suggest that 95% are the result of deliberate actions. This quantity of fires equates to 17 wildfires per km² over the nine years 2000-2008 in South Wales, compared with 2 wildfires per km² in the UK as a whole. South Wales has, on average, 8% of all grass, heath and forestry fires in the UK in an area which is 1.4% of the total land mass of the UK and contains 3% of the UK's population.

The estimated cost of a wildfire to the Fire Service is around £1000 per fire, depending on the pay structure of the organisation, and some estimates place this cost at £1970 per incident (JAG, 2007). SWFRS estimate the total cost of wildfires to the organisation at around £7m per year, with £3.5m of this being spent in Rhondda Cynon Taff Unitary Authority alone. This is public money and is provided to the Fire and Rescue Services in Wales from the Welsh Assembly Government (WAG).

Alongside the financial implications of responding to wildfire incidents there is the additional impact on the Fire and Rescue Services in South Wales in that Fire Fighters attending wildfires cannot be deployed to tackle other emergencies. Wildfire incidents have the potential to cause death, serious injury or loss of property in South Wales either directly (as a result of the fire itself), or indirectly (as a result of reduced capability to respond to other emergencies).

Development of the project

The 'Wildfires in Wales' project was developed in response to a perceived need to understand the issues surrounding the large number of wildfires experienced annually in South Wales. The research phase of this project ran alongside South Wales Fire and Rescue Service's 'social marketing' research and behaviour change campaign, which came to be known as the 'Bernie' Project. The two projects have different focuses, but both aim to contribute to understanding of wildfires in South Wales, to influence a change in policy towards wildfires, and to work towards a reduction in the number of wildfires in the region. Links to the five 'summary' documents that chart the development and progression of the South Wales Fire and Rescue Service Project can be found in the References at the end of this report.

The South Wales Fire and Rescue Service project and this project, while complimentary, have different methods and outputs. The South Wales Fire and Rescue Service project focused on a single area of South Wales – Tonypany (see figure 26) – and was designed as a pilot project to explore new ways of reducing deliberately set wildfires. In contrast, this project had a wider remit, to understand the context in which wildfires occur in South Wales, and to uncover motivations and drivers that lie behind wildfire arson and then to explore evidence-based responses to the issue.

This report focuses on five key research questions developed through dialogue between Forestry Commission Wales and Forest Research. The questions were formulated to cover all aspects of wildfire arson as an issue in South Wales. While the primary partner in the research was Forestry Commission Wales, the report focus is not limited to the one organisation. Analysis includes data from publicly and privately owned forests, woodlands and grasslands. A systematic mapping of fire incidences was carried out, and the relationship between wildfire arson, weather, socio-economics, time and location was carried out. Furthermore a large-scale public survey collected information about the perceptions of wildfire and wildfire arson held by individuals living across South Wales. Other questions covered the identities of those involved with wildfire arson, the motivations that lead people to commit wildfire arson and an analysis of mitigation measures. The key questions were:

1. Where and when do wildfires happen in South Wales?
2. What are the community and institutional stakeholder perceptions of wildfires?
3. Who is perceived to be responsible for committing wildfire arson in South Wales?
4. What are the motivations for wildfire arson in South Wales?
5. What strategies are currently being used to mitigate against wildfires and how successful are they?

This report concludes a two-year study into wildfires and wildfire arson in South Wales. Each chapter is structured around a single research question. Each chapter discusses the findings related to each research question before offering recommendations. The document concludes with a section summing up key findings from the report and bringing together the key recommendations into one place. The document can be read in parts, or as a whole. Footnotes will point readers to additional information on a subject contained within the report.

This project partially fulfils aims set out in the Wales Arson Reduction Strategy (WARS) document (JAG, 2007), namely, the development of knowledge that will help “To reduce the number of grass and forest fires which are deliberately set.” (Ibid., 14), and “To produce a clear picture of the extent to which children and youth are involved in firesetting behaviour” (Ibid., 22).



Figure 1: Coed y Cymoedd Forestry Commission Wales District, FCW Forests highlighted in green

The research focuses on public and private land inside the boundaries of Forestry Commission Wales district *Coed y Cymoedd*. The district encompasses the South Wales valleys and the three major cities of Wales, Cardiff, Newport and Swansea (see figure 1).

Contextualising the South Wales area

Our GIS¹ analysis indicates that 330 of the 380 20% most deprived Lower Super Output Areas in Wales, as indicated by the Welsh Index of Multiple Deprivation, fall within the boundaries of Coed y Cymoedd. This means that 87% of the most deprived areas are in South Wales. The majority of Wales' population lives in the region, and around one million of these people live in the area widely known as the Valleys.

¹ We used ArcGIS, a spatial analysis software package, GIS software allows for the presentation and exploration of geographically defined data.

Rugged hillsides, dense forests and busy towns are tightly packed into steep valleys. The area is largely post industrial, and has high levels of unemployment. The socio-economic problems faced by the population of the Valleys are wide and varied (David et al., 2003).

Terminology

There is some debate about the use of the term 'wildfire' to describe vegetation fires in Wales. However, to keep things simple, throughout the report the term 'wildfire' is used to describe any outdoor vegetation fire, and the terms 'wildfire arson' or 'firesetting' are used to describe the act of deliberately setting fire in vegetated areas.

For some respondents and interviewees the terminology used to refer to vegetation fires was seen as misleading. Rather than associating the term with the vegetation fires that they experienced in their local area the term conjured up images of large conflagrations in the Americas, Mediterranean and Australia.

Researcher: "Have you ever seen a wildfire?"

Respondent 1: "No, they happen in America don't they?"

Respondent 2: "Yeah you have, you saw Baglan mountain"

Respondent 1: "oh, that – yeah I seen that before, you mean that do you?"

- Conversation at 'Disco Inferno', Cwmafan

When discussing wildfire arson with external stakeholders the Fire and Rescue Services and Forestry Commission Wales should be clear about what they are talking about so as to avoid confusion of their messages.

2. Methods

The research utilised a number of social scientific and geographical research techniques, including:

- A review of published and grey literature
- GIS analysis of wildfire locations
- A large-scale questionnaire delivered by telephone (1025 respondents)
- Observations at events
- Interviews and informal discussions with:
 - Young people (Cwmafan, Aberdare, Tonypandy), including:
 - Firesetters
 - Non-firesetters
 - Police Officers (Merthyr Tydfil, FCW, Arson Reduction Teams)
 - Forestry Commission Wales Employees (Coed y Cymoedd, Coed y Mynydd, Llanymddyfri)
 - Fire and Rescue Service Employees, including
 - Arson Reduction Teams (MAW, SW, NW)
 - Community Safety Teams (MAW, SW)
 - Station Crew Members (Cardiff, Tonypandy, Treorchy and Aberdare)
 - Staff at Head Quarters (MAW, SW)
 - Information Officers (MAW, SW)
 - Community Members (PACT meetings, Community Centres and Communities First locations)
 - Academics (Pontypridd, Swansea)
 - Questionnaires to Forestry Commission Wales staff across Wales
- Questionnaires given to young people
- Action Research

In the course of this research there was an emphasis on opinions and information held by young people and other community members. The aim was to give a voice to people who have knowledge and experience of wildfires, but who may not normally be consulted by institutional stakeholder groups.

Interviewing young people

Interviewing young people about an issue such as wildfires is not entirely straight forward. Maintaining the interest of a group of people who do not always want to engage with the researcher or the subject means that traditional interviews and questionnaires are not always the best methods to use. Interviews with young people happened in loud public halls, on the street, at youth clubs, in the forest and anywhere that allowed the opportunity for discussions to arise.

More structured interviews with young people were possible when attending Phoenix Courses at Port Talbot Fire Station. At these events the researcher was given between 15 minutes and one hour with a group of six to eight children. The ages spread from 11 to 17. Thirty-nine young people were given questionnaires and interviewed as groups in these sessions. In half the events only the young people and researcher were present in the room. In the others the researcher and either a member of the community safety team or a youth worker were present.

Notes on data usage

Data used in this report came from a number of sources. Data on fire locations were provided by Mid and West Wales Fire and Rescue Service and South Wales Fire and Rescue Service. Welsh Index of Multiple Deprivation data are from 2004 and were collected on behalf of the Welsh Assembly Government. GIS analysis was carried out on spatial data using ArcGIS software and Hawth's Tools analysis add-on.

Operational crews are responsible for recording the location and time of wildfire incidents using on-board devices. This means that the location that is recorded, and the location that the fire occurred may be slightly different. Our analysis takes this into consideration.

The researcher, Matthew Jollands of Forest Research, collected all interview data during fieldwork encounters. Observations and research reflections were made by the researcher in collaboration with partners in other agencies.

We also present results of a telephone questionnaire, conducted by Beaufort Research on behalf of Forestry Commission Wales and the project funders at the end of 2009. There were 1025 respondents to the questionnaire. The survey covered a representative sample of people living within the boundaries of Coed y Cymoedd, and in immediately adjacent postcode areas². All data were stored securely by Forestry Commission Wales.

Quotes from interviews have been attributed to the interviewees, except when respondents requested to be anonymous. Some quotes are not attributed specifically to individuals. It was decided that appropriate anonymity would be granted to respondents in order to encourage frank and truthful responses.

Quotes from firesetters are attributed to the area in which the individuals live, and their gender. Respondents who admitted firesetting were uncomfortable being identified and it was felt that more reliable responses would be received with condition of anonymity.

² For a full summary of statistics please see accompanying data provided by Beaufort Research.

3. Where and when do fires happen?

Observing patterns in the location and timing of grass and forestry fires can help build up a picture of possible causes. Critically, the timing and location of fires can be compared with a number of social and environmental variables, such as patterns in weather and the location of settlements. As such, asking when and where fires happen is a key research question for this project. It is also a key question for stakeholders. Fire and Rescue Services, for example, are keen to establish if patterns exist as this enables them to plan and resource prevention services and interventions appropriately and efficiently.

This section analyses statistical data relating to fire incidences derived from two Fire and Rescue Services (FRS) that operate within Coed y Cymoedd. Data concerning fire locations were derived from incidents mapped by the FRS between the years 2000 and 2008³.

Data include all records of 'FDR3' and 'FDR1' fires that occur in vegetation⁴. Other fires, including free-standing buildings, bins and vehicles, which are recorded as FDR3, were removed from the sample.

Each fire incident is given a single 'point' on the map. This point contains co-ordinates for the incident, in some cases it includes the perceived 'cause' of the fire ('Accidental' or 'Non-Accidental'), the severity of the fire (FDR1 or FDR3) and a brief description of what was burnt (i.e. 'Crops', 'Forestry', 'Gorse', etc.). The time and date of fire is also recorded.

The spatial unit used in this research to analyse occurrences of wildfires is the Lower Super Output Area (LSOA). We have included wildfires that occur outside the boundaries of Coed y Cymoedd but which occur within an LSOA that intersects with the Forest District boundary. Note that *all* recorded grassfires are included in this analysis. This includes small fires in parks, verges and other vegetated environments, including parks in the major cities inside Coed y Cymoedd (Cardiff, Newport and Swansea).

Locations of fires in the 'raw' data may be slightly inaccurate. This is as a result of recording techniques during the gathering of data. Fire location data for outdoor fires are currently recorded on a GPS device on board the fire engine. The location 'point' that is

³ Advice from the fire service suggested that earlier data are not available at a high enough standard, due to differences in the recording techniques used, and later data are not directly comparable due to changes in recording categories and methods.

⁴ The terms FDR1 and FDR3 are explained in the introduction. FDR3 fires are smaller fires which fewer than five fire engines attend, while FDR1 fires are larger, requiring more than five fire engines. FDR1 fires are largely forest fires or large-scale grass fires, FDR3 fires, in this case, are smaller grass fires. These terms have now been replaced by 'primary fires' and 'secondary fires'.

created marks the location of the fire engine, rather than the fire location. The analysis we carry out is of the recorded location of vegetation fires. If a fire engine is parked at the side of a road, but the fire is on adjoining grassland the recorded location is likely to be where the fire engine was parked, as opposed to the exact fire location. Furthermore, the extent of each fire is not recorded, so the data analysed are of the numbers of incidents, rather than the size of fires.

Location of fires

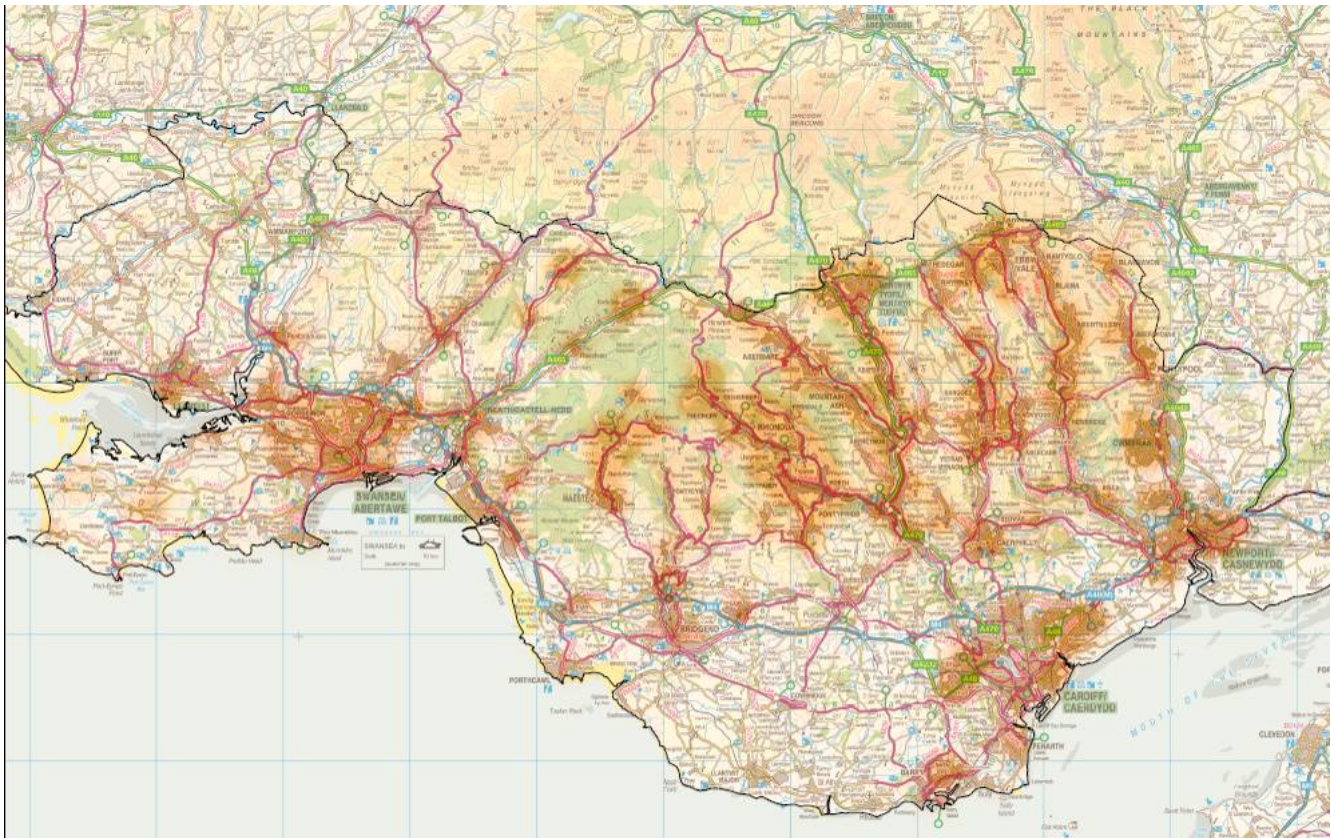


Figure 2: Location of all wildfires in Coed y Cymoedd 2000-2008 based on Kernel Density Estimations (KDEs)⁵

⁵ Kernel Density Estimation (KDE) is a non-parametric test which 'smoothes' irregular data points, removing 'noise' from the data and creating a visualisation of density of point occurrences.

Location of fires

Analysis of FRS fire location data from 2000 to 2008 shows that fires often occur in the same, or similar areas each year. Kernel Density Estimations (KDEs) year on year display a similarity both to each other and to total fires between 2000 and 2008 (Figures 2 & 3). This analysis of fire location is entirely new to South Wales - until now there has been no systematic analysis of the locations of recorded fires across South Wales. The analysis, combined with other data included in this report, should allow improved targeting of mitigation strategies on communities most at risk from wildfires. Stakeholder groups can also use the information on spatial patterns in fire locations to direct the provision of both proactive and reactive mitigation strategies (see chapter 7).

Location of fires

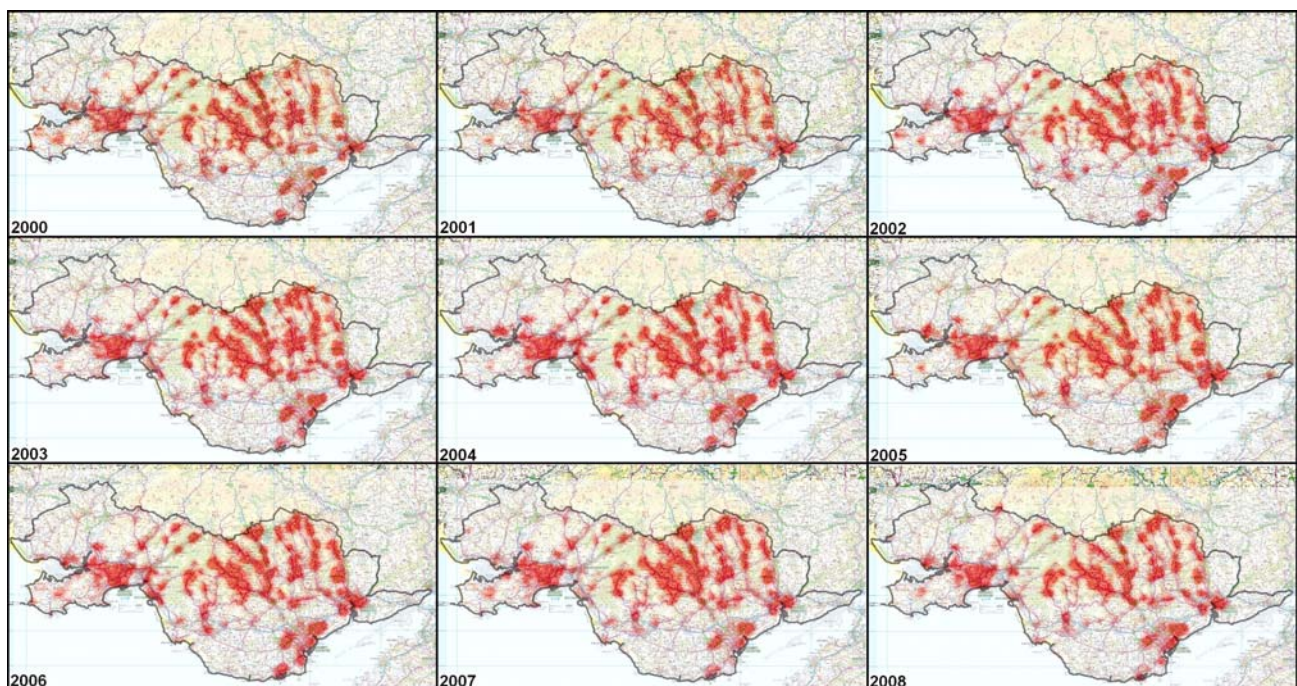


Figure 3: Yearly variation of fire locations 2000-2008, using KDE

Time of fires

The analysis of Fire Service data also reveals temporal patterns in vegetation fires. Data show that between January 1st 2000 and December 31st 2008 there were 55,331 grassfires and 527 forestry fires inside the boundaries of Coed y Cymoedd. There is some variation in the proportion of fires that occur on each day of the week. Figure 4 shows that 17% of wildfires occur on Sundays, whilst only 11% are recorded on Fridays.

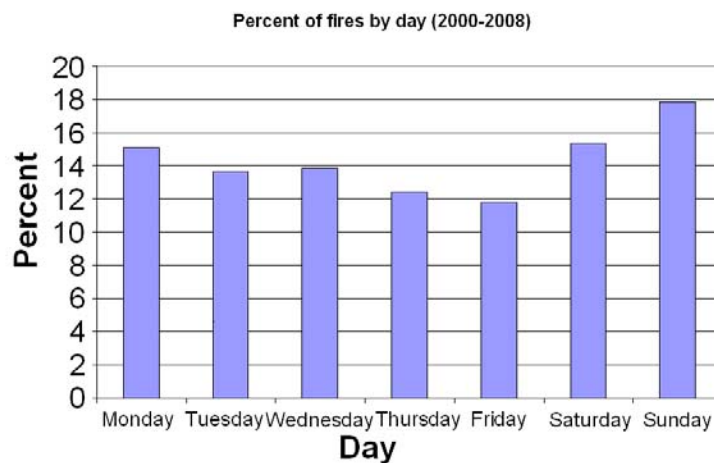


Figure 4: Daily distribution of fires

However the daily distribution of fires varies depending on the month. During summer periods a higher relative percentage of fires occurs mid-week. See figure 5, which shows percentage of total wildfires between 2000 and 2008, by day, divided by month.



Figure 5: Daily distribution of Fires (Percent of week) each month

These data also allow the analysis of patterns in the exact time at which fires are recorded. As figure 6 shows, incidences of fires build steadily throughout the day. Fires on weekdays build faster, and peak slightly later⁶, while fires at the weekend are

⁶ The peak for recorded wildfires is, on weekdays (Monday to Thursday) 1800, while at weekends (Friday to Sunday) the peak is slightly earlier, falling around 1700.

distributed over a longer timeframe. The data also demonstrate that throughout the summer months (April to August) the percentage of fires recorded later in the evenings increases, suggesting that fires start outside work and school hours. These results suggest a link between the timing of fires and the daily routines of firesetters.

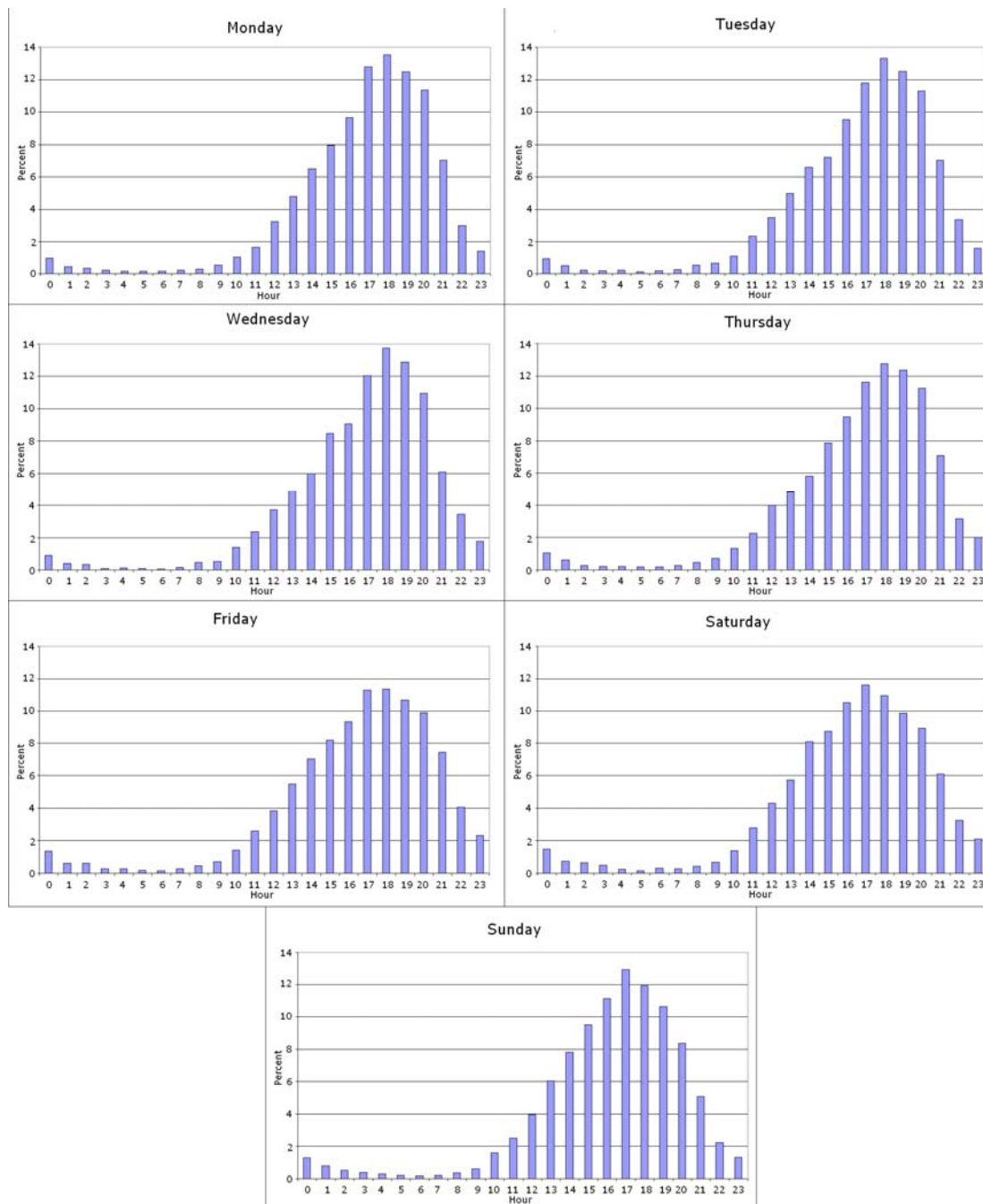


Figure 6: Hourly variation in incidences of wildfire by month

Fire Seasons

There are seasonal patterns to occurrence of wildfires. Throughout South Wales, a peak in fires is experienced between March and May (see figure 7). However, there is some variation year on year. The graph below shows that some years produce small peaks in fire occurrence throughout the summer months.

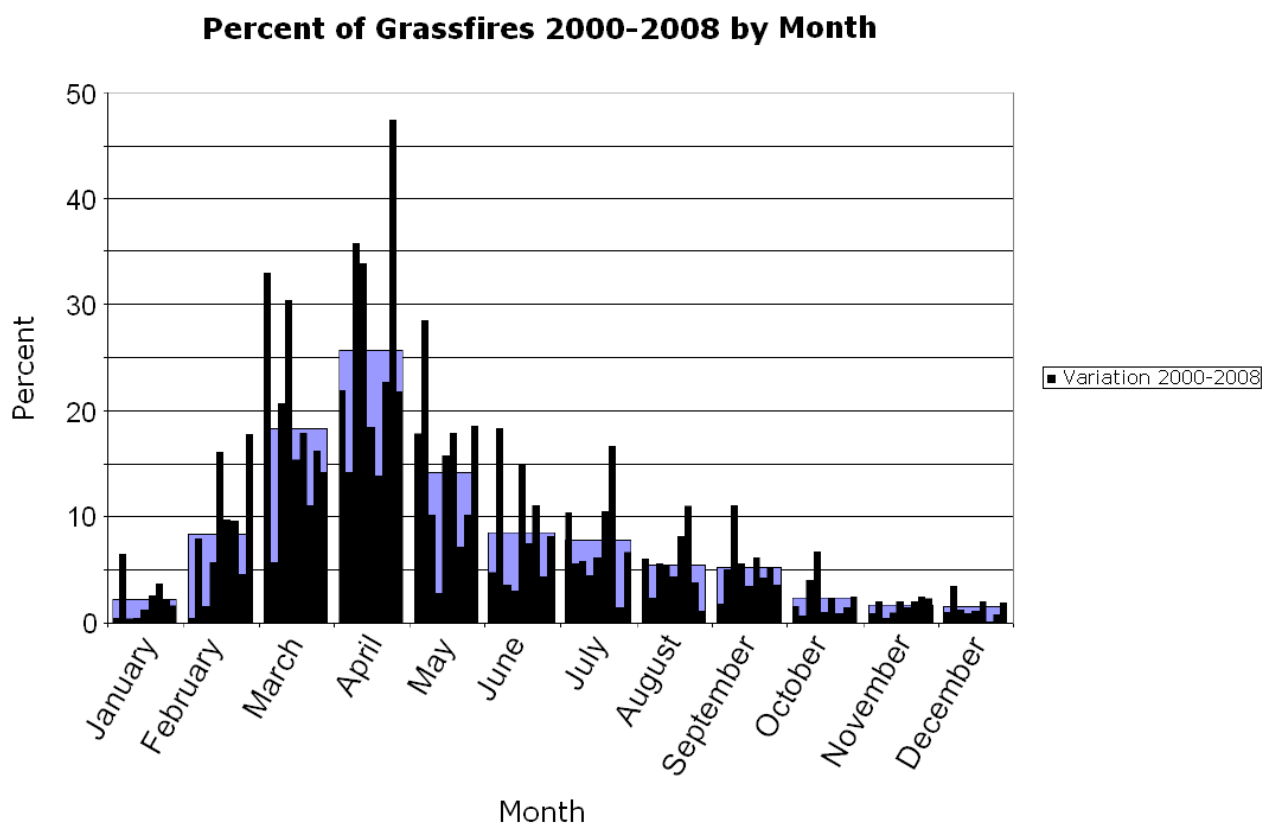


Figure 7: Grassfire occurrence by month

Primary or FDR1 fire incidence data for the same period show a similar pattern of occurrence (see figure 8). However, this model only takes into account the time at which the fire is recorded and not the length of time that the fire is burning, nor the fire's intensity.

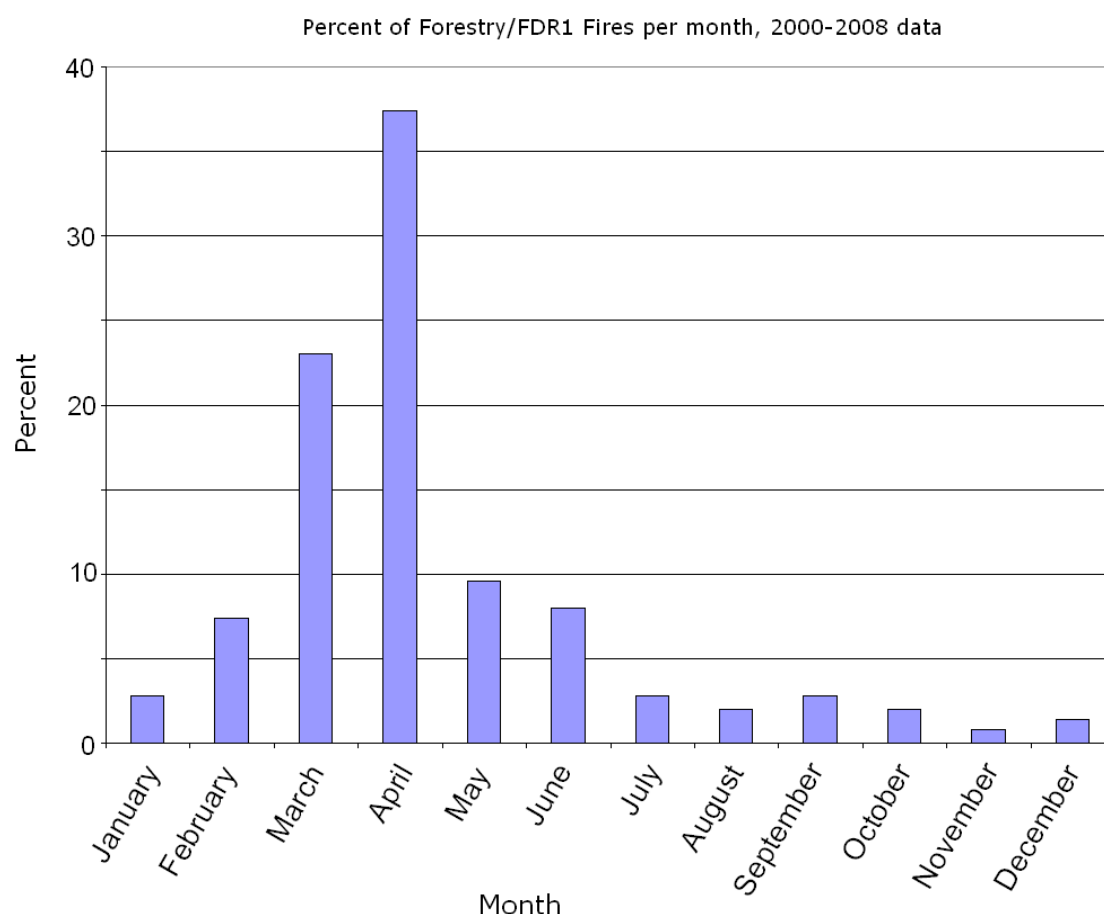


Figure 8: Forest Fire Occurrence by month

Between April and September Forestry Commission Wales (FCW) and the FRS currently have use of a helicopter for the purpose of fire-fighting on FCW land, or land immediately adjacent to FCW land. Available data suggest that there is a need to commence this provision earlier in the year.

Temporal patterns in wildfire occurrence

The above section indicates strong patterns in the timing of wildfire incidents. There are potentially a number of reasons for this. Hourly distribution of wildfire incidences, on weekdays, at least, can be explained by potential firesetters being free during the times of peak occurrence (afternoons and evenings). Weekly distribution of wildfires is more difficult to explain. People are more likely to be free to be able to light wildfires on weekends, and there is a tendency for more wildfire incidences to be recorded on Saturday and Sunday. However, the marked reduction in wildfire occurrence on Fridays is more difficult to explain. Fire Service personnel have suggested that this could be related to individuals who may have otherwise lit fires staying in to watch the rugby

television programme *Scrum V*, although this is not a programme that is on every week of the year. Further research should be carried out to better understand this pattern.

It is easier to explain the temporal patterns related to monthly occurrence of wildfires. There is more flammable material available in spring than in other times of the year. Additionally there is generally dryer, mild weather, and the school Easter holidays also fall in this period. Tying wildfire incidences to school holidays is difficult to do, as school holidays are not the same for each area. Stakeholders in affected areas could use available data to explore further the relationship between school holidays and wildfire occurrence in their local area.

Social deprivation and fire

Previous studies have looked at the relationship between social deprivation and incidences of fires. Some have involved statistical or geospatial mapping approaches, while others have employed qualitative social scientific research methods. Eccles (2001) explored a hypothetical link between instances and reports of fires and deprived areas in South Yorkshire and posited that fire occurrence is linked to areas of social deprivation. Similarly, Corcoran et al. (2007) demonstrated a spatial link between areas of deprivation in South Wales and increased fire risk. Jennings also drew the conclusion that 'socioeconomic and environmental factors [are] the primary determinants of fire loss' (1999: 27).

Other research has demonstrated that not all communities are at the same risk of experiencing arson:

"Not all communities suffer the same risk of becoming victims of arson. [...] There is a strong relationship between arson and other indications of social exclusion. The Arson Scoping Study found that the most socially deprived communities had a risk of an arson attack that was 31 times higher than that of the most affluent areas" (Home Office, 1999 in Canter and Almond 2002: 10).

While the above quote refers to arson in general, as opposed to just wildfire arson, it is telling that our research indicates similar patterns to wildfire arson as to arson more generally.

Our research strengthens the evidence of a link between fire and deprivation (see figure 9). Our analysis involved the spatial exploration of fire service data against data from the Welsh Index of Multiple Deprivation. Relevant layers of data were compared and correlations were noted. The results show that the 20% most deprived Lower Super Output Areas (LSOAs) inside or intersecting with Coed y Cymoedd are nine times more likely to experience a grassfire than the 20% least deprived LSOAs.

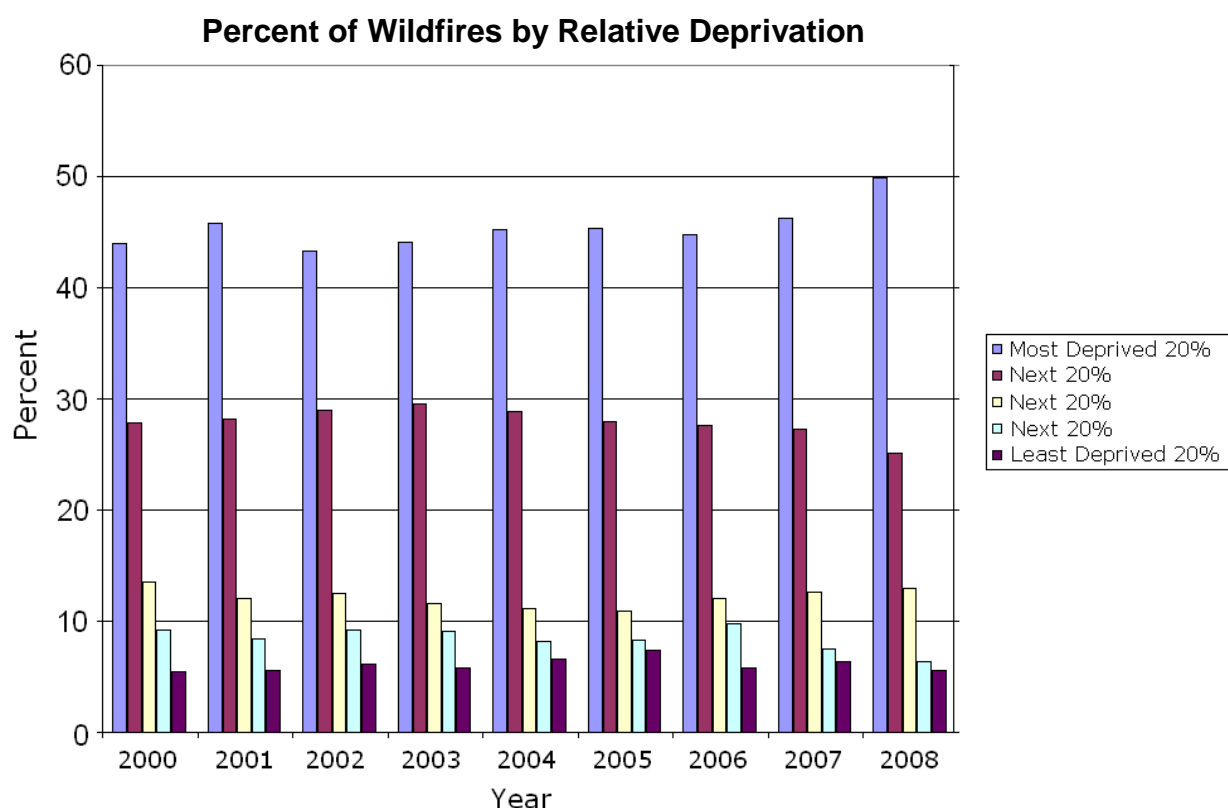


Figure 9: Relative deprivation and wildfire risk

Another notable correlation is the proximity of deprived areas to areas of forestry and grassland (see context section in the Introduction). The 20% relatively most deprived areas in Coed y Cymoedd are three times more likely to contain Forestry Commission woodland than the 20% least deprived areas in the area. This correlation may help to explain incidences of forest fires (which occur more frequently in Forestry Commission Wales land), although grass fires are less common on Forestry Commission Wales land than on other areas (see 'Habitat and fire', below). That wildfires are likely to occur more frequently in areas that contain vegetation has been raised in interviews (see chapter 6).

Habitat and fire

Using Phase One habitat survey data,⁷ fire incidents were mapped against the habitat types recorded by the survey. All areas that were not recorded as 'vegetation' were removed from the analysis and fire points were assigned to the nearest 'vegetation' polygon⁸.

The analysis demonstrates that the majority of grassfires occurred in 'Semi-improved neutral grassland'⁹ while the majority of forestry fires were recorded in 'planted coniferous woodland'. This is unsurprising, as 76% of forestry fires are recorded inside Forestry Commission Wales blocks, or within 500 m of one, and coniferous trees make up a large part of the tree species mix on Forestry Commission Wales land.

Forestry Commission Wales as a victim of wildfire

As mentioned, 76% of forestry fires in South Wales are recorded in Forestry Commission Wales managed woodlands, however, in real terms this equates to only 269 of the 354 recorded FDR1 forest fires. However only 6% of grassfires in South Wales are recorded on Forestry Commission Wales land¹⁰. This shows that while wildfires are undoubtedly an issue for Forestry Commission Wales, the organisation is not the sole landowner affected by wildfires. With the relatively low number of forest fires compared to grassfires, only 6.4% of all wildfires in South Wales are seen to occur on Forestry Commission Wales land.

Proximity of fires to roads, rights of way and buildings

The manner in which the fire services record fires means that the location that is 'geotagged' is likely to be the location of the GPS device, and therefore the location that the firefighting vehicle is parked, rather than where the fire actually occurs. There may be a large distance between the actual location of the fire and the recorded location.

However, it is useful to look closely at the proximity of fires to roads and other access points. Previous research has shown that criminals are unlikely to travel far from their home, and, for some crimes will commit offences when opportunities arise in their daily

⁷ The Phase 1 habitat survey is a system of mapping land cover. It is the industry standard used by ecologists throughout the UK.

⁸ In this context the term 'polygon' refers to a spatially defined dataset. It includes data which is given spatial attributes and can be viewed, analysed and edited in visual mapping software such as ArcGIS

⁹ The category of 'Semi-improved neutral grassland' covers grassland on soils with a neutral pH level, and which have been subject to some form of agricultural improvement.

¹⁰ Using Fire Service data 2000-2008

routine (Gonzales et al., 2005; Felson et al., 1980). If we consider firesetters to be similar to other users of natural spaces it is unlikely that they will travel far from access points (Forestry Commission Statistics, 2010 – Woodland visit characteristics). We hypothesise that the majority of firesetters have not travelled far to light a fire, and the location that they light fires is not much outside the spatial range of their daily routine. As one respondent, a retired firefighter, said

“A plane is only going to crash under a flight path, kids are only going to light fires where they are anyway.”

-Retired Fire Fighter, Merthyr Tydfil area.

The analysis of Ordnance Survey records of road networks and data mapping the locations of Public Rights of Way (PROW) shows that many fires occur within a short distance of roads and PROWs (See figure 10).

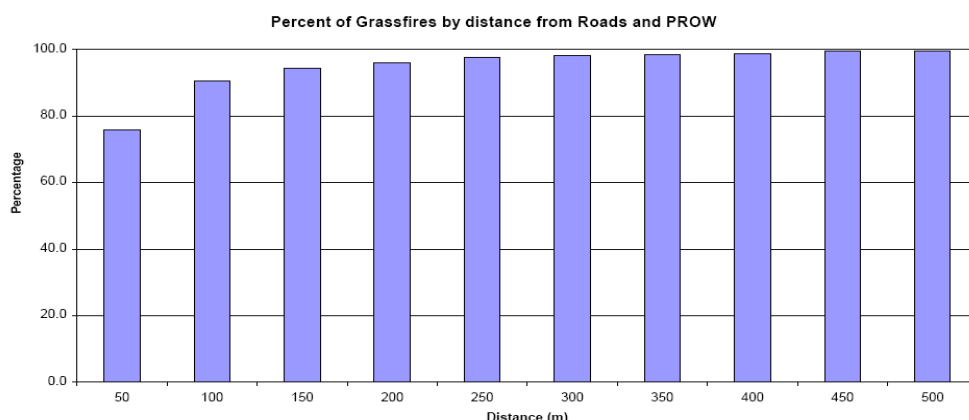


Figure 10: Wildfire incidences in relation to access routes

While caution should be exercised due to the issues around the accuracy of fire location data, it appears that fires are recorded close to access routes. Our research shows that 99% of vegetation fire incidents are recorded within 500 m of a road or right of way, and over 90% are recorded within 100 m of a road or right of way. Our GIS analysis also showed that 98% of grassfires are recorded within 500 m of a building. This analysis provides a strong indication that ease of access is an important factor in determining the location of firesetting behaviour.

Fire and weather

It may seem obvious, but at times of rainfall there are less recorded fires. Running a cross analysis of timings of vegetation fires and hour-by-hour weather data for the years

2000-2008 there is an observable decrease in fires during times of increased rainfall. However, it does not take long from the end of a period of rainfall before there is a significant increase in the number of fires recorded.

Fires, Temperature and Rainfall, March – April 2003

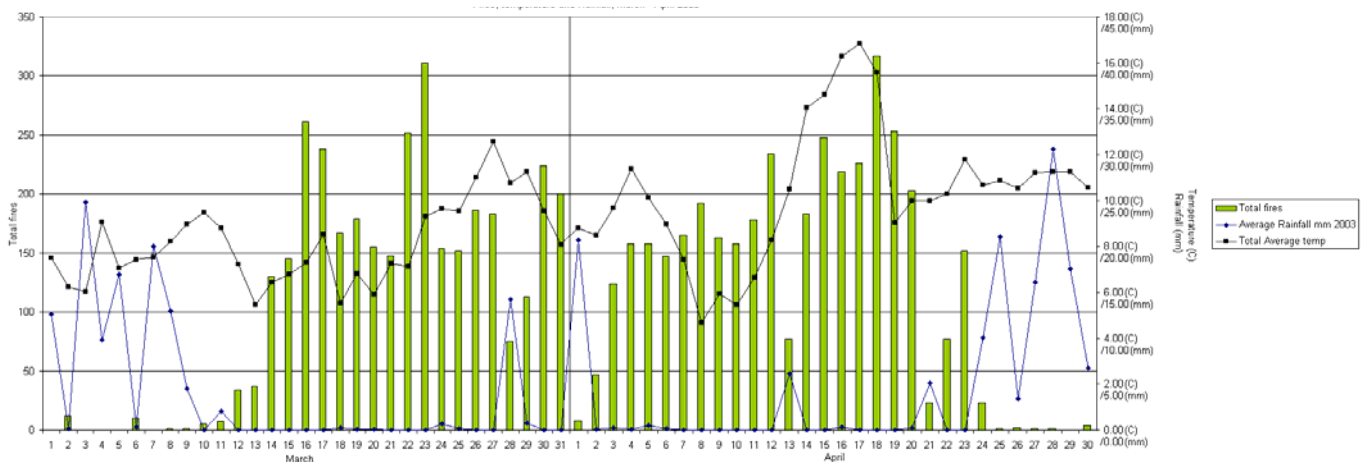


Figure 11: Fire and Weather, March and April 2003

Figure 11 shows that the relationship between weather and wildfires during March and April 2003. Much of the open land in the valleys is made up *Molinia* grass, bracken, gorse and grassland. In exposed areas this vegetation dries out quickly and becomes flammable. Even after a day of relatively heavy rainfall (e.g. April 1st) wildfires still occur. It can also be seen that with rising temperatures there can be increases in the number of recorded fire incidences. However, whether that can be attributed to drier vegetation or an increase in the number of people setting fires is uncertain.

Issues with data, and explanation of results

As mentioned, there are issues that should be taken into consideration when looking at these data. As discussed above, the recorded location of fires may introduce some inaccuracies. Steps have already been made by the FRS to improve the quality of data they collect.

The daily peak of recorded fires occurs after school hours. Many fire service personnel suggest that the peak in fires at this time is proof that young people are the primary perpetrators of wildfire arson. However, this is a contentious point for some respondents who point to the facts that it is not only young people who are free after school, and that

fires also occur during daytime hours. Furthermore, data demonstrate that the pattern of daily occurrence does not change significantly on weekends and weekdays.

All vegetation fires were treated as one category of fire for the purposes of this research, but there are differences between types of fire. Many 'wildfires' recorded in the cities of South Wales are rather small fires on grassland, often in parks. Fire Fighters in Cardiff explained the situation:

"They're kids messing around, largely. Not too different to the ones in the valleys, but much easier to put out, you don't have to go up a massive hill in all your gear for a start"

-Fireman, Ely Fire Station, Cardiff

Data do not always support stakeholder perceptions about fire occurrence. For example, many respondents refer to vegetation fires occurring in the 'Summer'. However, figures 7 & 8 shows that the yearly peak in vegetation fires falls earlier in the year. People's perceptions and memories of the timing of fires appear to be determined in part by the relative size of fires, something that is not shown in point data.

"There are more fires in the Spring, but they're often quite small, we get larger ones, generally, later in the year"

-Fireman, Rhondda

Conclusions

Despite the inherent inaccuracies in the manner the analysed data were collected, there is strong evidence that areas which are in close proximity to buildings and access routes, including roads and public rights of way are most prone to experiencing wildfire arson.

Areas of higher deprivation are more prone to wildfire arson than areas that are less deprived. However, it should be remembered that areas of deprivation in South Wales are also more likely to be contained in the Valleys area, and are more likely to contain Forestry Commission Wales plantations than less deprived areas.

The research also indicates a pattern to the times that fires occur. The peak in wildfire arson is shown to occur in March and April. Temporal patterns also extend to the days and hours that fires occur. Wildfire arson is most likely to occur on weekends, and especially on Sundays. The daily peak in fires is between 1600 hours and 1900 hours.

Recommendations

This chapter shows that there are a number of temporal and spatial patterns to wildfire arson. Partners should use this analysis in order to target preventative measures. South Wales Fire and Rescue Service have shown that targeting resources to areas prone to wildfire incidents can be effective. Information about the timing and likely locations of wildfire arson incidents can be used to direct the use of surveillance patrols which can, in tandem with other mitigation strategies, help to produce a marked decrease in incidences of wildfire arson (see chapter 7).

A helicopter is currently provided to the Fire and Rescue Services for use on forest fires or wildfires threatening Forestry Commission managed forests between April and September. This report presents evidence to suggest that there may be a need to commence helicopter provision earlier in the year, perhaps beginning at the start of March.

76% of forestry fires and 6% of grass fires occur on land managed by Forestry Commission Wales in Coed y Cymoedd (6.4% of total wildfires). There are potential cost savings to be delivered through approaching partners who are affected by wildfires and who may be willing to contribute financially towards the running of the helicopter.

This research shows a pattern to incidences of fire occurrence in South Wales (see Chapter 1). Stakeholder groups can, from the information in this report, see the areas of land that may be prone to wildfire arson, and the times at which they are most likely to burn. This information has not been previously shown in such a way. This information can be used to position firebreaks in the forest, plan access routes and highlight areas that are in need of more careful management.

The research indicates that areas close to roadways and public rights of way are prone to wildfire arson. Partners should consider the use of 'target hardening' strategies in these areas to decrease the amount of flammable material found there. Increased surveillance or restricting access to such areas is likely to bring about a decrease in wildfire arson.

4. What perceptions of wildfire are held from community and institutional stakeholder perspectives?

This chapter discusses the general public's perceptions of, and attitudes to, wildfires and firesetting, as well as the perceptions and attitudes of a range of stakeholders. Understanding how people think about wildfires – their causes, the impacts that they have, and the importance of the issue – can inform decision-making relating to the policies and practices of various stakeholder organisations, as well as the design of appropriate interventions.

Discussion of the public's perceptions and attitudes focuses primarily on the information gathered from the public survey, administered by telephone, and involving 1025 respondents from across South Wales. The sample was representative of the wider population of South Wales in terms of age, location and social class. Data on stakeholder attitudes and perceptions are drawn from interviews and from a questionnaire delivered to all Forestry Commission district staff in Wales, to which there were 46 responses.

Results

No one group appears to have significantly different opinions regarding wildfires, except to say that institutional stakeholders in Coed y Cymoedd, who have a professional connection to wildfire arson, are most likely to engage with wildfires as being an issue than their colleagues in Western and North Wales. We present the results of research into perceptions of wildfires in South Wales below.

Community stakeholders

In the public survey, respondents were asked a number of questions about their perceptions of wildfires as a problem in South Wales. Weighted results from the public survey show that 65% of respondents feel that South Wales does not have a problem with wildfires, while 33% of respondents have the opposite view. A key conclusion to be drawn from this is that, for the majority of people in South Wales, wildfires are not seen as a problem.

However, those people with direct or indirect experience of wildfires are more likely to report fires as being a problem than those with no prior experience of wildfires. For

example, respondents who have seen wildfires, evidence of wildfires¹¹, or publicity campaigns aimed at increasing awareness of the issue are more likely to consider South Wales to have a problem with wildfires. Some 83% of respondents who reported having seen a wildfire agreed that South Wales has a problem with wildfires, whilst this figure is lower, at 17%, amongst people who have never seen a wildfire (figure 12).

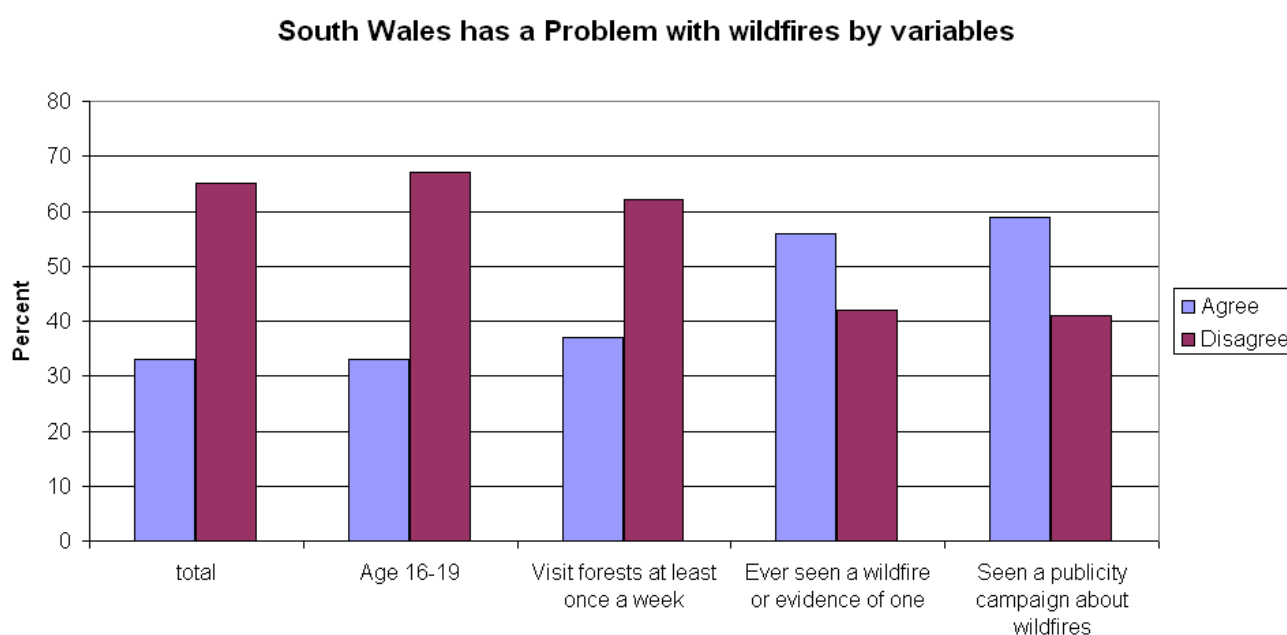


Figure 12: Perceptions of Wildfires as a problem in South Wales

The only variables that are seen to impact on perceptions of wildfires are having “seen a wildfire or evidence of one” or having “seen a publicity campaign about wildfires” (figure 12). Our data suggests that seeing information about wildfires is actually slightly more likely to influence people to think of wildfires as being a problem than having seen a wildfire. Despite this, only 13% of respondents to the public survey reported having ever seen such information.

Although 33% of people agree that there is a problem with wildfires in South Wales, only 18% of respondents believe that there is problem with wildfires in their local area (figure 13). This opinion appears to be influenced by having seen a wildfire, or having seen a publicity campaign about wildfires.

¹¹ By ‘evidence of fires’ we mean burnt hillsides or trees or any other indication of a wildfire happening. This term was used in the public survey in order to encompass a wider understanding of the impacts of wildfires.

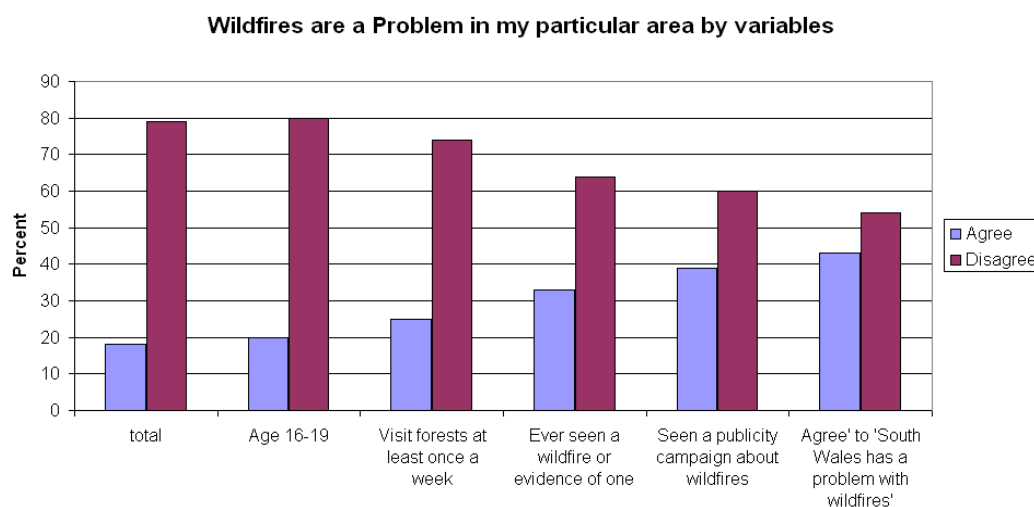


Figure 13: Perceptions of wildfires as a problem in respondents' local area

The results of the public survey also show a degree of regional variation in the attitudes to wildfires. The survey divided the district into three areas so that regional comparisons could be made. These areas correspond to the three 'Local Areas' in Coed y Cymoedd (Ardul y Glynau, Llanwono and Ebbw). Llanwono covers the Rhondda Valley, the area with the greatest number of recorded wildfires in South Wales. This is reflected in the perception of wildfires expressed by respondents in this area: In all three local areas in Coed y Cymoedd more respondents felt that wildfires are not a problem than those that did. The public survey revealed that respondents in Llanwono are more likely than those in Ardul y Glynau and Ebbw local areas to suggest that wildfires are a problem in their local areas.

Respondents were also asked about their perceptions of the causes of wildfires. The majority (65%) of respondents to the public survey identified that most wildfires in South Wales are 'deliberately set by people' (see figure 14). This indicates a level of consistency between institutional and community stakeholders in South Wales, with both groups believing that the majority of wildfires are the result of deliberate actions.

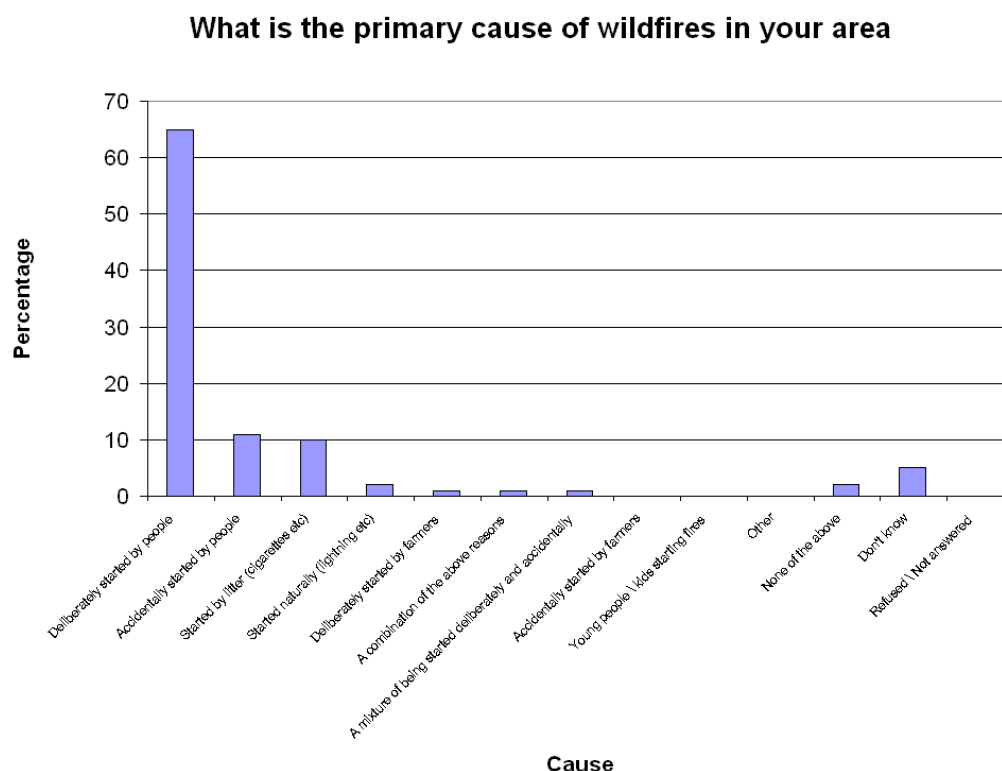


Figure 14: Respondents perceived causes of wildfires in South Wales

Wildfire arson and memories of community stakeholders

Community stakeholders were, to some extent, aware of the issues surrounding wildfire arson. However, engaging in firesetting as youths was either seen as something that was “a bit of fun”, and wasn’t “serious”, or as something that respondents had not engaged in. Older residents of the Valleys felt that there was a difference in how young people use the forests and hillsides today, as compared to when they were young.

“When I was young we’d spend all day out on the mountains, we’d use them, but wouldn’t damage them. You just need a sheet of cardboard and a hill, sledging.”

-Firefighter – Rhondda

The visions of innocent childhoods spent on the mountain and not causing serious trouble may be tinged with nostalgia and not entirely accurate. Documented evidence and research interviews have demonstrated that there has been an issue with firesetting in South Wales for decades. A Forestry Commission publication from 1961 mentions school children who “are tempted to burn the mountains themselves” (Edlin, 1961).

Indeed, young people are not the only interviewees to admit to firesetting. Four older respondents discussed their own past experiences of firesetting, explaining that it was:

“Fun, although now I think about it, it was a terrible thing to do”,
-Middle aged man, South Wales

And

“When I was growing up I never lit a fire on the mountain. Actually, one time I was with a group and someone decided to set a gorse bush on fire, to see what would happen, it went up so quickly, none of us were expecting it”
-Local female resident, Afan Valley

Community members hold conflicting attitudes with regard to young people and their actions. For some, young people are a ‘problem’ and need harsh treatment, and for others, or at other times, there is an acceptance that for young people life can be difficult and there is a need to adopt a tolerant stance towards them and their behaviour.

Forestry Commission Wales staff

There are four Forestry Commission Wales districts: Coed y Cymoedd, Coed y Mynydd, Coed y Gororau and Llanyddfri. Their locations can be seen in figure 15.



Figure 15: Location of Forest Districts in Wales

A online survey was distributed to all Forestry Commission Wales district staff. This was intended to identify differences or similarities in opinions held by FCW staff about wildfires and their causes in different areas of Wales. FCW Staff in South Wales tend to agree that the majority of fires are started deliberately, as one long-standing FCW employee from Coed y Cymoedd stated:

"99% are arson, the rest are deliberately lit"
 -FCW employee, Coed y Cymoedd

The survey revealed that differences between perceptions of wildfires held by Forestry Commission Wales staff can be in part explained by the area in which they work. Forestry Commission Wales staff in Coed y Cymoedd are more likely than their colleagues in Northern and Western areas of Wales to agree that the majority of the fires that they experience are the result of the activities of young people.

Question: "Most of the grass and forest fires in my district are deliberately started by young people"

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	Don't Know
Coed y Cymoedd (South Wales)	12%	39%	12%	12%	0%	15%
Llanymddfri (Mid and West Wales)	0%	22%	44%	22%	0%	0%
Coed y Mynydd (North West)	0%	33%	0%	33%	0%	33%
Coed y Gororau (North East)	0%	0%	14%	29%	14%	43%
Total	6%	29%	16%	18%	4%	18%

Figure 16: Young people as firesetters - FCW staff perceptions

Staff in Coed y Cymoedd are more likely than their colleagues in other FCW districts to attribute wildfires to young people, 51% of staff in the district agree or strongly agree that wildfires in their district are started deliberately by young people (Figure 16). Coed y Mynydd staff are the next most likely to agree that wildfires are deliberately started by young people (NB there were only six respondents from this district).

Other questions in the FCW staff survey explored the causes of wildfires in each local district.

Question: "Most of the grass and forest fires in my district are accidental"

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	Don't Know
Coed y Cymoedd (South Wales)	0%	4%	8%	46%	15%	12%
Llanymddfri (Mid and West Wales)	0%	0%	22%	67%	0%	0%
Coed y Mynydd (North West)	0%	17%	17%	33%	0%	33%
Coed y Gororau (North East)	14%	29%	14%	0%	0%	43%
Total	6%	29%	16%	18%	4%	18%

Figure 17: Wildfires as an accidental occurrence - FCW staff perceptions

Only FCW staff in Coed y Gororau agreed that most wildfires in their district were accidental, but this district also had the highest percentage of respondents who chose the “Don’t know” option.

In Coed y Cymoedd there is a widely held assumption that no wildfires in the district are natural in origin, and the staff survey shows this is a widely held opinion throughout FCW districts (see figure 18).

Question: “Most of the grass and forest fires in my district are started naturally ”

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	Don't Know
Coed y Cymoedd (South Wales)	0%	0%	12%	35%	31%	12%
Llanymddfri (Mid and West Wales)	0%	0%	11%	56%	22%	0%
Coed y Mynydd (North West)	0%	0%	17%	33%	17%	33%
Coed y Gororau (North East)	0%	0%	71%	0%	0%	29%
Total	0%	0%	20%	33%	25%	14%

Figure 18: Wildfires as a natural occurrence - FCW staff perceptions

A further question asked respondents to indicate their level of agreement or disagreement with the statement “It is difficult to tell who is responsible for starting grass and forestry fires”. The responses to this demonstrate that, in most cases, and in most districts, there is agreement with this statement (see figure 19). 49% of respondents agreed or strongly agreed that it is difficult to say who is responsible for setting grass and forestry fires, as opposed to 26% who disagreed or strongly disagreed with the statement.

The FCW staff survey also asked about other antisocial behaviours that occur on Forestry Commission managed land. FCW staff in Coed y Cymoedd were more likely than colleagues in other districts to suggest that the district has a problem with antisocial and criminal behaviour in the forests. This can be attributed to the large population in South Wales, with many populated areas in close proximity to forests and other natural areas, meaning that social problems normally associated with towns and cities are manifest in wild and forested areas.

Question: "It is difficult to say who is responsible for starting grass and forestry fires"

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree	Don't Know
Coed y Cymoedd (South Wales)	4%	48%	4%	26%	4%	13%
Llanymddfri (Mid and West Wales)	0%	38%	25%	25%	0%	13%
Coed y Mynydd (North West)	40%	0%	0%	20%	20%	20%
Coed y Gororau (North East)	13%	50%	13%	0%	0%	25%
Total	5%	44%	9%	21%	5%	16%

Figure 19: "It is difficult to tell who is responsible for wildfires" - FCW staff perceptions

Although data from the telephone survey suggest that the majority of residents of South Wales are likely to believe that wildfires are the result of deliberate actions, qualitative interviews suggest that views held by individuals are less uniform. Stakeholders repeatedly express the opinion that fires are the result of deliberate actions, but many also believe that there are other causes.

"I remember a fire over that way, that was a while ago, but I think that it was an accident, maybe a cigarette or something"
 - 18 year old resident, Aberdare

This expression of uncertainty is one that should be considered when planning intervention and mitigation measures; if people believe that some fires are accidental, they may be more willing to accept them as a part of life in South Wales. Contrasting this, a consistent message that accidents, natural phenomena and litter are unlikely causes of wildfires may galvanise people into being more vigilant against wildfires and their setters.

Extensive literature searches have revealed little empirical research into the causes of wildfires. Egri et al. (2010) explored the sunburn of leaves by water droplets using glass beads placed on leaves placed in sunlight. Their experiment showed that spheres of glass do not cause leaf burn. It should be noted that they were not experimenting the potential to cause wildfires, but simply looking at the potential damage to leaves caused by sunlight through water droplets. There is a demonstrable lack of research in this area that needs to be addressed if wildfire research is to progress.

Conclusions

Most members of the public in South Wales do not consider there to be a problem with wildfires in the region, and even fewer people believe that wildfires are an issue either for themselves, their locality, or for their families.

While the majority of respondents to this research believe that wildfires are mainly the result of deliberate actions, there is still some confusion in people's minds as to the precise nature of the causes.

Furthermore, there is a variety of opinion, depending on where a person lives, both within the country, and within a given region. If people have seen wildfires, evidence of wildfires, or information about wildfires, they are more likely to consider South Wales to have a problem with wildfires. However, only a small minority of people have actually seen any information about wildfires.

During the course of this research there has been a move by the Fire and Rescue Services to remove misinformation regarding the ignition sources of wildfires from their literature. The websites and published literature from the Fire and Rescue Services that cover South Wales no longer include reference to 'broken glass' or 'discarded cigarettes' as potential causes of wildfires.

Recommendations

Literature searches have shown that there is little scientific evidence regarding the ignition sources of wildfires. Scientific research, including this project, has relied heavily on the opinions of professionals with an interest in wildfires. While valuable, these opinions may be unreliable as they are in part based on subjective knowledge. We recommend that experiments be carried out under controlled conditions to study ignition sources of wildfires. Conclusive evidence regarding the likelihood of discarded cigarettes and broken glass as causes of wildfires should be collected. This will improve knowledge of wildfires in the UK and improve the information that is provided to stakeholders and the wider public.

Information about wildfires should be more widely available to raise public awareness of the problem. This research has shown that people who have seen information about wildfires are more likely to consider wildfires to be a problem.

Information that is provided to the public regarding wildfires should be targeted to the areas where it is needed. In South Wales this means that the central Valleys and the outskirts of Swansea should be targeted most heavily.

This research shows that perceptions of causes of wildfires vary between different areas of Wales. This suggests that interventions and mitigation strategies should be implemented at the regional and local, rather than the national level in order that they be focused on the wildfire setter group that is most prevalent in each area.

5. Who is perceived to be responsible for setting wildfires in South Wales?

Introduction

The majority of people in South Wales believe that wildfires are the result of deliberate actions. However, the identities of wildfire arsonists are difficult to ascertain. In this section we discuss the perceived identities of wildfire arsonists, and examine the different types of wildfire arsonists in relation to the locations in which they operate.

As wildfire arson is a difficult crime to detect and prosecute there is a lack of information about perpetrators. This chapter examines the opinions of stakeholders, and the opinions of local young people, some of whom have firsthand experience of wildfire arson.

While reading this chapter it should be remembered that the number of people who are involved in firesetting is likely to be a very small minority of the population of South Wales. A mean of around 5000 grass, gorse and forestry fires are reported per year in Coed y Cymoedd (2000-08). The population of Coed y Cymoedd is around 1.6 million people meaning that there are 0.004 fires per head of population on average each year.

As previously discussed (see Chapter 4), the majority of people in South Wales believe that wildfires are the result of deliberate actions. Primarily the blame for this falls on young people living in communities adjacent to areas of grassland and forestry. However this statement does not give the full picture of potential firesetters, or of the perceptions of stakeholders as to the identities of firesetters.

It is important for us to understand who is perceived as being most likely to commit wildfire arson, as the placing of 'blame' informs and frames the debate surrounding the issue and methods of prevention used. As can be seen in Chapter five, the majority of wildfire mitigation strategies currently enacted are aimed at young people. This is the result of a dominant discourse that suggests firstly that young people are likely to light fires, and secondly, that anti-wildfire arson education needs to begin at a young age to reinforce the unacceptability of it.

Confusion and difficulty in identifying wildfire arsonists

As mentioned, wildfire arson is an extremely hard crime to detect, and for police in South Wales it has not been a priority. This may be as a result of wildfires not being reported as a crime, and also the difficulty the police have in being able to prosecute wildfire arson. Because there have been no convictions there is little solid information about the identity of wildfire arsonists in South Wales. Despite this, there is anecdotal evidence to be gained from members of the FRS and FCW.

The lack of certainty about the identities of wildfire arsonists is demonstrated throughout qualitative interviews carried out as part of our research. While “young people” or “kids” are those primarily blamed for firesetting this does not cover the full array of potential wildfire arsonists. Older people (“young men, in their 20s” – Youth and Community Worker, Treherbert) and farmers were also blamed for wildfire arson by some respondents.

Perceptions of the identities of wildfire arsonists

A telephone survey was carried out in November 2009 with the aim of understanding how the wider population thinks about wildfires in South Wales and in their local area. It was felt that people living in South Wales would have valuable insights into their local environment.

Figure 14 (Chapter 4) presents information about perceptions of the ignition sources of wildfires. The majority of respondents (65%) stated that people deliberately start the majority of vegetation fires. This was marginally higher (69%) in the area around the Rhondda Valley.

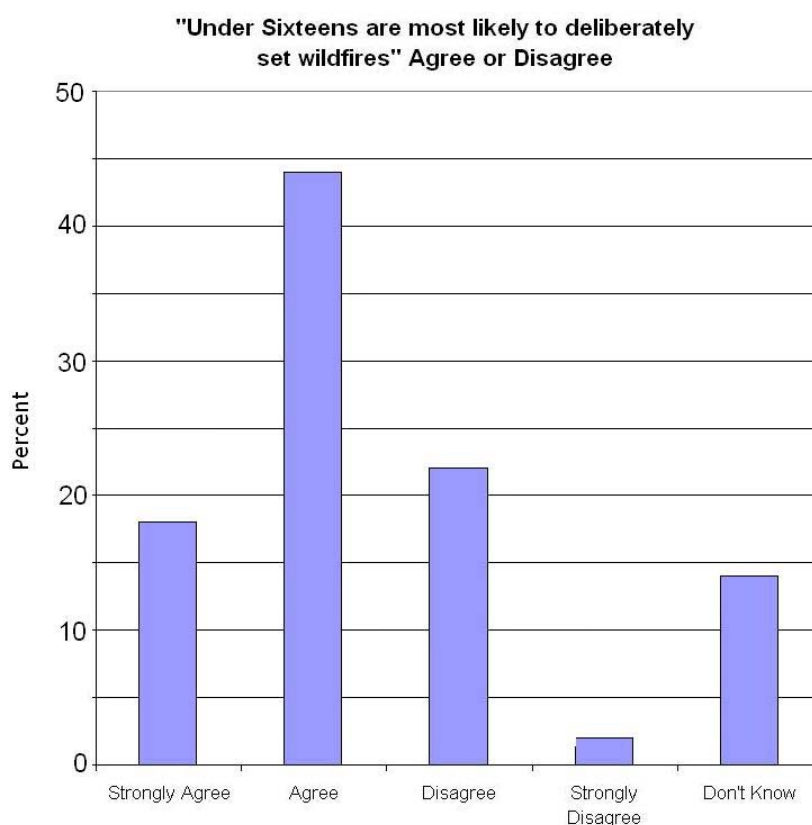


Figure 20: "Under sixteen's are most likely to deliberately set grassfires" - Public perceptions data

Respondents believe that under 16s are largely to blame for lighting wildfires. 63% of respondents agreed or strongly agreed that under 16s are most likely to deliberately set fires in vegetation (see figure 20). This shows agreement between institutional stakeholders and the wider public. Research interviews also demonstrated that there is an over-riding assumption that young people are the main firesetters in South Wales:

"It's primarily secondary school children"
 -Local community worker, Treherbert

"Its about engaging young men, primarily, because firesetting is a male occupation, you don't get girls doing it."
 -Local community worker, Treherbert

"Probably teenagers"

-Young person, Afan Valley

The category of 'young people' is not homogeneous. There is demonstrable uncertainty as to the sex of perpetrators, and even their exact age. 'Kids' appears to encompass both young children and older 'young people' who have access to vehicles and a potentially wider range where they can engage in firesetting:

"They [the fire service] told us that it was mostly people aged seven to fourteen"

-Child at 'Bernie' event

"We dropped the number of fires in the immediate area, but we believe that we had people thinking 'they're all around there, so we'll go somewhere else to light a fire' we were pushing them out to other areas"

-SWFRS staff, summing up 'Bernie' Project

"You get older people, young men in their twenties"

-Community worker, Treherbert

For some respondents (see above) firesetting was seen primarily as a male 'occupation'. However, this, like other aspects of the identities of firesetters is contested.

"There are as many girls as boys doing it"

-Fire Service

SWFRS reported that two teenage girls had been stopped for wildfire arson in 2010 during the 'Bernie' campaign, among others. There were no reported formal legal consequences or firesetter interventions imposed on those caught engaging in wildfire arson. Coed y Cymoedd staff also believe that young people are responsible for the majority of wildfire arson in the area. However, they also acknowledge that it is difficult to say categorically who is responsible for wildfire arson in South Wales (see figure 19 and 21).

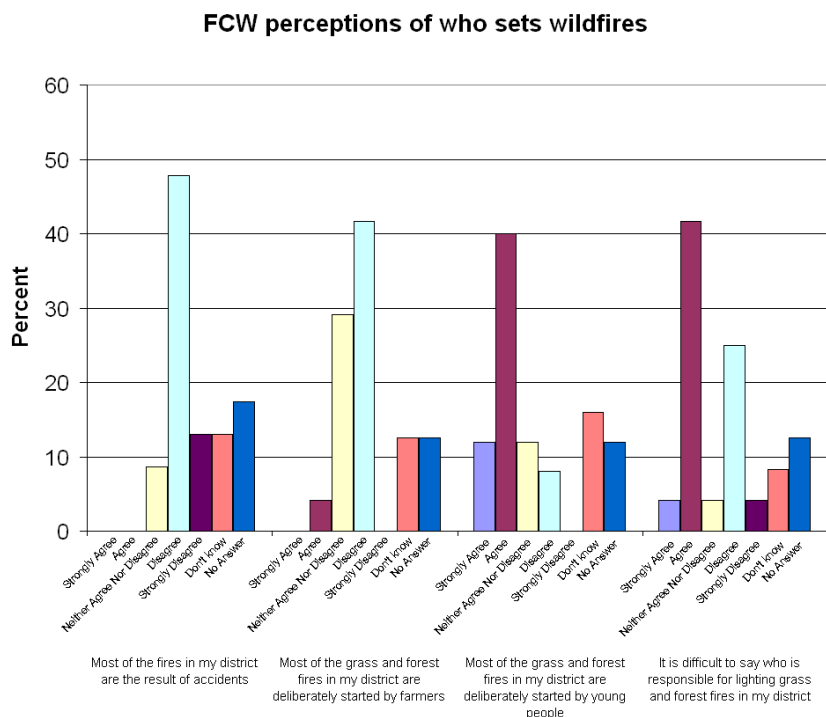


Figure 21: Causes of Wildfires - FCW staff perceptions

Young people in the study areas of Aberdare and the Afan Valley also stated that under 16s are most likely to commit wildfire arson. 47% of questioned young people (ranging from 11 to 19 yrs) believe that under sixteens are most likely to commit wildfire arson, with a further 44% stating that older teens are the main perpetrators of wildfire arson in South Wales.

Other firesetters

As stated, there is no clear pattern of blame for wildfire arson other than that directed at young people. This demonstrates a problem with the research method employed. Through necessity we had to ask people who have knowledge of the issue of firesetting, although they may not have a full picture. Respondents had access to knowledge in their field of reference, but were not always aware of the wider scope of the problem. In their study of causes of wildfires in Spain, De las Heras et al. (2003) also encountered this problem. Asking local experts reveals a wide range of answers, but responses should be taken to be truth-as-observed by experts and stakeholders, not exact science. Research interviews demonstrate a wide variety of views on the identities of firesetters. It is not possible to group opinions purely by respondent type.

Older Residents

People using motorcycles as a means to access vegetated areas have been seen setting fires. Anecdotally both FRS and FCW staff explained that this has either involved stopping to light fires, or trailing a burning rope or similar behind a motorcycle.

Two quotes from one interview with a group of firefighters based in Tonypandy demonstrate this:

"It's sometimes bikers, you can see them going across the mountain, stopping, setting a fire and moving on. They've disappeared by the time you get there"

"It's not 'bikers' it's kids on bikes. I think that there is too much emphasis placed on these off-roaders, the proper ones don't cause bother"

-FRS employees on watch in Mid-Rhondda

One of the interviewees had seen people on bikes lighting fires, and therefore 'knew' that bikers are in part responsible for firesetting in the local area. However, the second quote comes from his colleague who, as an off-road biker himself, knew that the majority of off-roaders are unlikely to light fires.

Farmers and landowners

Some stakeholders identify farmers as a source of wildfire arson, both 'directly' and 'indirectly'.

Farmers may be responsible for setting fires themselves, as part of a land management technique (directly). This is seen to be more prevalent in some areas than in others:

"There are fires on the Gower, here, and in West Wales, these fires are set by farmers. There aren't young people near by."

-FRS employee, MAWWFRS Headquarters

Despite this blame being placed on farmers, they are likely to deny that they are involved in firesetting activities:

"Farmers tend to deny all knowledge if you turn up, they'll blame it on kids or walkers, but you know it's them. It's easier for them to light a fire, walk away and leave us to deal with it."

-FRS employee on watch in Aberdare

One farmer was sure that none of the farmers in their valley still lit fires as a method of encouraging growth of fresh grass and as a land clearance tool:

"I'm trying to think... certainly no one we know around here has burnt for about a decade I'd say"

-Farmer, Neath Valley

At present burning regulations imposed on farmers to encourage responsible burning are being reviewed and researched¹². Once more is understood about farmers' use of fire as a land management tool, and more guidance on responsible burning is provided, there should see a decrease in fires started by farmers.

Indirectly, farmers are also blamed for spates of firesetting. This is seen to be as a result of incidences of fire encouraging further firesetting:

"It's like Ping-Pong across the valley. One starts, then another on the other side"

-FRS employee, Tonypandy

Further discussion of motivations for farmers to set fires, and the methods that are currently used to mitigate against the danger of wildfires caused by farmers or land owners are included in chapters 6 and 7.

Institutional employees

Interviews revealed the opinion that fires may be set by those charged with preventing or extinguishing them. Institutional employees, as we here term them, include Forestry Commission Wales staff and fire fighters. It is widely assumed that, although this was an issue in the past it is something that has been addressed and is no longer likely to be an issue.

Coed y Cymoedd forest district was once much more heavily staffed, and employees were required to both watch for wildfires, and to take part in tackling them. There is anecdotal evidence that rewarding overtime payments, especially during the fire season and summer encouraged some FCW staff to set fires, or to encourage fire setting in the forests.

¹² Work is being undertaken by the Sustainability & Environmental Evidence Division (SEED) of the Welsh Assembly Government along with representatives from the Fire and Rescue Services, Countryside Commission Wales and other partners.

The overriding perception from institutional stakeholders was that FCW and FRS staff were no longer responsible for wildfire arson in South Wales.

Specificity of firesetters to area

While only a minority may be involved in setting fires, in a densely populated area, such as the valleys, this 'minority' actually equates to quite a large number of people.

"It's a problem caused by a minority of people, but it's a densely populated area"
-Youth Worker, Afan Valley

As has been seen, the identities of wildfire arsonists are considered, by stakeholders, to be in part tied to the area in which they occur. Fires in Western areas, and on the Gower peninsular are more likely to be attributed to farmers than fires in the Valleys, which are more likely to be attributed to young people or bikers committing wildfire arson.

For purposes of comparison, views on wildfires and wildfire arson were gathered from the rest of Wales. Within FCW there is a demonstrable difference in who is blamed for wildfire arson depending on the Forestry Commission district in which the respondent works.

In Coed y Cymoedd staff are more likely to blame young people than their colleagues in other districts. Llandovery (Western and Mid- Wales) district staff are more likely to blame farmers for fires. This is a more rural area than Coed y Cymoedd, and suggests that there is both more space for farmers to burn, and a sparser population close to grass and forested land who may be tempted to set fires.

Conclusions

A number of groups are blamed for starting fires. Primary among these are young people or children. Young people are also blamed for other low-level antisocial behaviour in the communities where research was carried out.

Location of fire incidents can have an impact on who may be blamed. In areas close to population centres, children tend to be blamed, while in more remote, rural areas, farmers are considered to be the more likely culprits.

The difference between identities of wildfire arsonists in different areas may cause problems for efforts to educate against deliberate firesetting. If, as suggested, "fires trigger fires", allowing farmers to burn whilst at the same time discouraging the activity amongst the wider population may prove difficult, especially in the heavily populated valleys. A blanket ban on burning in close proximity to Valleys communities may be

more workable than legislation that allows legitimate burning while also attempting to stop wildfire arson.

Recommendations

The majority of respondents state that young people are primarily responsible for committing wildfire arson in South Wales. However, young people are by no means the only group who engage in this behaviour. The areas in which different firesetter groups operate may vary depending on their identifies. Wildfires set in farmed, grazed or privately managed land are likely to be the result of actions by farmers, while fires set in areas close to houses, schools, towns and villages are more likely to be caused by young people. The location in which fires occur can be used by stakeholders to ascertain the identities of wildfire arsonists that mitigation strategies should target.

This report suggests that actions by young people (below the age of 20 years) are the primary setters of wildfires in the Valleys. However, in West Wales and the Gower peninsular wildfires are largely attributable to farmers and land managers.

Our research suggests that wildfire mitigation strategies should focus on different groups depending on the area. In areas of the Gower, upland areas, and to the west of Coed y Cymoedd, mitigation strategies should aim their messages at farmers, while in the central valleys, especially the Afan, Rhondda and Dare valleys, mitigation strategies should be targeted more towards younger people.

6. What motivations lie behind firesetting?

Introduction

Our research has shown that in South Wales there is more than one type of wildfire arsonist. As seen in the previous chapter, research access to actual firesetters can prove problematic. Despite some reported arrests for wildfire arson over the past two years there has never been a conviction for wildfire arson in South Wales. This goes some way to explaining the lack of a coherent description of the 'typical' firesetter in the region.

The limited access available to wildfire arsonists in South Wales means that, at present, mitigation measures and stakeholders rely on intuition and guesswork to understand and explain the motivations driving wildfire arsonists.

This chapter draws on a review of relevant academic literature and presents data from interviews with institutional and community stakeholders to discuss potential motivations that lie behind wildfire arson. We support this with data from group interviews conducted with self-reported wildfire arsonists.

Historical, cultural and environmental context of wildfire arson

From interviews with community members, fire fighters, other fire and rescue service staff, and other stakeholders, it is clear that there is no unified opinion about the motivations or drivers behind wildfire arson. Community and institutional stakeholders are aware that firesetting forms a part of a wider set of social issues, not all related to the individual, psychological motivations of the wildfire arsonist. Understanding the wider social context in which wildfire arsonists operate can produce insights into the complex issue of drivers and motivations.

The population of the Valleys is close to a million people. The area is so densely populated that it has been described as "the city of the valleys" (Tanner 2010). In addition, the area is characterised by high levels of deprivation and has been described as "a distressed area unique in Great Britain for the depth and concentration of its problems" (David et al., 2003). Deprivation has been linked to incidences of arson and property fires in Wales (Corcoran et al., 2007), Yorkshire (Eccles, 2001) and Britain more generally (Canter and Almond, 2002; Jennings, 1999). Drivers that lie behind

firesetting are not limited to psychological issues, and can be influenced by the wider social context in which fires occur. As seen in Chapter 1, the social and demographic context in which wildfire arsonists may live is seen as a potential driver for firesetting behaviour.

"The root causes are really lack of employment, lack of opportunity. There is a cycle to the lives of some of these kids"

-Youth Worker, Cwmafan

The impression that wildfire arson sits as an ancillary issue to the socioeconomic situation of many areas within the Valleys region forms a theme in interviews. Respondents saw wildfire arson as tied to a perceived lack of engagement and services in the area.

"It's [the amount of fires] because there's nothing to do, it's boring round here"

-Self-confessed firesetter, Afan Valley

A key finding of this research is that wildfire arson appears to be a form of recreation in an area that is almost universally viewed as having few provisions for out-of-school activities. 92% of twenty-five young respondents questioned disagreed with the statement "There is lots to do where I live".

In addition to the social and economic context of the Valleys the geographical and environmental context was also felt to be a potential driver of wildfire arson and other criminal and antisocial behaviour. As mentioned in the introduction to this report, the South Wales region is heavily forested, containing around 30,000 hectares of Forestry Commission Wales managed land. For some respondents there was a feeling that the natural areas of the valleys were not always appreciated or looked upon as being a positive or productive landscape:

"There's all this land up there, the forest and that, and no one is ever doing anything up there. Then if you get caught up there on your [motor]bike it gets taken off you or whatever"

-Self-confessed wildfire arsonist, Afan Valley

A belief that the land is not truly 'owned' or managed by anyone also appears to be coupled with a sense that opinions regarding acceptable forms of behaviour are being forced onto the people who want to actually use the land. A respondent from within FCW sums this up:

"There's a sense of malevolent ownership. It's like, it's my valley, who are you to tell me I shouldn't do this?"

-FCW employee, Coed y Cymoedd

This term, 'malevolent ownership' captures a sense of ownership of the land in the Valleys and of resistance towards external influences on behaviours. This is coupled with a feeling that the local population has a right to choose how 'their' land is used, without interference from outside.

Motivations vary across different firesetter types. A farmer or landowner may set a fire to encourage new growth of grass. A young person may light a fire without the intention of it spreading, merely as a result of peer pressure, or because they feel they have nothing better to do. Adults' motivations may be linked to their attitudes to the way in which their local environment is managed, to general feelings of hopelessness, or may be akin to the motivations experienced by younger firesetters.

In South Wales these myriad of potential drivers are coupled with an apparent historical and social acceptance of wildfires reported in literature (Edlin, 1961) as well as respondents.

"There is probably more of a mindset up here, because it's historical, because it's become part of the culture that every year, it's been passed down. It's also never been looked upon as being particularly serious. Everyone moans about it, but it is never been seen as if one of the kids has set fire to somebody's shed, or car"

-Station commander – SWFRS

"It's naughty, but not too naughty, it's for the devilment"

-Community Worker, Treherbert

The opinion that wildfire arson is not seen as being especially bad or dangerous is tied in with the fact that the parents of today's firesetters may themselves have engaged in the activity when they were younger. The issue of behaviour being 'inherited' from parents is something that arose in interviews with members of all stakeholder groups, apart from young people:

"There's an issue that if your parents did it, and they think that it's ok, that then they're not going to take it seriously, they won't tell their children not to do it"

-Community Worker, Treherbert

Some respondents talked about the 'sort of people' who may be wildfire arsonists, and these were seen as people who did not bring up their children correctly, possibly due to immaturity or poor parenting.

"Kids having kids, that's what it is"

-Respondent, Rhondda Valley

The idea that there is a 'sort' of person who is more prone to wildfire arson emerged from a number of interviews with groups and individuals. Young people who did not engage in firesetting would talk about fires being the fault of people who drink and take drugs in the forests. For these respondents, wildfire arson was just another form of criminal, or antisocial behaviour:

"It's a minority, the same ones that are going to take drugs, steal cars, get in trouble"

- Young respondent, Rhondda Valley

A Typology of Motivations for Wildfire Arson

While an understanding of context is important, there are other drivers that pertain to the individual wildfire arsonist. Early in the research process we developed a typology of firesetter motivations to help inform the research. The typology uses information gathered from a wide variety of psychological and social literature, and drawing substantially on Willis' (2004) review of literature on 'bushfire arson' in Australia. This was supplemented with information from interviews conducted during the scoping phase of the research. The research then set out to test the resulting provisional typology (Figure 22) by examining how it applies to the context of wildfire arson in South Wales. A revised typology is set out in the conclusion to this chapter.

Proposed Motivations for Wildfire Arson

- Wildfires lit to create excitement or relieve boredom
 - This category includes 'competitive' firesetting and group activity. Also includes fires set in order to encourage a fire engine or helicopter to respond.
- Wildfires as 'harmless fun'
 - Fires set by those who would not normally engage in antisocial behaviour, including those who are curious.
- Wildfires lit as a form of malicious vandalism
 - Maliciously set fires by those who may also engage in antisocial behaviour, higher level of planning, perhaps using vehicles for access and accelerants (eg. Petrol, lighter fluid, constructed incendiary devices, etc.).
- Wildfires lit for psychological reasons
 - Including as a 'cry for help', the result of psychological disorders or as a response to social or familial stresses
- Wildfires arising from uncontrolled 'controlled burns'
 - Fires set by farmers or landowners that are carelessly managed and get out of control.
- Wildfires with an unclear motive
- Wildfires set by those who do not fully understand the consequences of their actions, and those set out of curiosity.
 - This includes fires set by children
- Wildfires set in response to socioeconomic situation
 - Fires set in areas of socioeconomic deprivation, perhaps out of a sense of anomie, protest or desperation.

Figure 22: A working typology of motivations for wildfire arson in South Wales

We include the working typology, along with the revised typology (Figure 24) in order to demonstrate the development in thought over the course of the project.

Perceived motivations and drivers for wildfire arson

The public survey included a question about perceived motivations for firesetting. The majority of respondents stated the main reason for people deliberately lighting fires was "for excitement, or out of boredom" (47.8%) or "as an act of criminal vandalism (28.9%). The next highest rated motivation was "due to drug or alcohol misuse" (5.8%) (see figure 23).

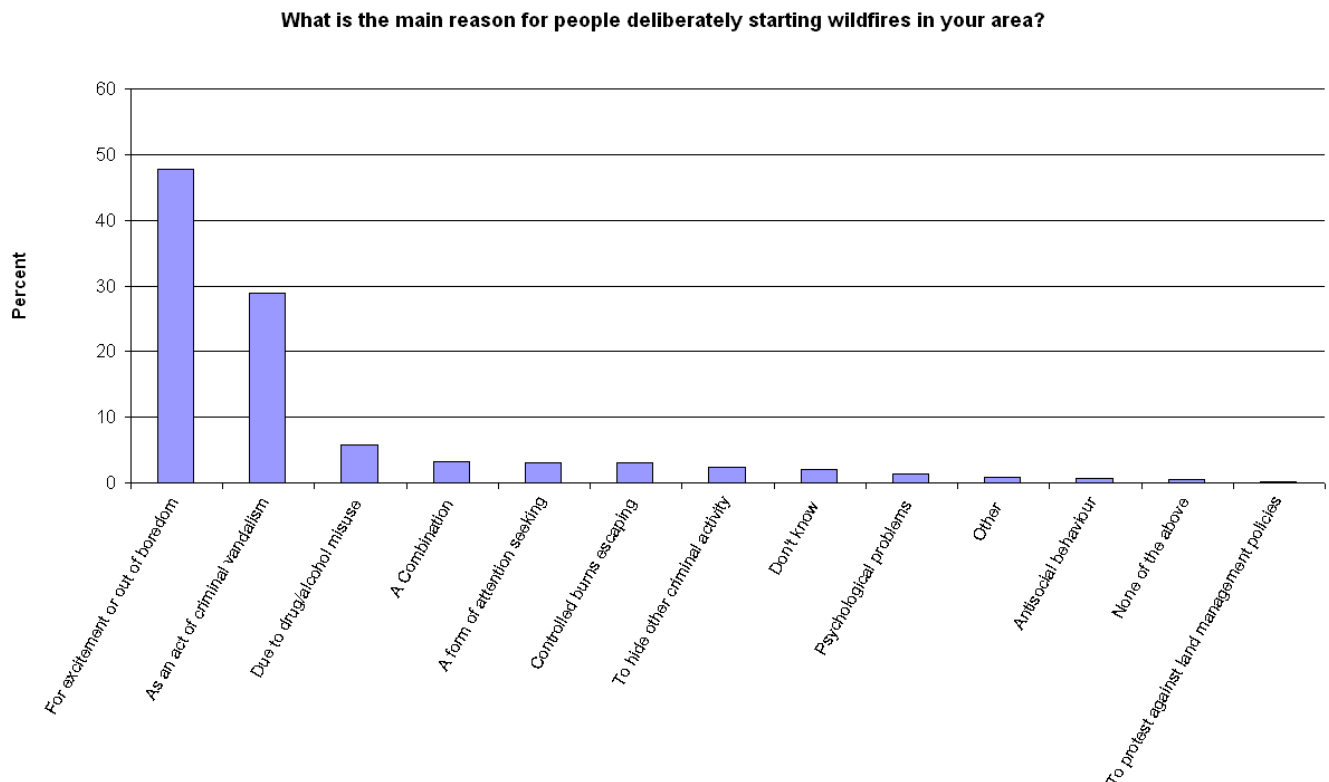


Figure 23: Perceived motivations for wildfire arson

The research also used qualitative research methods to test the motivation typology presented in Figure 22. Interviews with stakeholders, community members and young people were used to build a picture of motivations that may drive wildfire arson. The research findings are presented by firesetter 'group' as outlined in the previous chapter (Fire fighters/FCW employees; Adult populations; Farmers, and Young people).

Understanding that different groups of wildfire arsonists are likely to have different motivations will allow relevant organisations to tailor interventions to an identified firesetter group, while also understanding the impact that this could have on other groups.

Farmers and landowners

Burning regulations in Wales allow for farmers and landowners to burn at specified times of the year¹³ to manage vegetation growth. However these regulations are not always adhered to and firefighters attend a number of upland blazes each year that are the result of farmers burning grass, without prior notification, and without proper precautions.

Farmers and landowners may not have any knowledge of regulations, may choose to ignore them, or simply regard the process of informing the fire service and registering the burn as too onerous. FRS employees report attending blazes where it is obvious that the perpetrator is a local farmer, but where the farmer has blamed a third party. At present, research is being undertaken by the Welsh Assembly Government to improve adherence to grass burning regulations.

There is also a project underway in Mid and West Wales Fire and Rescue Service to improve relationships with farmers and landowners, and to assist them with burning land. As mentioned, there is a perception that, for some landowners, adhering to regulations will encourage uncontrolled firesetting on farmland. Through engaging with commoners and farmers, and making the process of legitimate burning easier, Mid and West Wales Fire and Rescue Service hope to decrease the number of unsafe fires being set.

Farmers and landowners may also be indirectly responsible for firesetting. The perception that seeing a wildfire may encourage some people to set another fire was a common feature of interviews with a range of stakeholders. Some interviewees within the FRS and FCW have suggested that fires started by farmers act as a beacon that encourages other locals to light fires.

"It's that time of year, the first farmer will light a fire, it's like a beacon: the grass will burn now, and it all kicks off"

-Firefighter, Aberdare

Institutional employees

Our research explored the idea that employees of agencies tasked with wildfire prevention are responsible for starting some wildfires. This is clearly a controversial issue. However, some respondents did refer to firesetting by fire fighters or FCW staff.

¹³ Burning regulations allow for different burning times, depending on the location of the land. Upland burning and lowland burning are subject to different restrictions.

However, these were typically anecdotes relayed in the past tense, referring to something that used to happen, but no longer does.

The motivation for this sort of wildfire arson is understood to be financial. Overtime payments could be gained through setting fires which are not seen as dangerous, but that take a considerable amount of time to extinguish.

However, Coed y Cymoedd no longer operate a fire rota¹⁴, and South Wales FRS have placed retained fire fighters¹⁵ on a salary rather than a payment per-call out basis. This is considered to have tackled the issue of fires set by this group.

Adults

Our research reveals considerable overlap between the motivations of adult wildfire arsonists in South Wales and those that drive young people.

Historical and anecdotal evidence is linked with the idea that wildfires were set as a form of protest against Forestry Commission Wales' acquisition of land and unpopular planting regimes. However, this is not something that is considered to be a driving force behind wildfire arson today.

FCW employees expressed the opinion that fires may be set as a form of protest against land managers and management techniques. It is thought that some residents dislike certain types of forests, including densely planted woodlands containing non-native species. Furthermore, some respondents suggested that trees backing on to houses and a lack of managed access to forests may encourage firesetting.

However community stakeholders have dismissed the idea that fires are set as a form of protest:

"I doubt that they know they're setting fire to Forestry Commission land, I don't think they care where it is, or who owns it."

-Community Worker, Treherbert

¹⁴ A system by which staff from the district were placed 'on call' during the fire season to attend fires and aid the fire service in tackling the fire. The fire rota system ceased in the first decade of this century.

¹⁵ Fire fighters employed on a part-time basis, often paid a retainer fee, with this being topped up per-call out.

Young people

Young people or 'kids' is the group of people primarily blamed for firesetting. However, 'young people' should not be treated as a homogeneous group. Below we discuss the variety of motivations that influence wildfire arson among young people in South Wales.

Data were gathered from young people through semi-structured interviews and questionnaires with open and closed questions. The results of the questionnaires reveal that only 6% of young respondents (n.30) had no previous experience of wildfires. The young people who responded to the questionnaire felt that the majority of fires were lit by people under 16 (49%) and by older teenagers (38%), and that the majority of fires were lit due to "boredom" (46%) or for "fun" (17%) or because the firesetter was drunk (17%).

It must be noted that the data gathered during interviews with young people should be treated with caution. Firstly, not all of those young people interviewed had previously set fires. Additionally, some respondents were more vocal than others and, for some, there may have been an element of bravado in the stories they relayed.

The young people who admitted to starting wildfires during interviews (17 of all young people interviewed at Phoenix courses – about half) expressed a number of motivations, many of which point to a lack of understanding of the potentially serious consequences of their actions. The following quotations from interviews provide some illustration of this:

"I was steaming [drunk] ",

"There's nothing else to do"

"My girlfriend stole my hat and said she wouldn't give it back unless I lit a fire"

"We just wanted to see what would happen"

"Dunno really".

Boredom

Respondents from all stakeholder groups and, in particular, young people, cited boredom as being a driver for wildfire arson. During an interview, one respondent explained:

"It's because there's nothing to do, it's boring round here"

-Self-confessed firesetter, Afan Valley.

47.8% of respondents to the public survey believe that boredom is the primary driver behind wildfire arson. Young people questioned in South Wales at Phoenix courses stated that it is hard to fill their days with interesting things (76% of 25 respondents).

Previous research using a tool called the Boredom Proneness Scale has shown a link between proneness to boredom and engaging in sensation- or thrill-seeking behaviour such as wildfire arson (Farmer and Sundberg, 1986). Other research has shown that feeling bored may push individuals or groups into creating 'temporary autonomous zones' through engaging in instances of momentary excitement (Bey, 1995: 39). This may involve actions that contravene societal rules and conventions, such as acts of violence, vandalism or arson. Ferrell (2004: 10), refers to these actions as 'self made dynamics of engagement and excitement' that help the perpetrator to 'transcend the structures of boredom'.

However, the extent to which 'boredom' actually drives people to set fires is contested. Respondents have raised the issue that there is far more provision of services in South Wales than in the past and that young people should not really be bored:

"It did happen when I was a kid, but I think that is more severe now, but I think that the difference is the culture was different, there is more provided for them ... easy entertainment. I think that that has led to a culture of 'entertain me' and they won't go and make up this game, or whatever. This sort of culture has disappeared, I think that culturally there has been this shift that kids are bored, not because there is nothing to do, but because they can't entertain myself. Passive entertainment, rather than active"

-Firefighter and resident of Rhondda

"It's not as if there's nothing to do, its that it isn't what people want to do"

-Young person, Bernie bushcraft event

Some interviewees felt that young people are less inclined to play outside 'on the mountain' as their forebears were, and that:

"Playing for them is Playstation"

-Firefighter - Rhondda

Some young people are unlikely to use the outdoor environment around them, while others are enthusiastic about the area that surrounds them, casting into doubt the idea that young people are not interested in the outdoors. Our research found that some young people do not spend much time in the forests near their houses. For some this is as a result of fear that older people hang out in the forests and drink, making the area unsafe for them. For others, their lack of engagement with forests is more a reflection of a general sense of apathy towards the outdoors:

"I wouldn't come here by myself, only if I was on something like this [an organised event]"

-Young person, Bernie Event

For other young people the outdoors around their houses, towns and villages do provide a location for recreation, albeit not always legitimate forms of recreation. Camping in the forests, off-road motor biking, and building unofficial BMX or mountain biking trails number amongst some of the activities mentioned in interviews and discussions.

Millie (2009) proposes competing narratives regarding drivers for behaviour deemed 'antisocial' that can coexist when explaining youth behaviour, namely:

- Social and moral decline;
- Disengagement, and
- Kids will be kids.

All these narratives, along with boredom and, perhaps more loosely, peer pressure, create what Millie (2009) has termed, 'a great excuse for deviancy'. Young firesetters, and those who work with them, tacitly acknowledge this. It appears to be easier to be bored than it is to engage positively and constructively with the local environment.

"It's easier for a kid to just say "I'm bored" and go and hang about on the street than it is to go and, you know, actually do something that is a bit creative, entertain themselves. There's more provision for young people than there used to be around here, they just aren't interested."

-Firefighter, Rhondda

The use of the notion of boredom and an associated lack of alternative pastimes to explain behaviour is, perhaps, less a reflection of reality and more a construction used by firesetters. Constructing this perspective allows firesetters to deflect responsibility away from the individual (themselves) and towards wider social circumstances of which they cast themselves as the victim. If alternative activities are rejected in favour of "just

sitting on the wall, hanging about” (Young, self confessed firesetter, Afan Valley), or firesetting, then it should be questioned whether responsibility for an individual’s boredom rests with society or with the individual.

Firesetting as thrill seeking

A female community worker in Treherbert suggested that some firesetters set fires with the express intention of watching them being extinguished by the fire service as a form of entertainment. She explained that areas are selected that offer easy access both for the setter and fire services, because part of the draw of wildfire arson is *“to see them tackling the fire”*. Fire and rescue service staff and community members also corroborated this. Here, the perceived motivation for the setter(s) is to see fire engines arrive and to watch the fire being put out. This fits with the motivation included in our typology of fires set to ‘create excitement or relieve boredom’.

Firesetting as a developmental stage

Many respondents agreed that most people have the potential to engage in firesetting:

“There’s sometimes a little arsonist inside all of us”

-FRS Watch staff SWFRS

“Everyone goes through a stage of lighting fires, don’t they? But some people, and there’s only a few, take it too far”

-19 year old boy, Afan Valley

That most people engage at some point in their life in playing with fire is, to some extent, true. As respondents explained, fires are interesting to look at and can be fun or exciting for those lighting them. Providing the facility to light fires in a controlled environment, thereby satisfying this latent fascination with fire may have a positive impact on reducing unsafe fireplay in South Wales.

Malevolent ownership

The issues of perceived and actual ‘ownership’ and use of land in the Valleys is key to understanding wildfire arson in South Wales. In this sub-section we discuss these issues from the perspective of the motivations behind firesetting expressed by self-confessed wildfire arsonists from in and around the Afan Valley.

The term 'malevolent ownership' comes from an interview with a member of staff from Forestry Commission Wales based in Coed y Cymoedd. It encapsulates an idea that young people in the Valleys have a sense that they own the land around where they live, and this conflicts with the reality of land ownership and management in the region.

A telling interview with one youth worker who had grown up in the area suggested that for many young people the Valleys are seen as "a pretty prison". Aesthetically the area could be admired, but the lack of transport out of the valleys and a seeming lack of prospects for local residents creates a feeling of being trapped.

For many community respondents, the valleys in which they live do not offer opportunities to engage with the natural world, but are seen as a place where "nothing happens". Respondents felt that their local area was not particularly special, as they do not feel excited by or drawn to the activities and facilities that are not provided for them.

"There's a youth club, there's a playground, we don't need any more stuff like that"

For some young respondents there was a greater desire for unstructured activities; they felt excluded from areas that they could potentially use due to lack of resources, or were critical of the perceived lack of quality of services:

"There's a football pitch, with floodlights but you've got to pay to use that"

"The park is pitch black at night, we go and sit there and get steaming [drunk]. You can't do anything else"

"The trails there [at local Mountain Biking centre] are rubbish, we go in the forest and make our own."

Despite a stated desire for "more of everything", as one respondent put it, it is also obvious that when facilities are provided they do not always receive the uptake necessary to maintain them:

"We had water sports, but that was cancelled because not enough people came. So now we'd have to go to Cardiff and [name of youth worker] doesn't want to do that, and we couldn't afford to go anyway."

-Youth Worker, Afan Valley

There appears to be a fine balance between a desire for improved services and the rejection of those already available. For some young people, the answer to their problems lies in improving the services and facilities available to them, while for others

there is a demonstrable desire to ignore organised activities. Furthermore, many respondent's attitudes are mixed and sometimes contradictory - within the space of a few minutes during an interview, a respondent could switch from suggesting that they needed more things to do, to reporting that they did not want to engage with certain activities or clubs that had been provided.

Some young respondents expressed the view that continued criticisms by adult residents of the activities that they perceive as being not entirely legitimate will lead to an increasing divide between generations. Some young respondents felt that their desires and needs were ignored in favour of other people's (i.e. adults'). This was an especially prevalent feeling in discussions of off-road biking, but also camping.

The area surrounding the valleys is largely covered by forest and heathland. While Forestry Commission staff and other interviewees saw the multi-purpose value of these land-uses, either as areas of natural beauty, as Sites of Special Scientific Interest or as an economically viable forest crop, most of the young people interviewed were unaware of the worth or use of the forest. As one young respondent stated:

"There's all this forest there and no one is ever doing anything with it, so why am I not allowed to ride a motorbike there?"

Conflicting demands on use of land, perceived exclusion from land and activities and a strong sense from young people that they own the valleys in which they live can combine to motivate firesetting behaviour.

Firesetting as rebellion

If a message tells individuals or communities not to do something, there is a chance that they will respond by rebelling against the message. This point is well illustrated by perceptions of events run as part of the SWFRS Bernie campaign (see Chapter 7):

"Since Bernie's been out there have been loads [of fires], I think people are doing it to take the piss"

-Young person at 'Bernie' Bushcraft event

"My son is at school, and he's said it's quite competitive. He's well up in school and in education, but some of the others in school have been saying 'we see X amount of Bernies, we'll light X amount of fires', it's a vicious circle"

-Fire Service Personnel, Rhondda

"The only thing I will say is that Bernie the sheep, this thing they've introduced, a couple of kids that I've spoken to, on a personal basis, and I've had reports from

others, is that since Bernie the sheep came out everybody is out lighting fires now"

-Fire Service Personnel, Rhondda

Although statistics show that the Bernie project brought about a net decrease in wildfires in the local area, there was a perception that some wildfires which started around that time were a direct reaction to the project. Rebelling against anti-wildfire messages can prove to be an especially strong driver for younger residents. Respondents have suggested that young people are likely to do the opposite of what they are told to do:

"They're [young people] like firemen really, tell us not to do something, we'll do it you know?"

-Firefighter, Rhondda

Firesetting and associated criminality

Firesetting is not the only criminal or antisocial activity engaged in by some respondents, allowing the conclusion that firesetting can form part of a spectrum of criminal behaviours. Some (n= 9) respondents admitted to having been cautioned or talked to by police, sometimes for relatively minor infractions, often involving alcohol. Others had been picked up for such petty acts of vandalism:

"Kicking bus shelters, but it wasn't just me"

The theme of the general criminality of wildfire arsonists also emerges in interviews with stakeholders. Wildfire arsonists are perceived by many to be people who would engage in other forms of antisocial and criminal behaviour.

"It's a minority, the same ones that are going to take drugs, steal cars, get in trouble"

-Institutional Respondent, Rhondda Valley

Adult interviewees often saw the behaviour of young people as antisocial, even extending this definition to relatively harmless activities, such as hanging about, playing football or cycling in the park. This generational divide in perceptions of behaviour is something that has been noted previously (Millie, 2006, 2009).

If leisure activities are constrained for young people by rules that appear to be unreasonable, then it may be understandable that young people will find ways to alleviate their boredom. Spending time with friends, even if this just results in hanging

about doing nothing, was considered to be less 'boring' than other activities, even though this often involved drinking.

Psychological pressures

There is little evidence to suggest that wildfire arson in South Wales is related to psychological disturbance. Fires set for psychological reasons were seen by institutional stakeholders to occur primarily in or around the setter's home, and often as a response to abuse:

"You'll find that young people who have been abused, particularly girls, will set fire to their bed, or places around the home that remind them of the abuse"

-Firesetter intervention scheme employee

However, there were reports of wildfire arsonists being in some way psychologically disturbed:

"There was one boy, he'd go out by himself [to light fires], there was something not right about him, you could see it in his eyes ... He died of an overdose"

-Community Worker, Treherbert

Firesetting for fun

As previous researchers have argued, delinquent behaviour is sometimes a means to an end - a way of creating fun or relieving boredom (Cohen, 1955). Only one of the research respondents who admitted to setting a fire claimed that a large fire was the specific aim of their activity. In all other cases firesetting was a group activity where the primary motivation was entertainment. The thought of setting fires alone was dismissed as 'weird', and was certainly something that the respondents viewed as somehow different to their firesetting activities. For many young people who have set vegetation fires, the fire itself is perceived as an incidental, and not always an intentional outcome of the actual act of lighting a fire.

Firesetting as a predominantly group activity emerged as a strong feature of all the accounts of fires elicited during interviews. It was either conceptualised as something that happened as a result of peer pressure, or the need to impress other people (especially girls). There appears to be certain kudos in the ability to light fires and firesetters can gain a positive social standing through their ability to light fires well. A primary motivation for firesetting, as one young respondent put it, was

"to have fun and act hard. LOL."

There is a positive benefit for some young people in being seen as 'hard', or as Katz (1988) has termed it, being a 'badass'. A studied nonchalance and apparent disregard for authority can go a long way in gaining social status. Getting in trouble, while not being seen as a fun thing to do, does earn 'street-cred' and *"having trouble with police"* (Self reported firesetter, Phoenix Course) is not always seen as a bad thing. It remains unclear how much of this is an "act" to gain social standing amongst peers, and how much is an accurate reflection of an individual's character.

One participant, who was identified by fire service staff as a persistent firesetter prior to the interview, claimed that one fire he had recently set was as a result of his girlfriend stealing his hat *"and she said she wouldn't give it back unless I lit a fire"*. Other fires that he claimed responsibility for were set by him, but in his capacity as the 'leader' of a group. Other participants in that interview admirably singled out this boy as being:

"Really good at lighting fires ... he can get anything going"

For other respondents, fires were the result of activities that had not directly set out to cause damage. Some participants described a sense of boredom with their surroundings and activities that were provided for them, and how they would go camping in the wooded and grassland areas around their houses. The primary focus for participants in going camping was to "get steaming" [drunk], something that featured heavily as a leisure activity, and to have a fire. In this context fires can be small campfires set with the express intention of keeping warm, while others can be better conceptualised as wilful vandalism:

"...so we piled wood and grass all around the tree and got it burning and it got really big, and when the fire went out the tree was completely burnt at the bottom and really thin, nearly all the way through, like you could just push it over"

Some interviewees explained that although they had lit a fire intentionally, the subsequent spread of the fire was not an intended consequence.

Respondent: "We were having a fire and it got really big, so we tried to put it out by putting grass on it, but it just got bigger"

Researcher: "Why did you throw grass on a fire?"

Respondent: "We were steaming, it seemed like a good idea. We just ran away then"

"We lit it, it got really big, so I called the fire brigade and we ran away and sat and watched them put it out."

We suggest that for some young people, starting a large vegetation fire may be in and of itself a positive activity, but for many others it is an unintended consequence of enjoyment and experimentation:

“just throw[ing] things on the fire and see what happens, we put a can on there and it exploded and some fire hit me ... like an experiment”

While adults and external observers may see the issue with this as a form of recreation, there is little to suggest that the young people interviewed view these actions as particularly naughty or socially unacceptable.

A Revised typology of motivations

The research data presented above inform a number of important adjustments to the typology of motivations behind wildfire arson in South Wales presented earlier in the chapter. The revised typology takes into account both the collected data and preserves certain elements of the provisional motivations typology based on a review of relevant research literature. As seen throughout this chapter, different motivations and social drivers will influence different groups of wildfire arsonists more than others. This section will discuss the revised typology (see Figure 24, below) and analyses the relationship between elements in the typology and the wildfire arsonist group to which they are most applicable.

The typology contains eight elements, each of which refers to motivations for wildfire arson. Some motivations have multiple elements to them.

A Revised Typology of Motivations for Wildfire Arson

- Wildfires lit to relieve boredom
 - Perceived lack of service provision
- Wildfires lit in response to Socio-economic situations
 - Wildfires lit due to issues related to social and economic contexts
 - Issues with engagement between wildfire arsonists and their environment
- Wildfires lit to aid land clearance
 - Uncontrolled, and un-reported burns getting out of control
- Wildfires lit for fun
 - Fires lit as part of other activities without the aim of causing a wildfire
 - Group 'activities', including 'competitive' firesetting and 'campfires'
- Wildfires lit as part of associate criminality
 - Wildfires which are similar in motivations to other forms of vandalism
- Wildfires set as an act of rebellion
 - Wildfire arson that occurs as a direct result of mitigation efforts
- Wildfires lit as a result of psychological pressures
 - Fires set due to mental issues
- Wildfires lit with an unclear motive
 - Wildfires set for a reason that cannot be identified.

Figure 24: A revised typology of motivations for wildfire arson in South Wales

Wildfires lit to relieve boredom, and wildfires that are lit for fun are similar, in that there may not be the explicit intention of lighting a wildfire behind their setting. These motivations encompass fires that were set small and subsequently spread to create a wildfire. These motivations are most likely to relate to firesetting by young people. As can be seen throughout this chapter, issues of boredom are often raised in relation to wildfire arson, as is the idea that wildfires are seen by some as merely being harmless fun.

As noted, the socio-economic context of the Valleys region has a connection to the number of fires in the area. This has been set out as a separate 'motivation', although it can be best understood as a contextual driver behind wildfire arson. All attempts to understand and respond to wildfires in South Wales should include a consideration of socio-economic context.

"Wildfires lit to aid land clearance" encompasses farmers' and land owners' motivations for wildfire arson. Land owners may not see themselves as engaging in arson, but unless

reported prior to burning taking place, a wildfire set by a land owner will be treated the same as any other wildfire in South Wales.

There is a high level of criminal activity in the forests of South Wales. As such, we have included the motivation of associated criminality. This includes fires that are set for similar motivations to other criminal and antisocial behaviour, such as vandalism, and fires that are a result of other crimes, such as car theft and fly-tipping. This relates largely to older teens and adult wildfire arsonists in South Wales.

“Wildfires set as an act of rebellion” includes wildfires that are set due to conflicts over land use, perceptions of unfair rules governing ownership of areas, as well as wildfire arson that occurs in direct response to efforts aimed at preventing wildfires.

“Wildfires lit as a result of psychological pressures” is included largely in response to literature of firesetting. Young people and older residents may have psychological issues that lead them to light grass and forest fires. Respondents with knowledge of this motivation suggest that firesetting as a cry for help, or driven by psychological issues is more likely to occur in or around the home than in areas outside the home.

We also include “wildfires that are set with unclear motives”, as do other commentators (Willis, 2004). It is not possible in all situations to know why a fire was started, and any potential wildfire arsonist may light a fire without being able to explain exactly why they did it.

Conclusions

The presentation and discussion of a typology of motivations can be usefully linked to the various categories of wildfire arsonist, showing that wildfire arsonists and their motivations are not homogeneous. Motivations and drivers which influence wildfire arsonists depend on the identities of the arsonists involved. We have shown that motivations that lie behind wildfire arson are linked to the identity of the given arsonist.

The issue of boredom as a driver of wildfire arson was frequently raised during research encounters with a range of respondents. Our research has demonstrated that the term is frequently used as a catch-all phrase, used to articulate a complex range of issues, such as the perceived lack of service provision, attachment to the surrounding environment, as well as contested notions of what count as legitimate activities for Valleys residents within the forests that border on their communities. Young people, in particular, have expressed the opinion that they have little to do in the areas of the Valleys in which they

live, and this perception, even if it is not entirely accurate, can lead to young people engaging in a variety of antisocial behaviours, one of which is wildfire arson.

Our research indicates that there is a correlation between wildfire arson and the socio-economic situation evidenced in the valleys of South Wales. That there has been previous research which links social deprivation to incidences of fire (Canter and Almond, 2002; Corcoran et al., 2007; Eccles, 2001; Jennings, 1999) indicates that firesetting, fire occurrence and wider social context are intimately linked. This is a primary finding and should encourage institutional stakeholders to consider how their wildfire arson mitigation strategies relate to much wider socio-economic issues in the Valleys region.

Recommendations

Future mitigation strategies should take into account the variety of motivations that drive individuals to commit wildfire arson. Depending on the audience (see chapter 5), mitigation strategies need to be altered to address the specific motivations relevant to a particular group. The Bernie project used information gathered from the local area in order to tailor mitigation measures to target audiences.

The prevailing opinion in South Wales is that the majority of wildfire arsonists are young people in their teenage years. These young people are likely to set fires for fun, to relieve boredom, as part of associated criminal behaviour, and in response to their socio-economic situation. Mitigation measures that target these root drivers will have more success in combating wildfire arson than information campaigns and education initiatives targeted at the general population.

The forests and valleys of South Wales have an issue of competing land use requirements of different user groups. A more open usage policy governing access to public land and what activities are permitted and prohibited will create an environment that is more appealing to a wider range of user groups, will raise awareness of the actual uses of the land, and facilitate informal surveillance of forests and grasslands. Many research respondents mentioned off-road motor cycling as either being an issue linked to firesetting (as a mode of transport), or to the lack of provision for such activities (thereby encouraging greater antisocial behaviour in the forests of South Wales). While those who light fires are unlikely to be serious off-road motorcyclists, providing spaces for the legitimate use of the forests by this user-group could be tested as a potential method of decreasing wildfires. Organised, legitimate access to Forestry Commission Wales land in South Wales for off-road motorcycles may result in stronger feelings of entitlement to, and ownership of the forests and may increase levels of informal surveillance in forests and wild areas of South Wales.

If wildfires are to be tackled conclusively then there is a need to address the root causes which appear to lead to firesetting. At present wildfires are treated as a single issue, as opposed to a symptom of socio-economic deprivation. Viable solutions to the problem will require agencies to address some of the root causes of deprivation and the perceived lack of opportunity that characterises many people's identification with the South Wales Valleys region. Interventions should be tied into wider regeneration programmes in the Valleys, and should be delivered by a wide range of partner organisations in the public, private and third sectors. Immediate opportunities are provided by the Heads of the Valleys and Western Valleys regeneration programmes.

7. What mitigation measures are being used and how successful are they?

For as long as wildfires have been perceived to be a problem, there have also been attempts by stakeholder organisations both to prevent them occurring, and to mitigate against their impacts. In the 1960s the Forestry Commission saw that there was an issue of schoolchildren lighting fires on the hillsides of South Wales that damaged grasslands and relatively newly established forests. At this time literature shows that the Forestry Commission were already attempting to educate young people about the dangers of fires in the forest (Edlin, 1961; Balchin, 1971).

This chapter focuses on research carried out with youth groups and organisations in Aberdare, Treherbert, Cwmafan and Tonypany, looking at a range of activities and projects dealing directly or indirectly with wildfires and wildfire arson.

Types of mitigation measures

During the project's scoping phase a typology of mitigation strategies was drawn up to help structure and target the research (see Figure 25). The typology divides efforts to reduce incidences of wildfires into four areas which cover all current methods used by stakeholders to mitigate against fire risk.

A Typology of Wildfire Arson Mitigation Strategies

- Operational Proactive (e.g. Designing in firebreaks, clearing areas, limiting access)
- Educational Proactive (e.g. Education programmes delivered prior to firesetting incidents)
- Operational Reactive (e.g. Provision of more effective firefighting equipment)
- Educational Reactive (e.g. Education once a firesetting incident has occurred)

Figure 25: A typology of wildfire mitigation strategies

Broadly, the typology divides mitigation measures into 'Educational' and 'Operational' tactics. Operational strategies are those which involve techniques used to fight fires (including training of fire fighters in wildfire fighting, and provision of specific equipment); target hardening techniques; as well as creating firebreaks and surveillance operations. Educational tactics include awareness raising amongst the wider population

through campaigns and press reports, school education programmes and firesetter intervention schemes. Further to these two divisions we differentiate between 'proactive' and 'reactive' mitigation strategies. This distinguishes between strategies that are used either before an incidence of wildfire arson occurs and those which can be used to improve responses to wildfire arson (reactive), or that can be used to prevent further incidences (proactive).

This chapter evaluates a number of mitigation strategies that are currently in operation in South Wales and provides workable recommendations for future work.

Operational proactive strategies

As part of the forest design process, planning teams for Forestry Commission Wales work with a range of stakeholders and partners to develop the plans for the spatial organisation and management of areas of forest. There have previously been attempts to design in firebreaks that can help to tackle the spread of large-scale forest fires. Recently, this has been given less emphasis within the planning process, may cause problems in the future. Risk planning which addresses increased fire risk as a result of climate change, including the designing in of firebreaks, should be a priority for Forestry Commission Wales. As a Met Office employee put it:

"We're looking at the forests of the future, and you've really got to think about what the climate is going to be like. If there are going to be more and more severe fires in the next twenty, thirty years, those are the forests that are being planted now, those are the mature trees that are going to be at risk."

-Met Office staff

Related to this is the issue of tree felling and clearing the brash¹⁶ left behind by forestry operations. There is an operational need to retain carbon in the forest area, and brash is often left in recently harvested areas. However this can cause problems:

"Tell me about the brash?" he [local Rhondda firefighter] asks "Couldn't you do something with that?" His concern is that the brash will dry out and cause a fire hazard, then, when it comes to fire fighting "there's a likelihood of ankles being twisted and hoses and equipment being damaged"

-Extract from research notes

Forestry Commission managers and planning team members have been receptive to ideas of designing out fire impacts at the planning stage. This can be easily implemented with minimal impact on the planning and productive forestry process.

¹⁶ Cuttings from trees that are a by-product of the felling and thinning processes.

Other proactive strategies include the work undertaken by the Rural and Forestry Team (RaFT) based within Mid and West Wales Fire and Rescue Service in the Port Talbot Fire Station. The team covers the Neath Valley, the Afan Valley and surrounding areas. RaFT have access to two off-road motor cycles and 4x4 vehicles. RaFT's focus is not specifically wildfires. The team has a wider remit to address rural fire safety issues. However, the existence of the group has increased Fire and Rescue Service surveillance of forested and rural areas around Neath Port Talbot Unitary Authority. Working with Coed y Cymoedd's district Police Officer the actions of RaFT have resulted in the seizure of illegal off-road bikes, prosecutions for fly tipping and an increased capacity for engaging with forest users in the area.

Educational Proactive strategies

The most visible attempt that Forestry Commission Wales in Coed y Cymoedd Forest District make to educate young people about the impacts of vegetation fires is a 'station', (a specifically designed area) at an all-schools event known as Crucial Crew. The main Crucial Crew site in the Rhondda is based in a building known as the 'Safety Zone' in Treforest, just outside Pontypridd. The Welsh Assembly Government's Cymorth Fund funds the location, and the Safety Zone is run on a not-for-profit basis.

Crucial Crew is an education programme delivered to schoolchildren in their final year of Primary education across South Wales. A number of organisations participate in the events, including the Police, the Fire Service, Food standards and Welsh Water. Crucial Crew events aim to provide information about personal safety to young people before they reach an age where their peers could influence them to act in dangerous ways.

The FCW station at Crucial Crew focuses on informing young people of the danger of wildfires, alongside other forestry issues, including fly tipping, and the legitimate activities that are available to young people and families. Each visit to the FCW station lasts ten minutes, and is delivered to groups of around ten year six pupils. At present a company called Chance Encounters delivers the message. During the event each group is welcomed to the FCW station by an employee from Chance Encounters, dressed in a Forestry Commission corporate clothing. The presenter talks briefly about the forest and then shows a short (5 minute long) video about two boys who light a forest fire. At present Crucial Crew costs FCW around £20,000 per year.

Interviews with children and young people show that many remember attending Crucial Crew, and the reception to it is largely positive. Their memories of the FCW area are of the section in the video where they are shown animals injured or killed by wildfire. Our research shows that 81% of young people questioned about the success of Crucial Crew believe that it is a good method of preventing wildfire arson.

Observations at three separate Crucial Crew events revealed that the time spent on the presentation could be better utilised. The presentation was not being delivered as laid out in the script provided by FCW to Chance Encounters. Additionally, there were a number of different messages being presented, including respect for wildlife, the activities available in the forest, fly tipping and the dangers of wildfire. There did not appear to be a coherent message being delivered, and the presentation as a whole did not hold the attention of the young people involved.

After discussions with the local area manager responsible for Crucial Crew, a re-written script was agreed between the FCW employees responsible for Crucial Crew and Chance Encounters as a result of this research.

Forestry Commission documents demonstrate the use of educational initiatives for over half a century (Edlin, 1961). The persistence of wildfire arson in South Wales suggests that, while there is a perceived need to educate young people about wildfires, these initiatives have not made a significant impact on the occurrence of wildfire arson in the area. This supports the suggestion that the money spent on Crucial Crew, which is already targeted towards areas prone to experiencing wildfires, may be better re-directed towards other mitigation strategies. However, it should be stressed that predicting the impacts of removing information about wildfires altogether from educational encounters lies beyond the remit of this research.

As part of proactive educational activities, information is also disseminated to the wider public by both the fire and rescue services and FCW. Understanding how much information reaches residents is important for planning any future publicity or intervention campaigns. Results from the public survey show that only 13% of respondents had ever seen information about wildfires in their local area. However, as discussed earlier, those who had seen information about wildfires in their area were much more likely than their peers who had not seen any information about wildfires to consider wildfires to be a problem in South Wales. The majority of those (13%) of respondents who had seen information about wildfires had seen the information in a newspaper (23%). Other media that people report having seen information about wildfires included on television (19%), on a poster (19%) and in leaflets (17%). Of the 1025 respondents, to the public survey 32 were aged between 16 and 19. Of these, 6% reported having seen information about wildfires while at school.

Our research indicates that the information entering the public domain may cause confusion about the causes of wildfires (as mentioned in Chapter 2). For example, information has included references to broken glass being a fire hazard, thereby perpetuating the myth that wildfires can be started accidentally.

During the course of this research there has been a move by both Fire and Rescue Services and Forestry Commission Wales to agree consistent messages about wildfire and to remove ambiguous and misleading information from published literature, press releases and online communications.

Our research results suggest that increasing the focus of efforts to disseminate information about wildfires to the wider public may have a greater impact on general awareness of, and willingness to tackle the issue than merely focusing on school-age children.

Operational Reactive strategies

In order to tackle vegetation fires more effectively, Coed y Cymoedd forest district have made the decision to step back entirely from fire fighting duties. Until the mid-2000s, FCW staff were on a 'fire rota' during the summer, putting staff members 'on call' to fight wildfires that were on, or posing a danger to, FCW land.

At present FCW do not have an all-Wales policy on fire response. This is due to the perceived differences in causes of wildfires in each district, as well as the differences in numbers and intensity of fires experienced in each district.

Coed y Cymoedd forest district currently provides the fire services (through South Wales Fire and Rescue Service) with the means of procuring a helicopter for a period of each year. The helicopter is used on areas of Forestry Commission land and for areas immediately adjacent to Forestry Commission land. The provision of a helicopter for firefighting purposes, new training in wildfire fighting for firefighters, and the ceasing of FCW staff attending fires has been well received by firefighters and FCW staff alike. Frequent meetings and increased co-operation between the agencies has improved the operational response to wildfires.

"Before we were going out to grass fires, and none of us were really trained, we didn't have the right equipment, we weren't doing any good out there. It was sensible to move us away from firefighting, we're not trained for it, the fire service are"

-FCW employee, Coed y Cymoedd

The movement towards using specially trained staff to fight wildfires is considered to be time and cost effective. One officer who had been trained explained the benefit of the increased knowledge of wildfire fighting techniques:

"Since we went to Northumberland [for wildfire fighting training] we've been using only a couple of appliances [fire engines] on fires that would have needed five"

pumps before. Now I can go to a vantage point, direct operations remotely, and we'll look at the slope, position people in the right places... It's made our jobs easier, especially knowing we can call in the helicopter if we need it"

-Firefighter, Rhondda

In addition, the Fire and Rescue Services have been provided with digital, and hard copy maps of Forestry Commission Wales forests in Coed y Cymoedd, as well as keys that open the barriers at forest entry points. FCW have, by their own admission, taken a more 'back seat' role in fighting wildfires, but it is considered by Forestry Commission and Fire Service staff to be a more tactical and strategic use of resources.

"It got to the point where we had people who should not have been out there fighting fires – we weren't trained, and these were men in their fifties and sixties who work in an office, it was dangerous."

-FCW staff member

At present, only trained fire fighters are deployed to actively fight fires. However, not all firefighters were fully aware of the changes, and some felt that they no longer have full support of FCW. Greater dissemination of information about changes to FCW policy to external agencies may help increase understanding within partner organisations of how and why changes are implemented.

"When you used to go to a fire in the forestry, you'd get there and the Forestry Commission would be there too. But now you go up there, they're not around and it sort of makes you think 'if they don't care about the trees, why should I be up here?'"

-Firefighter, South Wales

From a tactical perspective of those in Headquarters, a decrease of man-hours spent fighting wildfires is a positive development. However, there is seen to be a need to explain more fully the changes in policy to all staff. FCW and the FRS are on the way to more integrated and cost effective management of wildfires. These mitigation strategies are of positive benefit to all agencies involved.

FCW can also work to aid the Fire and Rescue Services in South Wales to react to wildfires by creating areas which can be used for fire breaks and access. This is something that can be built in at the forest design stage. This should be balanced against loss of income due to reduced planting, and the additional costs associated with road and access construction in the forests.

Educational Reactive strategies

'Educational reactive' mitigation strategies include interventions with firesetters who have already committed an offence. These are extremely difficult to implement, not least because of the low rate of detection, and zero conviction rate for wildfire arsonists currently seen in South Wales.

'Firesetter Intervention Schemes' are currently used by the FRSs that cover Coed y Cymoedd. These are run from within the fire services, and focus primarily on firesetters who have been referred by police, parents, schools or other organisations for lighting fires on school premises or in and around the home. Therapy sessions are used to encourage young firesetters to think about their actions before they light a fire, and they are supported through other issues that lead them to set fires. The staff that run these schemes say that some people they see admit to also lighting wildfires. However, this has never been the reason for a referral. If a wildfire arsonist was referred the programme could prove useful.

There are other projects currently underway that focus on groups of young people who may engage in firesetting as well as other dangerous and antisocial activities. An example of this approach can be seen in the work of the Rural and Forestry Team (RaFT), a small group based in the Mid and West Wales Fire and Rescue Service Community Safety Team. This group focuses primarily on the Afan, Neath, and Swansea Valleys and provides a number of services to local residents and local youths (further information about the work of the RaFT team can be found under the operational proactive heading in this chapter).

Part of their work involves courses known as 'Phoenix courses'¹⁷. Groups of around 7 to 10 young people aged between 11 and 17 attend the courses. Often schools or youth workers select the attendees. Some of them, but by no means all, have exhibited either firesetting behaviour alongside other problematic behaviours.

The course is intensive and takes place over five days. During this time the young people are taught a fire service drill, including the use of ladders, hoses and a fire engine. This is in preparation for a 'pass out parade' on the final day of the course, which is sometimes attended by family members or youth workers. In addition, the young people are shown educational videos and presentations, are given a guided tour around the fire station and generally develop fairly good rapport with the staff leading the course.

¹⁷ Similar courses are run throughout the country, and some tie in with the fire service run initiative 'young firefighters'

At the nine Phoenix courses attended as part of this research, the young people attending were largely enthusiastic about the course. After the course leader developed a new presentation about the dangers of wildfire arson one young person attending the course became completely silent and would not eat his lunch¹⁸. His youth worker said

"I've never seen him like that, maybe that presentation got through to him. We know he's been lighting fires before, hopefully he'll remember this."

-Youth Worker, Afan Valley

Educating those who are suspected of engaging in wildfire arson can have positive outcomes, perhaps more than efforts targeted at the wider population of young people in South Wales.

The police and wildfire mitigation strategies

There is a concern among some institutional stakeholders that a lack of police engagement with the issue of wildfires is holding back the application of effective mitigation strategies in South Wales. Prosecuting, let alone detecting wildfire arson is a difficult task for police. Additionally there is some confusion regarding what crime a wildfire arsonist could be prosecuted for. For the police to prosecute for arson, ownership of the land needs to be established, or a protected status of the land (Site of Special Scientific Interest (SSSI) for example) needs to be proven.

Dorset police have formed a partnership with the local Fire and Rescue Service and local council known as the 'Urban Heath Partnership'. This is backed up with an operational order which positions arson on the heath lands in Dorset as a priority for the police. This change has resulted in a marked decrease in heath fires by around 60%, according to members of the partnership (personal correspondence). A move towards a similar partnership in South Wales could be explored.

Forestry Commission Wales and wildfire education

FCW has education teams that carry out forest schools classes and other educational delivery related to forests and the natural environment. The education teams work with young people throughout Wales and, although their focus is not specifically on educating about the dangers of wildfire arson, they do some work with Fire and Rescue Services in relation to fire safety in forests.

¹⁸ The presentation focused on two young people, a brother and sister, who died in a house fire. The course leader in his presentation, delivered by PowerPoint, claimed that the two young people had died because no fire engines were available to put out the fire in time, due to being engaged with a deliberately started wildfire. While only a story, it was presented as fact.

At present Coed y Cymoedd forest district have one dedicated community ranger, and other staff with an interest in working with communities. However, as a result of decreases in staffing numbers, there are fewer people available to facilitate community anti-wildfire initiatives and other projects involving the communities local to FCW forests. Despite some interest from the wider community in volunteering with FCW there is currently no allowance made within the district for organised volunteering.

Placing an onus on FCW education teams to deliver anti-wildfire arson messages will bring the creation and delivery of the message ‘in house’ rather than being sub-contracted to actors, as currently happens at ‘Crucial Crew’ events. Other FCW staff could also be tasked with more community work, although this would have to be balanced with their wider roles.

Bernie – a proactive approach to wildfire prevention.

During the Easter period (traditionally one of the peak times for vegetation fires – see Chapter 1) South Wales Fire and Rescue Service ran a six week pilot programme of anti-wildfire events in a single town in Mid-Rhondda. Tonypandy fire station, is the busiest station for outdoor fires in the South Wales Fire and Rescue Service area (see figure 26).



Figure 26: Tonypandy - Location

The project worked to the principles of ‘Social Marketing’. Social Marketing utilises marketing techniques, alongside social science research methods to work towards societal change. It has previously been used in initiatives targeting health issues, but the

South Wales Fire and Rescue Service 'Bernie' project was the first time that such techniques had ever been used by a Fire and Rescue Service in the UK¹⁹.

The project targeted the issue of deliberate wildfires. The research carried out by the Fire and Rescue Service identified a target audience of thirteen to sixteen year olds in the Tonypany area. Along with stakeholders, an 'advisory panel' of young people was consulted about the project. The six-week period in which the 'Bernie' project was operational was the culmination of over a year's research in the local area.

The project involved a variety of different methods to reduce the incidence of fires, including increased observation of the area, youth engagement activities and a high-profile presence in the centre of town. Thousands of man-hours were put into this pilot project. Fire Service statistics show a decrease in the number of fires in the area over the course of the intervention, and that numbers remained low after the intervention ended. Statistics provided in one of the reports on the success of the Bernie project show that there were, in comparison to the anticipated number of fires (when compared with the control station of Aberdare) fewer vegetation fires in the project period than would be expected²⁰.

Because FCW was a partner in the Bernie project, the researcher was given full access to the events and took part in the 'Bush Craft' activity days. These were carried out on Forestry Commission land, in an area known as Llwynypia. These days enabled the researcher to interview a large number of young people from the Tonypany area²¹ and to observe first-hand the running and organisation of the project.

Support for the project

Staff in SWFRS Headquarters were extremely positive about the Bernie project, and spoke of a number of notable positive outcomes. One of the headquarters staff explained that:

"On the first few times we were out kids were ignoring us, or whatever, swearing, you know. But after a few days they would stop us, say hi, wave. It helped build bridges really"

-SWFRS HQ staff

¹⁹ Reports on all the stages of the Bernie project are available from South Wales Fire and Rescue Service. Their locations can be found in the 'References' chapter of this report.

²⁰ This is shown in the 'Results' report from the South Wales Fire and Rescue Service.

²¹ Data collected from interviews conducted over this period are used throughout this report.

The project increased the visibility of the fire service in the area, with a fairly constant presence in the centre of town, at the local secondary school and the general area. There was also some positive feedback from local residents,

"Finally someone is doing something about grassfires"

-Local man, Tonypandy

Young people at Tonypandy Community College were broadly supportive of the event. A Bernie launch event held at the College was well attended and there was a good rapport developing between the FRS personnel and the young people at the college.

Although the genesis of the project came from SWFRS, the emphasis was on the project being community-owned, rather than fire service-owned. The buy-in to the project from local young people was impressive. The project focused on one school containing about 600 pupils. There were 312 spaces on events which were taken up by local young people (some attended more than one session), and over 1000 people became 'friends' with Bernie on the social networking website 'Facebook'.

Over the six weeks of the project there was a 46% drop in callouts to wildfires in the area. Over the weeks it was active the project over the weeks it was active, utilised a total of 1,694 SWFRS staff hours. The demonstrable success of the project has encouraged the management of SWFRS to work towards 'rolling out' the project across other Unitary Authorities which experience wildfires. The future shape of the Bernie events will be a more partnership based approach, utilising time and financial inputs from Unitary Authorities, the police and other partners.

A critical evaluation of Bernie

Statistics show that wildfire incidents were lower than would have been expected, but this did not stop some criticisms of the methods and aims of the project. During the Bernie period there were a number of reasonably large fires in the area surrounding Tonypandy. Furthermore, the demonstrable reduction in numbers of wildfires did not translate to a perception amongst young people that there were fewer wildfires:

"Since Bernie came out there's been loads [of fires] ... I think they're doing it to take the piss"

-Young person at Bernie event

However, the perception of some respondents that there had been an increase in wildfires over the period the Bernie project was in action may have had more to do with an increase in awareness of wildfires as an issue. From records collected over the period

and analysed as part of the Bernie project, there was a relative decrease in fires of 46%²².

Institutional stakeholders also expressed the perception that there had been an increase in fires although this was not borne out by the statistics. An interview with firefighters after the Bernie campaign had ceased revealed that some staff had a negative view of the project:

"My son is at school, and he's said it's quite competitive, he's well up in school and in education, but some of the others in school have been saying 'we see X amount of Bernies, we'll light X amount of fires', it's a vicious circle"

-Firefighter, Tonypandy

Some watch-based staff (operational staff who work on the fire engines) felt that their overtime payments were being taken off them, in favour of community safety staff (staff based at the headquarters and who are not presently engaged in operational firefighting). Furthermore, for some there was a concern that the correct groups were not being targeted by the project. As one interviewee said

"If you were an arsonist, would you want to go and spend a day at the fire station being told that your hobby is bad?"

-Interviewee Tonypandy area

This is something that was echoed by some of the young people at the Bernie Bush Craft days:

"It's not that there's nothing to do, it's that the people that are doing it [firesetting] don't want to do the things they're given to do. But they don't want to do anything"

-Young Person at Bush Craft event

Some criticism of the project may have been the result of normal resistance to change. However some of the criticism may have been the result of stakeholders not feeling as if they were included in the project.

An evaluation based purely on the statistical evidence available would conclude that the Bernie project was successful. Fires in the area did decrease against fires in the control area. However, there was a sense that the project did not gain the full buy-in of all staff.

²² See South Wales Fire and Rescue Service Bernie reports. Location can be found in the references of this report..

"If you try anything new, people are going to be cynical, and you know, I'm cynical about it [Bernie]"

-Firefighter, Rhondda

The 'social marketing' ethos of the Bernie project may mean that while it worked in the area in which it was developed, in other locations the buy-in from communities and the target audience (as well as local fire service and council staff) may be lower. The cost of running the Bernie campaign in a wider area may prove to be high, but for 2011 there have been pledges of funding and buy-in of the project in four other areas. South Wales Fire and Rescue Service report that they have gained greater support from police, due to associated drops in crime and antisocial behaviour during the period of the Bernie project.

While some staff will continue to be cynical, there are a lot of positives about the project, not least the demonstrable success Bernie had in decreasing fires in Tonypandy. Information and statistics about the expanded Bernie campaign will be available from South Wales Fire and Rescue Service later in the year. If the partnerships prove to be successful and money is found to fund the project further, 'Bernie' could be an extremely useful tool for tackling wildfire in South Wales. The project could be well used as a focus for other initiatives to work around, giving the issue a profile that is recognised across a number of agencies.

Penyrenglyn – a community approach to wildfire prevention

Towards the top of the Rhondda valley is the town of Treherbert. This has traditionally been an area that experiences a large number of vegetation fires. 'Communities First' (an organisation which provides funding and support in some of the most deprived areas of Wales) facilitated the conversion of an unoccupied row of houses into a community centre. In addition to the centre, which provides exercise equipment, meeting areas, computers and other facilities, there is also a small area of Forestry Commission owned woodland that is managed by the community group.

The project is reliant on support from FCW, along with funding from a central organisation known as Valleys Kids. The staff at the project are highly motivated, and well resourced. FCW staff are concerned that it is not easy to set up and support such projects without committed input from the local community and well funded support from partner organisations.

During an explanation of the work done by the project, one of the staff explained:

"There is a move to place more emphasis on the natural environment. There are going to be moth traps, and there are already bird boxes in the wood. We've got a fire circle, and a barbecue too, and anyone is free to use that. We let the kids build dens in the forest, and every now and then I go up there, knock them down, so they can start building them again"

-Community worker, Penyrenglyn

The people that run the project claim that their ownership of the wood has helped to decrease fires in the local area (although this was not an explicit aim of the project), as well as reduce antisocial behaviour in the area.

Staff feel that the public ownership of the project is one of its primary benefits. It was explained how some benches, carved by an artist, had been erected in the local area and had subsequently been vandalised. However, the same artist had previously worked with young people in the community to create sculptures, and these, created with, rather than for the community, had not been broken.

Support for the project

Staff consider the Penyrenglyn Project to be successful, and believe that there has been a reduction in fires in recent years. Fire service data show that between 2000 and 2008 a total of 229 fires were recorded within 1000 m² of the project area.

GIS analysis of the number of fires in the area demonstrates that, since 2003, the relative percentages of wildfires in the area local to the Penyrenglyn project is lower than the relative percentage of wildfires throughout South Wales in the same period.

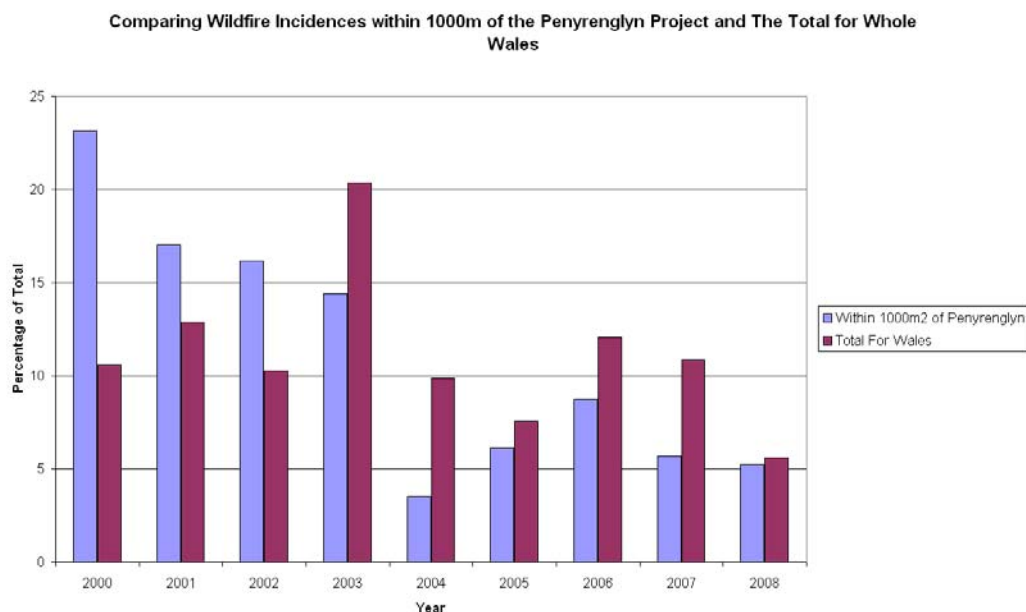


Figure 27: Wildfire incidences in the area of the Penyreglyn project

On one visit to the project, two young boys had recently been seen lighting fires in the forest behind the centre. They had been identified by the community, and staff at the project had informed the police who attended and spent some time talking to the boys. It was not possible to sit in on this interview. Additionally, the boys were threatened with being banned from using the facilities provided by the project which was considered to be a punishment that would be taken seriously, due to the project being a hub of community life.

Criticism of the project

At a PACT²³ meeting in Treherbert it was clear that not all residents of the local area felt that the project was beneficial. The meeting, as with other PACT meetings, was largely attended by older residents. Many of those attending felt that the majority of the problems in their neighbourhood were caused by young people. Some of the attendees expressed the opinion that young people from Penyreglyn were coming across to their area and causing trouble, including lighting fires.

²³ Police And Communities Together

Other Strategies

As part of the effort to decrease firesetting in South Wales the Joint Arson Group, set up under the auspices of the Welsh Assembly Government, distribute grants to projects that are attempting to prevent or reduce fires in their area. This can include school fires, bin fires, vegetation fires and other forms of arson. Grants are up to £10,000 and are primarily targeted towards partnership projects.

Youth Groups are dotted around the Valleys. They may only be open on occasional nights but provide a space for young people to congregate that is not outside, on the streets or in the forests. Fires, and specifically vegetation fires, are not the main focus of any youth group that was contacted during the course of the research. However, there are occasional attempts to discourage firesetting in youth group settings. One such event, funded with Arson Small Grant money, was 'Disco Inferno'. Disco Inferno was a one-off under 18s disco night in Cwmafan, whose stated aim was to educate local young people about the dangers of wildfire. The event was due to have a presence from the local Fire and Rescue Service and Forestry Commission Wales. Unfortunately some of the partners were not available on the night. Young people at the event were engaged by the subject matter up to a point, although the majority of attendees were probably there for the free sausage and chips, rather than as a result of the anti-wildfire message.

Thoughts from stakeholders and young people on improving mitigation tactics

For young people at Bernie 'bush craft events', the primary consideration is that people who are going to light wildfires will do it despite the use of engagement activities, youth groups and other educational techniques. There can be seen to be a perceived lack of engagement with prevention strategies by firesetters. One fire fighter, based in the Rhondda summed this view up:

"How much publicity are you going to get? If we had three fires started by campfires and put the information out, the people who are going to have campfires are responsible people, and we'd have a reduction. But these people, it's deliberate arson, they know what they're doing. You can't just tell them [not to do it] and they'll say 'thanks for telling me, I was going to do that, but I won't now'"

-Firefighter, Rhondda

Group work with young people revealed a number of opinions about the best way to prevent wildfire arson. Some young people emphasised the need to increase surveillance

and the chances of being caught, whilst others suggested restricting access as the best tactic for reducing grassfires:

“Don’t let people in the forests”

“Put cameras in the trees”

“More police”

The views of the young respondents and firefighter above suggest that there is only so far that education can go in preventing fires. Young people express the view that lack of surveillance, be it formal (police patrols, CCTV) or informal (increased use of forests and grassland by wider public) will continue to be a major factor in the continued incidences of wildfire in South Wales.

Conclusions

A wide variety of mitigation strategies are being implemented in different areas and with different groups throughout South Wales. Stakeholders display a range of opinions about the best potential strategies for preventing wildfires. Behaviour change strategies are seen as positive, although there is a need for such strategies to be focused towards actual or potential wildfire arsonists. The research-based targeting of the Bernie project, and the referral of ‘at risk’ individuals to the Phoenix courses in Port Talbot both take this approach.

The perceived lack of services available to young people in the affected areas is also a factor raised. The need to make prevention strategies relevant to the target audience is a continual challenge, requiring detailed knowledge of issues in communities from voluntary and youth sector workers combined with the institutional back-up provided by organisations such as FRS, the police and other institutions. This tactic requires financial input and time from all partners, and may prove to be a positive application of the current Westminster government’s ‘Big Society’ agenda.

As can be seen, there is little strategic planning involved in the majority of attempts to mitigate against vegetation fires. There are islands of good practice that should be taken into consideration before engaging in any new work to help guard against or reduce vegetation fires.

There is a feeling among stakeholders that there is a need for police to treat the issue of wildfire arson as seriously as the FRS does. Increased and improved partnership working between police, FCW and FRS throughout South Wales is seen to have potential to

improve wildfire arson mitigation strategies. The Bernie project has demonstrated to police that there is a positive role for them in the anti-wildfire agenda.

Recommendations

Partnership working, on a day-to-day operational, as well a managerial level should be encouraged. Partnership working is the only viable way to deliver mitigation strategies that are aimed at a problem with such diverse causes and actors. The Bernie project, carried out by South Wales Fire and Rescue Service, demonstrated that a multi-faceted approach to tackling firesetting can prove successful. If this, or similar projects, can draw in adequate funding and also take into account the socio-demographic context in which they occur, this style of partnership working will prove highly successful.

In the coming years there may be a reduction in staff numbers within many organisations involved in wildfire prevention and mitigation. As such, there is a marked need to look to non-traditional delivery mechanisms. Community organisations, with support from stakeholder organisations may be well placed to deliver anti-wildfire messages and educational programmes. Some stakeholders suggest that information delivered from community or peer level may be to the best way of getting the message across.

FCW, and especially Coed y Cymoedd forest district, should consider greater use of Penynglyn-style partnerships with motivated community groups. Increased community engagement with forests is likely to increase informal surveillance of forested areas, and also will engender a feeling of ownership and stewardship of the forest within communities in areas impacted by wildfires.

The methods used to decrease wildfire arson among one group may well not work with other groups. It is important for any mitigation measure to be effectively aimed at the relevant firesetter group.

Future forest design planning should take into account the changing climate and potential for more severe fire seasons. FCW can aid the Fire and Rescue Services in preventing and extinguishing wildfires by providing improved access routes into the forests and by creating fire breaks- and mapping them, to increase the ability of the Fire and Rescue Services to effectively fight wildfires.

There needs to be a move towards greater monitoring and evaluation of wildfire mitigation projects. Initiatives such as Crucial Crew are not well monitored to assess their effectiveness in reducing grass and forest fires. Continued funding for such projects should only be allocated if there is strong evidence to attest their effectiveness.

8. Conclusions

This section briefly summarises conclusions drawn from each section of the report.

Where and when do wildfires happen in South Wales?

This research demonstrates that there are temporal, geographical and social patterns to wildfire incidences. The predictable nature of wildfires in South Wales has not previously been documented. Spatial and temporal analysis should be utilised by stakeholder groups to inform the planning of wildfire arson prevention strategies.

What are the community and institutional stakeholder perceptions of wildfires?

Our research shows that there is low public awareness of wildfires in South Wales. Furthermore, few residents see wildfires as posing a problem for themselves and their communities.

All stakeholder groups interviewed consider that fires are primarily deliberate, but this does not translate into seeing them as an important issue. It is unlikely that residents see wildfires as posing a problem for themselves and their communities. This lack of engagement with the issue needs to be addressed.

Who is held to be responsible for committing wildfire arson in South Wales?

Young people are primarily seen as being responsible for committing wildfire arson in South Wales, although in areas to the west of Coed y Cymoedd stakeholders are more likely to blame farmers or land owners. Increased specificity of wildfire arson prevention efforts in relation to firesetter group and area affected can be guided from the findings presented in chapter 5.

What are the motivations for wildfire arson in South Wales?

There are a variety of motivations for wildfire arson in South Wales. Recognising this is key to tackling wildfire arson. A number of drivers can result in a firesetting incident and, as such, a variety of stakeholder groups are needed to work in partnership to tackle wildfire setting. If firesetting is tied into other socio-economic factors in a community, FCW, the Fire and Rescue Services, the Police Forces, Youth and Community Workers

working in isolation will have limited success in tackling wildfire arson. Effective partnership working will be critical in addressing the problem.

There are large, urban populations living in close proximity to 'wild' and rural areas. The problem is also compounded by poor transport links, lack of employment and other opportunities, and severe social deprivation. Greater investment in infrastructure in the Valleys, and an expansion of co-ordinated partnership working between agencies is likely to likely to achieve the best outcomes in terms of reducing wildfire arson.

What strategies are currently being used to mitigate against wildfires and how successful are they?

Mitigation strategies that are currently employed in South Wales take different forms, which we have categorised as 'educational' and 'operational'. These can either be proactive (prior to incident of wildfire arson) or reactive (in response to an incident of wildfire arson). While all the cases evaluated as part of this research have had positive and negative outcomes, a more coherent mitigation strategy that takes into account all aspects of wildfire arson could be used to improve the design of individual projects.

9. Recommendations

The issues raised in this report show that wildfire arson in South Wales is a persistent problem, albeit one that appears to be decreasing. Despite the long history of wildfires, members of the local communities in Wales are either not aware of wildfires, or do not see them as an issue.

Wildfires in South Wales, and the drivers that lay behind them, are more diverse than might be expected. Wildfires in South Wales are not a problem in and of themselves, but are also a symptom of wider issues in the region.

This section brings together the recommendations found throughout this report and organises them in terms of relevance to the various stakeholder groups. We divide them into changes that can be applied in the short term without much lead-in and changes that are longer-term in scope, and may take more time to implement.

Recommendations for key stakeholders

Short Term

- Wildfires in Wales are not seen as a problem for many in the region. **Awareness of wildfires should be increased.** The aim should be to encourage people and institutions to think more often and more seriously about wildfires in South Wales.
- The primary recommendation of this report is that **partnership working as a means of tackling wildfires should be encouraged and resourced.** Partnership working is the only viable way of tackling a multifaceted issue like wildfire arson, and is especially important in times of decreasing budgets and greater resource constraints. Sharing the burden of tackling wildfires in South Wales will serve to improve the relevance of mitigation strategies, and to reduce the cost to any one organisation. Partnership working should focus around an all-Wales wildfire group, which would bring together and steer responses to wildfire and the operational tactics used to tackle wildfires. Increased understanding between and within organisations will aid wildfire mitigation. There is currently a move towards the creation of an all Wales Wildfire Group. There should be clear terms of reference for this group.
- There is a persistent pattern to the location of incidences of wildfire arson in South Wales (Chapter 3). **Prevention efforts**, including preventative patrols, education initiatives and target hardening **should be focused on areas of high incidence** as shown by this analysis. This recommendation extends to all messages that are presented about wildfire arson. For example, initiatives in the Gower and West Wales

(as well as Mid and North Wales) should be targeted more towards land owners while efforts in the Valleys and South Wales should focus on young people.

- Stakeholders should consider a media and response black-out on wildfires as a test. There is some suggestion that the response to fires (engines turning up, the potential for a helicopter to be called, and the subsequent reports) may encourage firesetting. In the case of suspected wildfire arson it may be useful for fire services to respond not with a fire engine, but in the first incidence with an unmarked, or barely marked van to assess the fire. **Removing part of the 'thrill' of wildfire arson may cause it to become less attractive to perpetrators.**

Long Term

- Partnership working to address wildfire arson is already growing, but more formal channels should be explored, explicitly in relation to funding. The helicopter, which is provided to the Fire and Rescue Services by Forestry Commission Wales, is currently only to be used when Forestry Commission managed land is at risk. However, there are other land owners whose forests and grassland may be at risk of wildfire. **Creating financial partnerships to share the cost of helicopter provision would be a positive move.** This change would both expand the remit for use of the helicopter to fighting wildfires on other land which is at risk, and will reduce the cost to the Fire Services and Forestry Commission Wales.
- There are likely to be cuts in staffing numbers and budgets for stakeholder groups over the next few years. As a result of decreased budgets there will be a need to utilise non-traditional delivery mechanisms for anti-wildfire arson information and mitigation programmes. **Community organisations, with support from stakeholder organisations may be well placed to deliver anti-wildfire education and messages.**

Forestry Commission Wales

There are things that Forestry Commission Wales can do to help prevent and extinguish wildfires, but they are not the best-placed organisation to do this. There is invaluable knowledge in the organisation, but with an increasingly small and office-based staff there is an argument that they should be considered more as victims of wildfires, rather than an organisation charged with preventing them. However, there are policy changes which could be implemented to support the Fire and Rescue Services in extinguishing fires. These would help build bridges with user-groups and be a positive step towards a sustained and noticeable reduction in fires on the forest estate. They are presented below.

Short Term

- The research has shown that areas close to Public Rights of Way and roads are prone to wildfire arson. As a result of this **Forestry Commission Wales should consider a move towards altering the management strategy of areas which are prone to experiencing wildfires**. This will reduce the likelihood of successful ignition of a wildfire, and in turn reduce the likelihood of fires spreading into the forest.
- **Forestry Commission Wales should maintain and improve their partnership working, especially in relation to relationships between the organisation and the Fire and Rescue Services**. Partnerships with South Wales Fire and Rescue Service are more advanced than those with Mid and West Wales Fire and Rescue Service, and this discrepancy should be addressed quickly.
- **Crucial Crew, and other educational initiatives need to be more focused and should be subject to adequate monitoring and evaluation**. The FCW stand at Crucial Crew should be monitored as part of the contract with Chance Encounters to ensure that the message delivered is not diluted, and remains relevant to the time of year, and to the problems in the areas where the school children come from.

Long Term

- The forests and valleys of South Wales have issues, as seen, with competing land-use requirements of different user groups. A more open usage policy governing access to land, and what activities are permitted and prohibited on public land may create an environment that is more appealing to a wider range of user groups, increasing observable land-use, and facilitating informal surveillance of forests and grasslands. **Forestry Commission Wales should seek to better integrate their forest management decisions with the desires of local community groups**. There should be a move by the organisation to give greater responsibility for areas of woodland to local groups in a similar manner to the agreement with the Penyrenglyn project.
- In Coed y Cymoedd the planning team shapes the future layout of forests in the Valleys. **The planning team should carry out a number of long term changes to design planning which will slow the spread of fires**, and will also aid the Fire and Rescue Services in accessing the forests. Firstly, in a changing climate there is a need to reduce the risk of potentially more severe fire seasons; this can be done by building fire breaks into future forest design plans, and also planning the planting of trees that are more resilient to wildfire. Increased access routes into forests will help the Fire and Rescue Services to extinguish fires, these can be planned in advance through co-ordination between Forestry Commission Wales planners and the Fire and Rescue Services.

Fire and Rescue Services

Short Term

- The contract for the helicopter, which currently runs from April to September, misses one of the most intense months for wildfires, according to statistics. **There is a need to commence provision of the helicopter for firefighting purposes earlier in the year**, perhaps as early as February.
- The two Fire and Rescue Services that cover Coed y Cymoedd are beginning to work more closely on the issue of wildfires. South Wales Fire and Rescue Service, which experiences more wildfires than Mid and West Wales Fire and Rescue Service are more experienced in wildfire fighting. Partnerships between the two organisations are growing. **Greater co-operation, especially on the border between the two agencies' jurisdictions will improve the ability of both organisations to fight wildfires in a co-ordinated manner.**

Long Term

- The Fire and Rescue Services should recognise that there are a wide range of drivers for wildfire arson in South Wales and that they are not always best placed to tackle these issues. **Improved working with the police, as already seen through the South Wales Fire and Rescue Service 'Bernie' project should be increased**, and further co-operation with local community organisations and schools should be encouraged.

Welsh Assembly Government

Short Term

- **The Welsh Assembly Government should be appraised more fully of the problem of wildfires in South Wales.** Increased high-level awareness of the issue will mean that there is greater political support from governing bodies to tackle the problem.
- **Any mitigation strategy that is funded with public money should be properly evaluated.** Currently, mitigation strategies are funded without a requirement to prove their success, this does not encourage the use of effective wildfire mitigation strategies.

Long Term

- This report shows that one of the key correlates of wildfire arson in South Wales is the relative deprivation of areas seen in the Valleys region. **All mitigation measures should be seen in the context of a wider regeneration of the**

region. Wildfire reduction should be a stated aim of any regeneration grants in the Valleys.

- The National Farmers Union and Farmers Union of Wales should be integrated into research and decision-making regarding wildfire prevention. Farmers and other land owners can help spread education about wildfires and their actions, with the correct support, can work towards preventing wildfires on their land.

Research

- While the prevailing opinion of institutional stakeholder groups is that wildfires in South Wales are always the result of human actions, and that none are natural in origin, there has not been any empirical scientific research into wildfire causes in the UK. **We recommend that research should be carried out into wildfire ignition causes in the UK or Northern Europe.** There is no available evidence to support the claim that wildfires can be caused by broken glass or discarded cigarettes in South Wales. An increased understanding of what ignition sources can result in a wildfire will improve information given to the public and institutional stakeholders.

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South Wales Fire and Rescue Service 'Bernie' Reports

These can be found at www.southwales-fire.gov.uk. There are five reports covering all stages of the project:

1: A Social Marketing Project to Reduce the Incidence of Deliberate Grass Fires in Wales, UK: Summary Report of Scoping Phase
(www.southwales-fire.gov.uk/English/Bernie/4899%20Social%20Marketing%20Report%20summary_ENGLISH.pdf)

2: A Social Marketing Project to Reduce the Incidence of Deliberate Grass Fires in Wales, UK: Summary Report of Development Phase
(www.southwales-fire.gov.uk/English/Bernie/5241%20Summary%20Report%20-%20Development%20Phase.pdf)

3: A Social Marketing Project to Reduce the Incidence of Deliberate Grass Fires in Wales, UK: Summary Report of Implementation Phase

(http://www.southwales-fire.gov.uk/English/bernie/Documents/5403%20Social%20Marketing%20Implementation%20Phase%20Report_ENGLISH.pdf)

The following two reports are not yet online. They can be requested from South Wales Fire and Rescue Service directly.

4: A Social Marketing Project to Reduce the Incidence of Deliberate Grass Fires in Wales, UK: Evaluation

5: A Social Marketing Project to Reduce the Incidence of Deliberate Grass Fires in Wales, UK: Follow up