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NATURAL ENVIRONMENT RESEARCH COUNCIL


Knowledge for Wildfire NERC Knowledge Exchange Fellowship



Improving management of UK wildfire
through knowledge exchange

Julia McMorrow
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School of Environment, Education and Development, University of Manchester
julia.mcmorrow@manchester.ac.uk

Wildfire 2013, The Vale Resort, Glamorgan, 22-23 Oct 2013



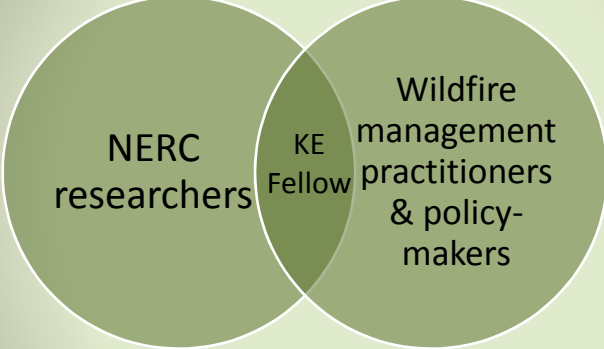
Improving management of UK wildfire
through knowledge exchange

Structure of session

1. Progress report on Knowledge for Wildfire project
2. Poster session

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Improving management of UK wildfire
through knowledge exchange

KE Fellow's role



The diagram consists of two overlapping circles. The left circle is labeled 'NERC researchers'. The right circle is labeled 'Wildfire management practitioners & policy-makers'. The overlapping area in the center is labeled 'KE Fellow'.

- Planned as a 3 year project, 3 days a week
- Funded for 2 years at 2 days a week, Oct 2012 - Sep 2014
- Top up funding from NERC; from 1st Oct 2013, 1.5 days a week, but extended to a 3rd year, ending 2015.

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Project aims

- To maximise the use of existing NERC-funded research and promote mutually beneficial new research and KE projects on wildfire;
improve the evidence base for managing wildfire risk in the UK
- To assist the management of wildfire risk in the UK at all stages from prevention to response and recovery.

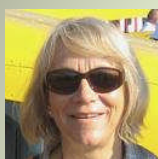


Project objectives

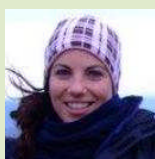
1. **Connect** emerging cross-sector and cross-disciplinary interests in wildfire; awareness-raising and advocacy role
2. **Apply** NERC's existing fire-related research, and use research to **adapt** (add value to) user data
3. **Create**/facilitate new partnership research and KE which addresses knowledge gaps.



Who we are



Julia McMorro
KE Fellow,
KfWf project leader



Ioanna (Jo) Tantanasi
Administrative
assistant

<http://kfwf.org.uk/about/staff/>

Gareth Clay
e-Communications

Steering Group

<http://kfwf.org.uk/about/steeringgroup/>

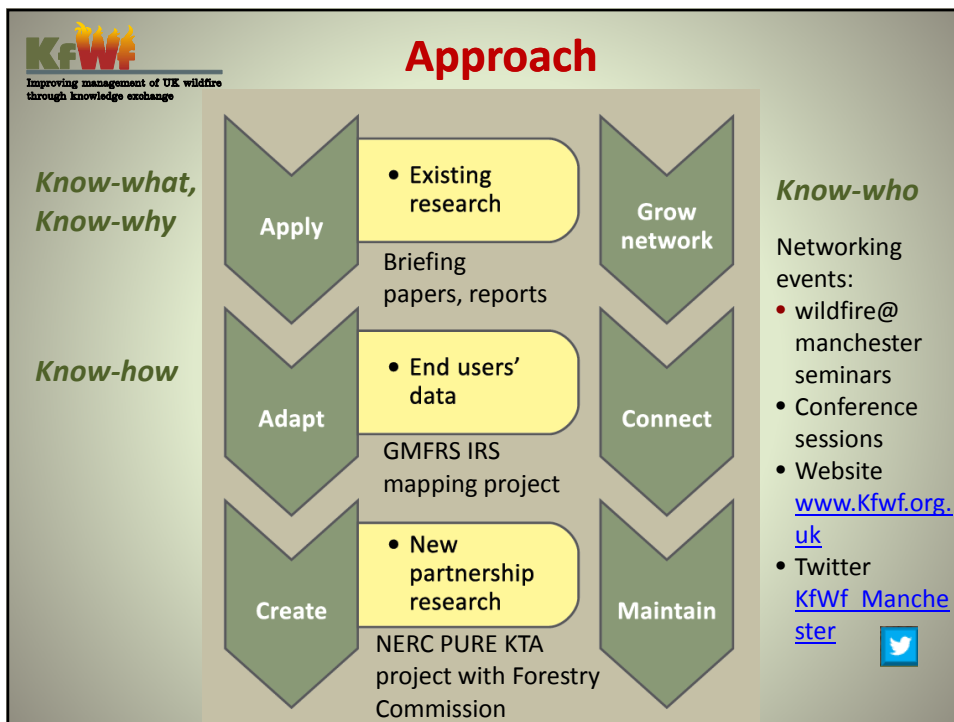
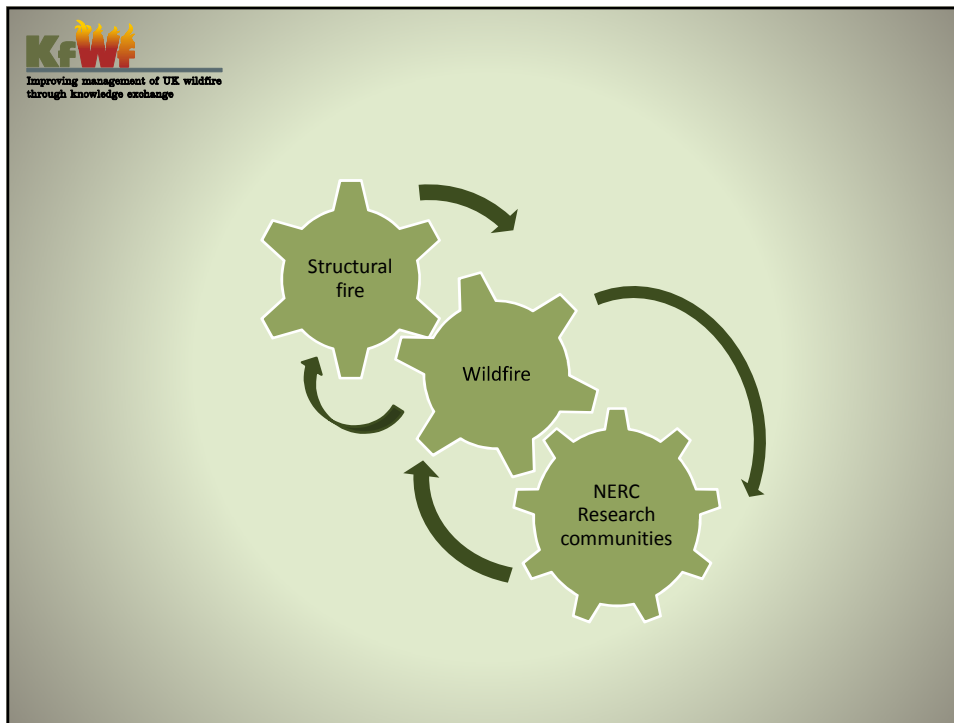
Paul Hedley: CFA Wildfire Group

Steve Barnes: Civil Contingencies Secretariat, Cabinet Office

Phil Philippou: Resilience and Emergencies Division, DCLG

Jonathan Ayles: Manchester Business School

Simon Thorp: The Heather Trust



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Apply | How NERC science can help

By improving our understanding of:

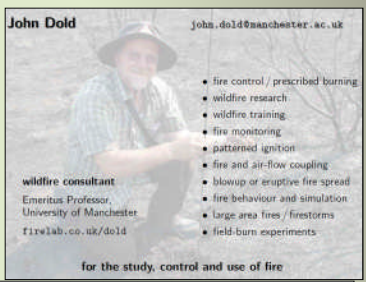
- How *past fire regimes* were related to climate and land management. How *climate change* may change wildfire frequency and magnitude, and feedback to climate
- How wildfires affect *carbon budgets*
- How wildfire emissions affect *air quality* and *health*
- How *fire ecology* explains complex relationships between fire, vegetation, soil, climate and people. How managed fire and wildfire interact with biodiversity, water colour and other ecosystem services
- How *remote sensing* can be used to detect: *pre-fire* fuel load & fuel moisture content; *active fire* location and energy; *post-fire* vegetation and soil burn severity, and monitor long-term ecological response
- How *GIS* can model wildfire risk, hazard and threat.....*etc*

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Connect, Apply | Who's Who in UK fire researchers

| | Fire behaviour | Hydrology | Keyword 3 |
|------------------|----------------|-----------|-----------|
| Research group 1 | ● | | ● |
| Research group 2 | | ● | |
| Research group 3 | | ● | ● |


John Dold john.dold@manchester.ac.uk



- fire control / prescribed burning
- wildfire research
- wildfire training
- fire monitoring
- patterned ignition
- fire and air-flow coupling
- blowup or eruptive fire spread
- fire behaviour and simulation
- large area fires / firestorms
- field-burn experiments

wildfire consultant
Emeritus Professor,
University of Manchester
firelab.co.uk/dold

for the study, control and use of fire



EMBER – Effects of Moorland Burning on the Ecohydrology of River basins
June 2009 – March 2013
Lee Brown, Joseph Holden & Sheila Palmer

water@leeds
UNIVERSITY OF LEEDS

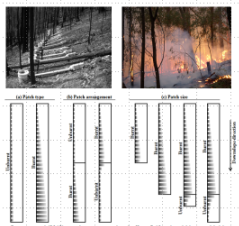
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Fire effects on runoff, erosion and water quality
Dr Hugh Smith
School of Environmental Sciences, University of Liverpool, hugh.smith@liverpool.ac.uk

Background: researching wildfire and prescribed fire in Australia since 2003: published 18 papers and 4 reports for management agencies to date.
Aim to apply fire research experience and methods in the UK.

Key questions:

1. How does burn patchiness affect runoff and sediment connectivity from patch to hillslope scales?
2. Can we design prescribed burns to minimise possible impacts on soil and water resources?
3. Does wildfire present a future threat to water supply catchments in the UK under a changing climate?



Causton et al. (2013) - unburnt vegetation buffers 5-10 m in width were highly effective in reducing runoff and erosion after prescribed burning

Example paper: Cameron, J., Dharman, S., Smith, H., Lohani, P. (2013) Effects of fire severity and burn patchiness on infiltration scale and runoff erosion and sediment connectivity in a prescribed burn. Forest Ecology and Management 303: 2-12

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Fire effects on runoff, erosion and water quality

Dr Hugh Smith

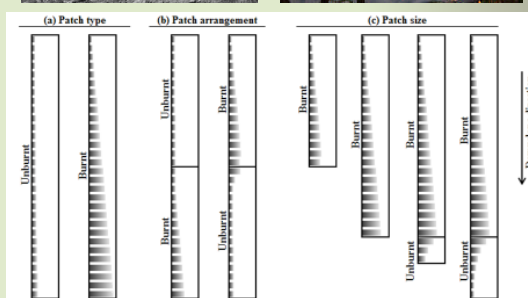
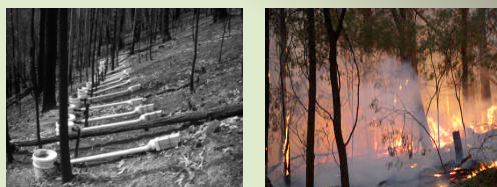
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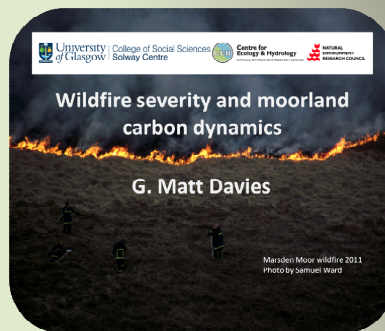
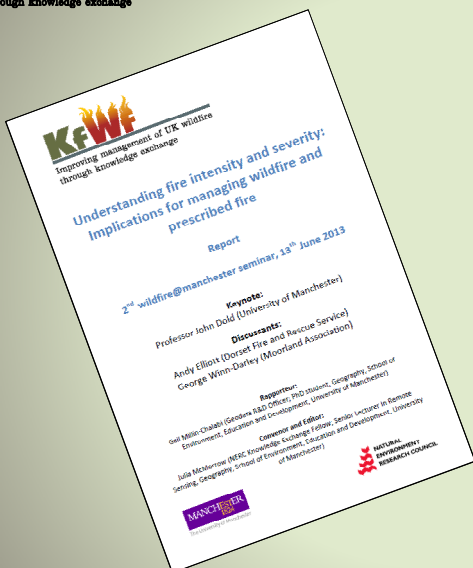
Cawson et al (2013) - unburnt vegetation buffers 5-10 m in width were highly effective in reducing runoff and erosion after prescribed burning




Example paper: Cawson JG, Sheridan GJ, Smith HG, Lane PNJ (2013) Effects of fire severity and burn patchiness on hillslope-scale surface runoff, erosion and hydrologic connectivity in a prescribed burn. *Forest Ecology and Management*, 310: 219-233.



Connect, Apply | Wildfire@manchester



<http://kfwf.org.uk/assets/documents/Millin-Chalabi et al 13jun13 KfWf seminar report.pdf>



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Knowledge for Wildfire

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What are wildfires?

A wildfire is any unplanned and uncontrolled vegetation fire which may require suppression. Most wildfires in the UK are started by humans, and occur on moorlands, heaths, grassland, woodland and agricultural land. We can help to prevent damaging fires by managing people (ignition sources) and vegetation (fuel).

Not all fire is damaging – controlled fire is a traditional management tool in fire-tolerant ecosystems. Zero tolerance to all fire can create larger fires. Fire ecology recognises the complex interactions between fire, ecosystems and people.

Why are wildfires important?

- Over 118,000 'grassland' fires were recorded by Fire and Rescue Services in Great Britain in the financial years 2010/11 and 2011/12. They are strongly weather-related and so are challenging to plan for; on average there were 374 per day in the dry April of 2011 compared to 30 in January 2012. [[Fire Statistics Great Britain, 2011-12](#)].
- UK-wide in the dry April and May of 2011, 44 were estimated to be over 40 hectares in size.
- Response costs alone are estimated at £55 million a year, and up to £1 million for a big moorland fire.
- Wildfire is identified as a key risk in the [UK Climate Change Risk Assessment 2012](#). The likelihood of wildfires occurring may increase between 10% and 50% by the 2080s with projected warmer, drier spring and summer conditions.
- More large fires would lead to significant loss of biodiversity and ecosystem services such as carbon storage for ecosystems like peatland and heathland, which are particularly sensitive to fire.


> [Information about how NERC science can help.](#)


Who we work with

Why join us


What we do

Get in touch





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Connect | Who we work with

England and Wales Wildfire Forum

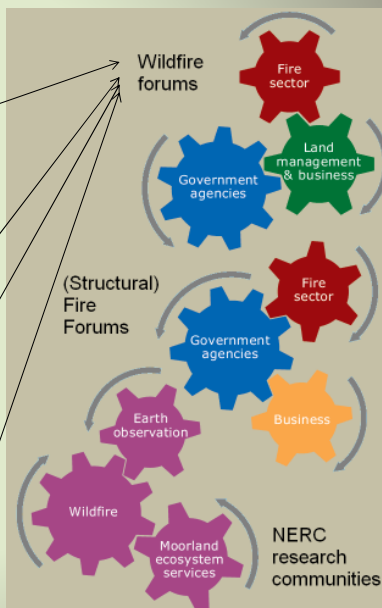
- [KfWf advisory panel](#)
- Responses to consultations, e.g: [UK Climate Change Risk Assessment](#) and [National Adaptation Programme](#);

CFOA Wildfire Group, Research & Information Workstream; IRS consultation

Local Fire Groups e.g. Lancashire FOG

Moorland management groups

- DEFRA Best Practice Burning Group: wildfire guidance note
- Moors for the Future: public awareness of wildfire risk interactive exhibit
- National Trust: [High Peak Moors Vision & Plan](#)



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Connect | Launch of National Trust High Peak Moors Vision and Plan, 20 Sep '13

<http://www.high-peak-moors.co.uk/>




Heather seeding

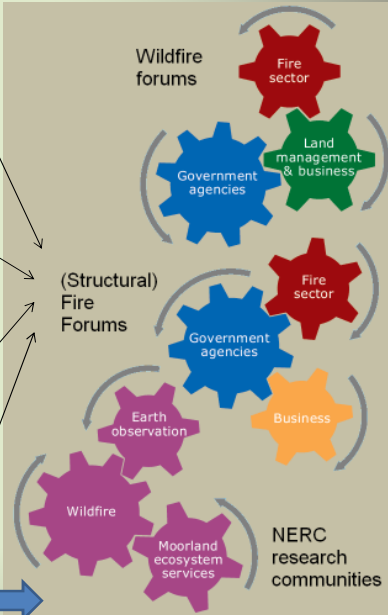



Contributed to 'expert evidence' on wildfire
'Managing the risk of wildfire is a key objective for us.' (p23)

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Connect | Fire sector

- **DCLG Fire Research Statistics User Group:** wildfire reporting in Incident Recording System
- **Fire Sector Federation**
Fire Research and Statistics Workstream: raising awareness of wildfire issues 
- **Institution of Fire Engineers:** papers at Fire-Related Research conferences, Re12 and Re13
- **Knowledge Infrastructure for the Fire Sector:** Buckinghamshire FRS's Manchester workshop, 6 Sep '13






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Connect | Fire Sector Federation

<http://firesectorfederation.co.uk/workstreams/research-and-statistics.php>



The screenshot shows the Fire Sector Federation website. At the top, there is a navigation menu with links for Home, About FSF, Resources, News, Membership, and Workstreams. A prominent banner reads "Bringing together members with a particular interest or expertise to discuss and develop policy and actions." Below this, the "Research and Statistics" section is highlighted, featuring a "Workstream Chair" profile for Dennis Davis CBE, QFSM. The page also includes a sidebar with various service categories and a main content area with detailed text about the Research and Statistics Workstream's goals and activities.




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Connect | Knowledge Infrastructure for the Fire Sector

Buckinghamshire FRS's Manchester workshop, 6 Sep '13





The left image shows a group of people in a meeting room, engaged in a workshop. The right image shows a handwritten diagram titled "The Knowledge Infrastructure Model". The diagram is a flowchart with several interconnected boxes and notes. Key elements include "Regional or local working", "National level class", and "Share his/her knowledge".




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Connect | Research communities



Conferences on remote sensing of fire; e.g. EARSeL Forest Fires Special Interest group


International Assoc of Wildland Fire; Human Dimensions conferences



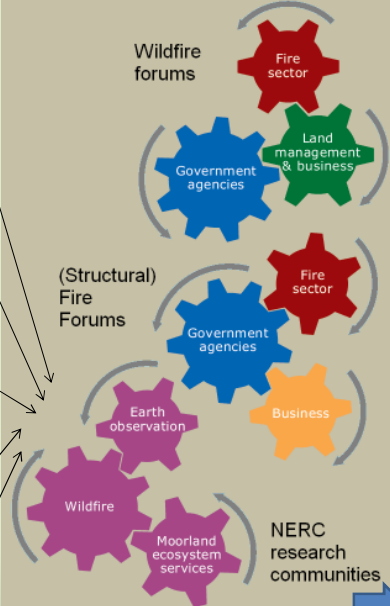
NERC meetings

- Think Tank on investment in natural hazards and risk, 21 Oct'13
- KE Network

Living with Environmental Change (LWEC) partnership



Survey of UK fire research activity



The diagram shows several interlocking gears representing different research communities: Wildfire forums (red), Fire sector (red), Land management & business (green), Government agencies (blue), (Structural) Fire Forums (blue), Fire sector (red), Government agencies (blue), Business (orange), Earth observation (purple), Wildfire (purple), Moorland ecosystem services (purple), and NERC research communities (blue). Arrows from the text boxes on the left point to these gears.



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EARSeL Workshop Forest Fires Special Interest Group, 15-17 Oct '13



European Association of Remote Sensing Laboratories



The poster features a satellite image and text: "Project 'Through information to promote the wildfire safety of the Rhodope Mountains' Operational Programme for European Technical cooperation 'Greece - Bulgaria 2007-2013'". It also includes the title "Early warning system for wildfire detection" and various charts and photos.



The poster has a large image of a wildfire and the title "Knowledge for Wildfire". It contains text about knowledge exchange and various diagrams.

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Apply, Connect | International Assoc of Wildland Fire (virtual) conference

International Association of Wildland Fire
Facilitating communication and providing leadership for the wildland fire community.

International Association of Wildland Fire
Third Human Dimensions of Wildland Fire
April 17 - 19, 2012
Seattle, Washington, USA

3rd Human Dimensions of Wildland Fire Conference
Responsibility: Research, Management, and Communities

Proceedings of 3rd Human Dimensions of Wildland Fire, April 17 - 19, 2012, Seattle, Washington, USA
Published by the International Association of Wildland Fire, Missoula, Montana, USA

Different risks, different solutions? A discussion on what traditionally fire prone and less fire-prone countries can learn from each other

Cathelijne R. Stoof^A, Brian Oswald^B, E. R. (Lisa) Langer^C, Mathijs Schuijn^D, Julia McMorrow^E, Alette Geiz-Smeenk^F, Ester Stalenhoef^G

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^C Rural Fire Research Group, Scion, Christchurch, New Zealand. lisa.langer@scionresearch.com
^D Safety Region Utrecht (VRU), Netherlands. mathijs_schuijn@hotmail.com
^E University of Manchester, United Kingdom. julia.mcmorrow@manchester.ac.uk
^F Fire and Rescue Services, VNOG, Netherlands. A.Getz@vnoog.nl
^G National Safety Institute (NIFV), Netherlands. ester.stalenhoef@nifv.nl

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Create | NERC-PURE KTA with Forestry Commission

PURE
Probabililty, Uncertainty and Risk in the Environment

KTA
Knowledge Transfer Associate

Wildfire Threat Analysis (WTA)
(Moffat & Pearce, 2013)

WILDFIRE THREAT

Risk of ignition

- Land use
- Population
- Accessibility
- ...

Hazard fire spread

- Land cover
- Fuel types
- Fuel load
- Slope
- Fire climate
- FWI data

Values at risk

- Life
- Property
- Infrastructure
- Forestry
- Agriculture
- Biodiversity
- ...

↑ Exposure ↓

↑ Hazard ↓

RISK

↑ Vulnerability ↓



Benefits

For end-users

- Access to NERC-funded science and expertise
- Opportunities to work with researchers and influence the research agenda
- Add value to your datasets

For researchers

- Benefit from end-users' expertise and data
- Increase the impact of your research
- Find out what new research end-users really want

For both

- Links into other networks
- Build partnerships for funding applications
- Improve the evidence base for management, policy making and funding applications



Thank you for listening

Questions?

Julia.mcmorrow@manchester.ac.uk

www.kfwf.org.uk



Poster session

1. **Controls on the formation, transport and fate of charcoal from moorland wildfires.** Gareth D CLAY
2. **Assessing prescribed burning performance over a 25 year period: a case-study.** Pierre DENELLE, Katherine A ALLEN, Francisco M SÁNCHEZ RUIZ and Rob H MARRS
3. **Measuring vegetation canopy moisture content with dual-wavelength terrestrial laser scanning** F.M. DANSON, R. GAULTON, S. HANCOCK, & L.A. WALKER
4. **The Geography of vegetation fires in Greater Manchester: adding value to Fire and Rescue Service incident data.** Richard DONLAN
5. ***Development of a mobile app for fire prediction, detection and monitoring** Philip E FROST and Derick SWANEPOEL

* Poster author not present



Poster session

6. **The effect of drought on fire severity in heather moorland prescribed burning.** Roger GRAU-ANDRES, G Matt DAVIES; Susan WALDRON and Michael BRUCE
7. ***The International Wildfire Simulation Training Project: 3D serious game-based training and exercising of wildfire response professionals.** Philippe MERESSE, Eric TURPIN, Martijn BOOSMAN, Steven VAN CAMPEN, *et al.*
8. **Detecting moorland wildfire scars and their persistence in the landscape using Synthetic Aperture Radar (SAR); Peak District National Park.** Gail MILLIN-CHALABI, Julia MCMORROW and Clive AGNEW
9. **Flammability properties of British moorlands and heathlands vegetation: models for predicting fire ignition and spread.** Victor M SANTANA, Rob H MARRS

* Poster author not present