Adapting international ideas to help develop wildfire strategies in Scotland / UK

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12 November 2024

firebreak

Introduction

- factors to consider

- Scotland / UK constitutional context
- International inputs: science, knowledge, best practice
  - *relevance*
- Land use changes
- Fuels and fire behaviour
- Capacity
- Politics
- Integrated Fire Management

With thanks to:

- Charles Gimingham (Aberdeen University)
- Bruce Farqhuarson (SFRS, retd)
- Matt Davies (Falkland Islands Agri-Dept)
- Colin Legg (Edinburgh University, retd)
- Wendy Anderson (Aus. Defence Force Academy)
- Marty Alexander (Natural Resources Canada retd)
- Brian Stocks (Natural Resources Canada retd)
- Johann Goldammer (Global Fire Monitoring Center)
- Marc Castellnou (GRAF, Catalan Fire Service)
- Ian Murgatroid (Forestry Commission)
- NatureScot / Scottish Natural Heritage
- **And many, many others**

UK constitutional context

- devolution of power, & asymmetry

- The main policy areas :
  - agriculture, forestry
  - environment
  - public access
  - fire services
  - funding
- UK wide powers in specific areas, e.g. international relations, Dept Science, Innovation & Technology
- Are within these Parliaments jurisdiction:
  - Scottish Parliament 1998
  - Northern Ireland Assembly 1998
  - Welsh Assembly 1999
  - UK (Westminster, London) Parliament (England) on-going
- Anything not covered reverts e.g. to the Scottish Parliament

UK - Easter Sunday 20/4/03



- 4 major & many smaller wildfires at the same time:
  - *Lots of damage & expense*
  - *Helicopter, FRS & private sector staff over-stretched*
    - *Firebreak Services Ltd wrote & distributed discussion paper, 2003*

A WILDFIRE PROTECTION STRATEGY FOR SCOTLAND –

DO WE NEED ONE?

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1st Wildfire conference - Conclusions

- Aberdeen 5th Oct 2004

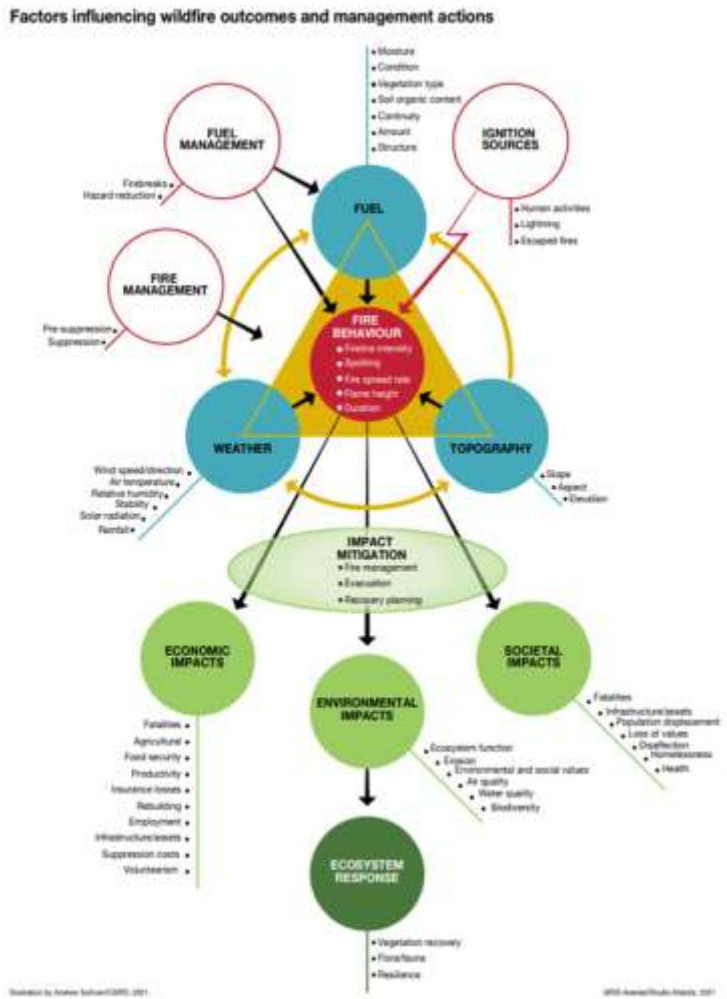
- Resources really stretched by a bad fire season - 2003
- Fire hazards & risks increasing with fuel loads and the variety of fire causes.
- Modern Fire Danger Rating & Fire Behaviour Prediction systems needed.
- Few people familiar with wildfire suppression concepts. Training needed.
- Equipment & vehicles not fit for purpose.
- Weak integration of private and public sector resources
- Rural Fire Protection Groups, positive contribution, but need support.

2024: land-use change accelerating

- Fuel loads up:
  - *Reduced livestock numbers in marginal farming areas*
  - *Deer reduction programmes in the uplands*
  - *Land abandonment by farms and estates & deliberate re-wilding,*
  - *Large scale native woodland schemes with variable stocking densities*
  - *Pressure from Governments to reduce traditional burning*
- Resources down:
  - *Reduced employment in traditional activities, impact on skills & kit available*
  - *Rural depopulation, difficulties in recruiting & staffing FRS*
- **All leading to increased surface vegetation – fuels + more communities, infrastructure & landscapes at risk**

International Policy Context

Complex situation to manage



International guidance

- UN FAO Fire Management Voluntary guidelines 2007
- UN EP Spreading Like Wildfire, 2022
- Landscape Fire Governance Framework, 2023
- UN FAO Integrated Fire Management Voluntary Guidelines principles and strategic actions, 2024

USA Fire order No 2

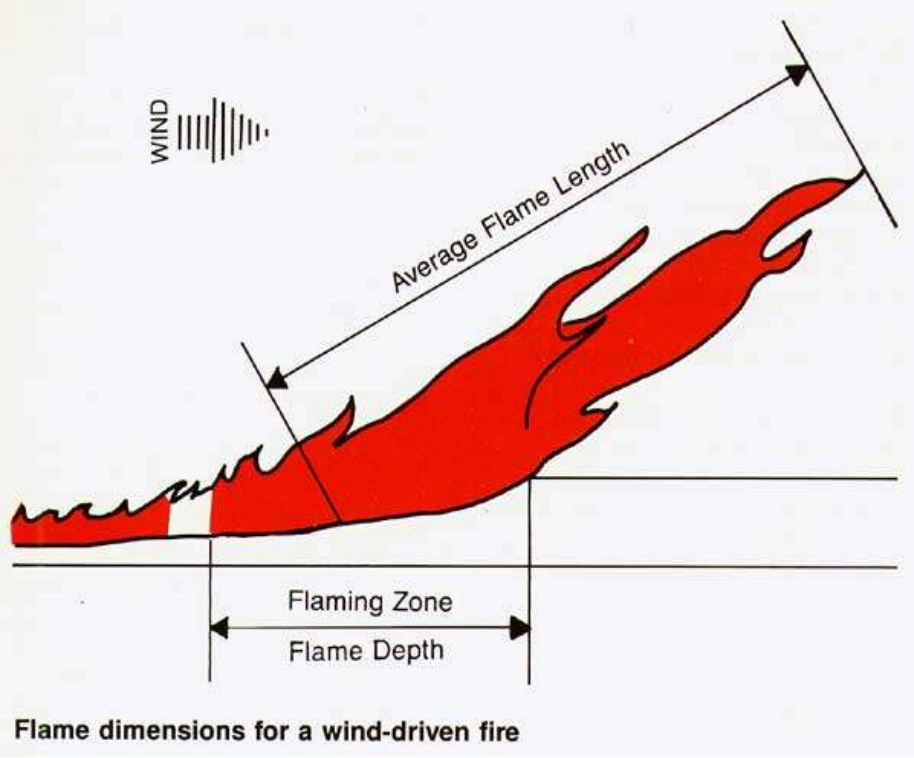
“Initiate all actions based on current and expected fire behaviour”

Fire intensity / Flame Length

Fire intensity

- **The rate of energy release per unit length of fire front**
- **Represented as kW/m (Byram, 1959)**
- I=Hwr:
  - H = Heat yield of fuel (kJ/kg)
  - w = dry weight of fuel consumed (kg/m2)
  - r = forward rate of spread (m/s)

Flame Length



Flame dimensions for a wind-driven fire

Glen Tanar 2002 Forest Edge Heather Fire Tests – deep heather, regenerating pinewood



- Flame length 6-8m
- Rate of spread 1.2km/h
- Fire intensity 15,300kW

Fuel quantity x2
ROS x2 & fire intensity x4 (Rothermal, 1972)

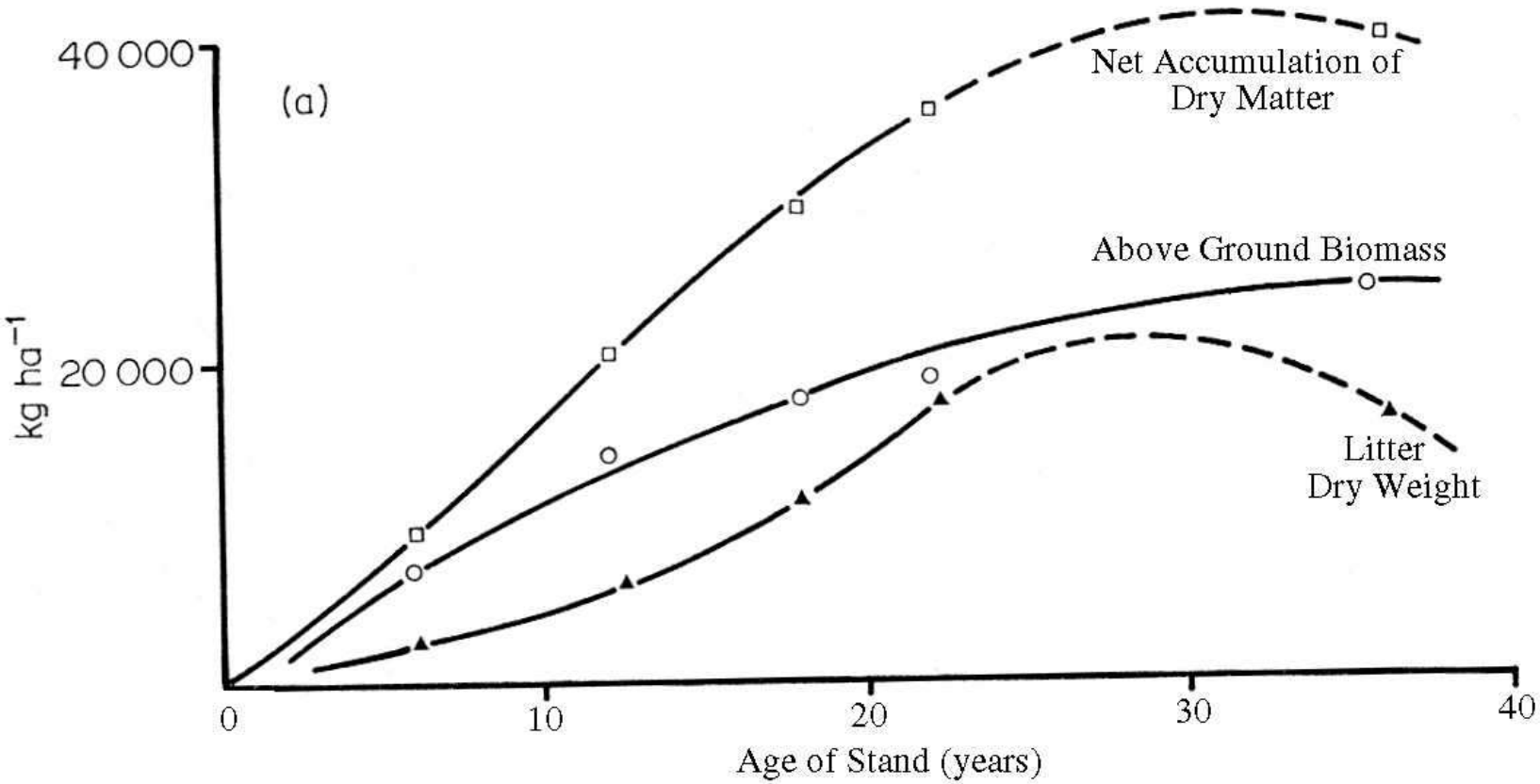
High fuel quantity



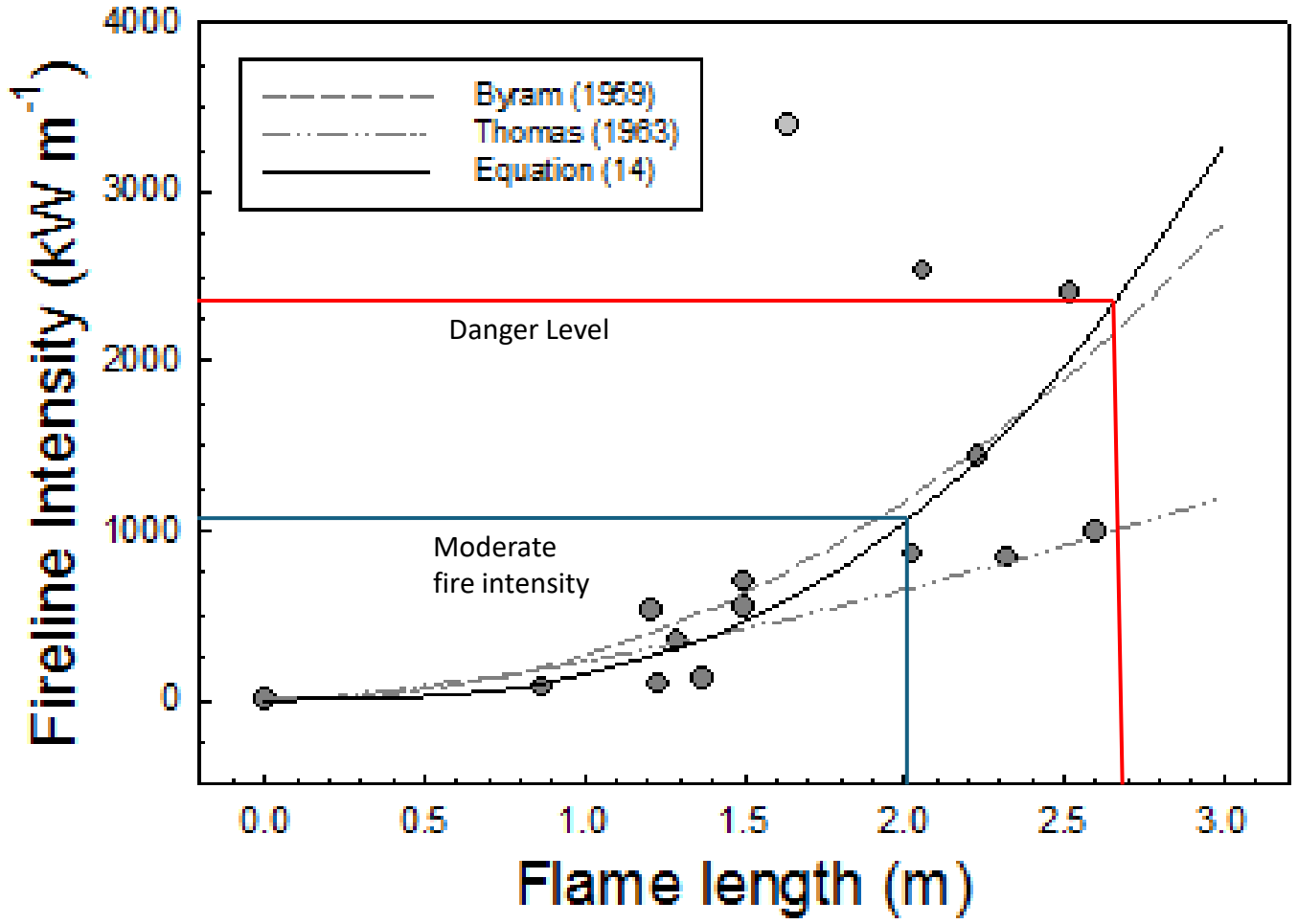
High fire intensity



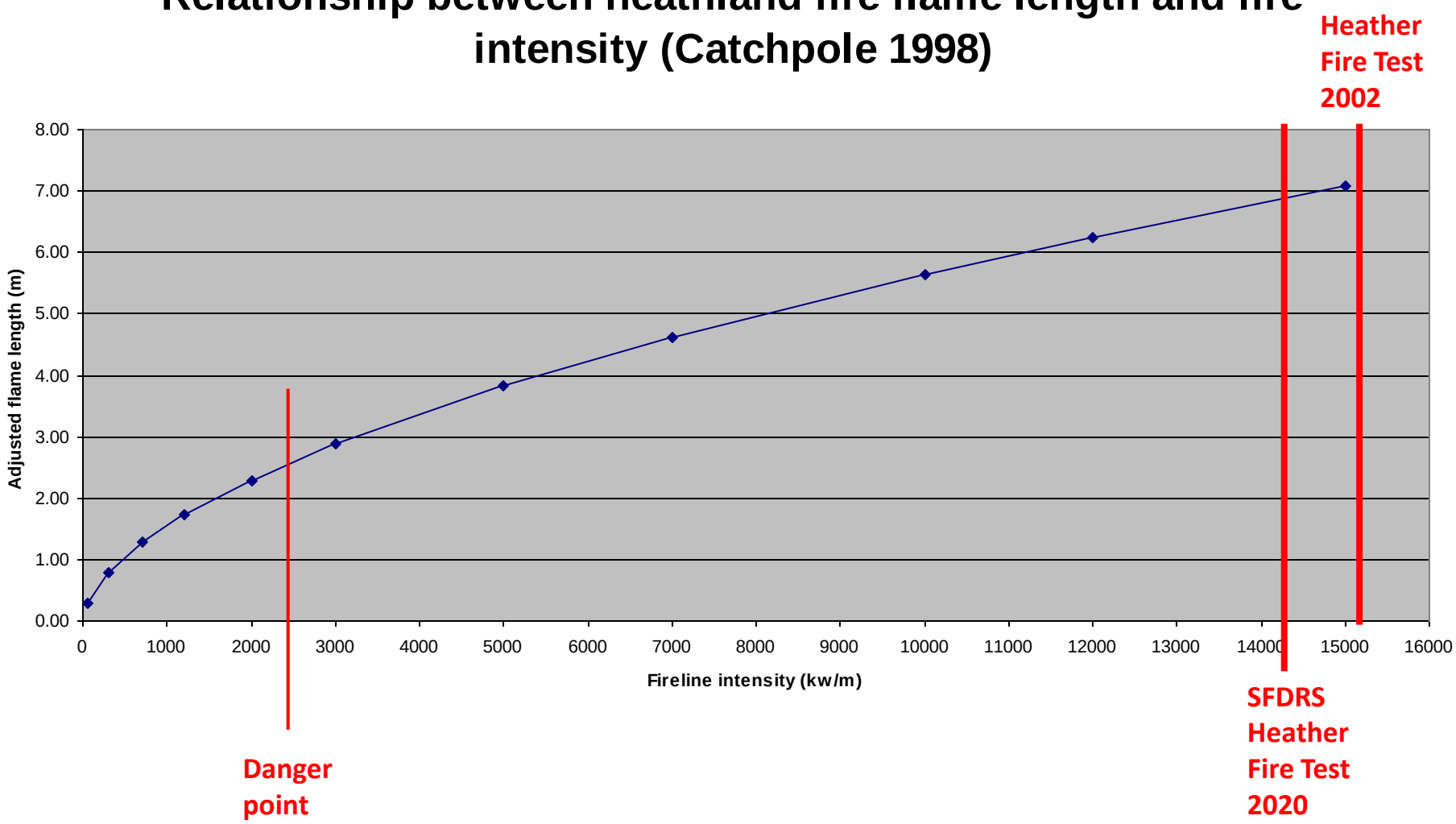
UK heather fuel loads (Gimingham, 1972)



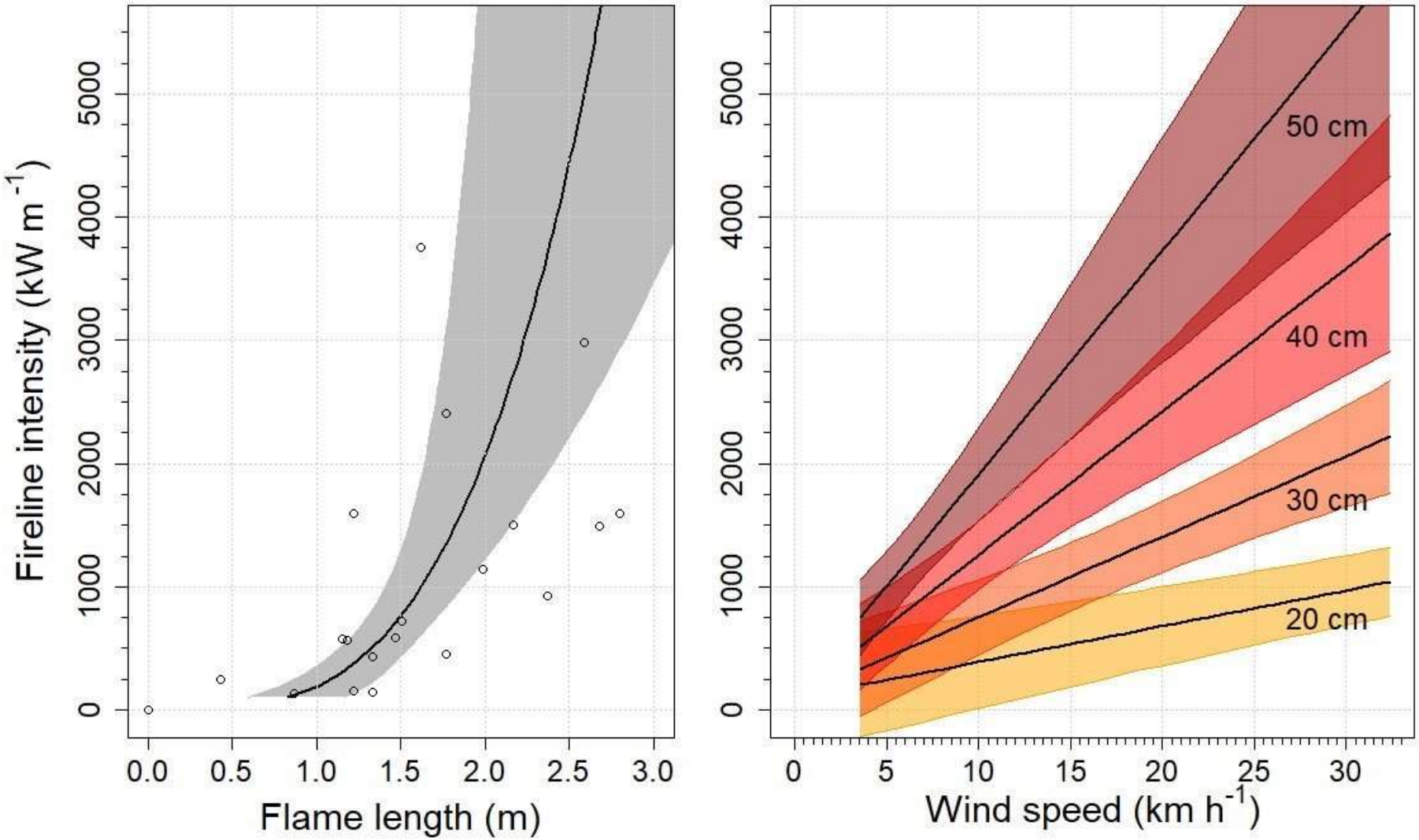
Moderate Heather Headfires <2m flame length



Relationship between heathland fire flame length and fire intensity (Catchpole 1998)



Field guides - nomograms



Upper limits of fire suppression control

– tools, kW/m, flames, tactics & triage

- Hand tools
- Power assisted water
- Helicopter
- Backburning

- 500 kW/m – 1.5m flames
- 2000 kW/m - 2m – 3m flames
- 4000 kW/m - 2.5m – 4m flames
- 10,000 kW/m – 5.6m flames

Situation summary

- In the UK we have the potential for multiple landscape scale high intensity fires that we will not be able to control.
    - *That will really stretch our limited resources: staff, equipment, & helicopters*
    - *Put at risk: people, property, infrastructure, environment and other values*
    - *Creates- a need for triage at fires, and planning and stakeholder engagement in advance*
- **We are not alone with this problem, the situation is happening in other countries already - how can we learn from them?**

Change thinking from:

"reactive"

Fire Suppression

to "proactive"

Integrated Fire Management

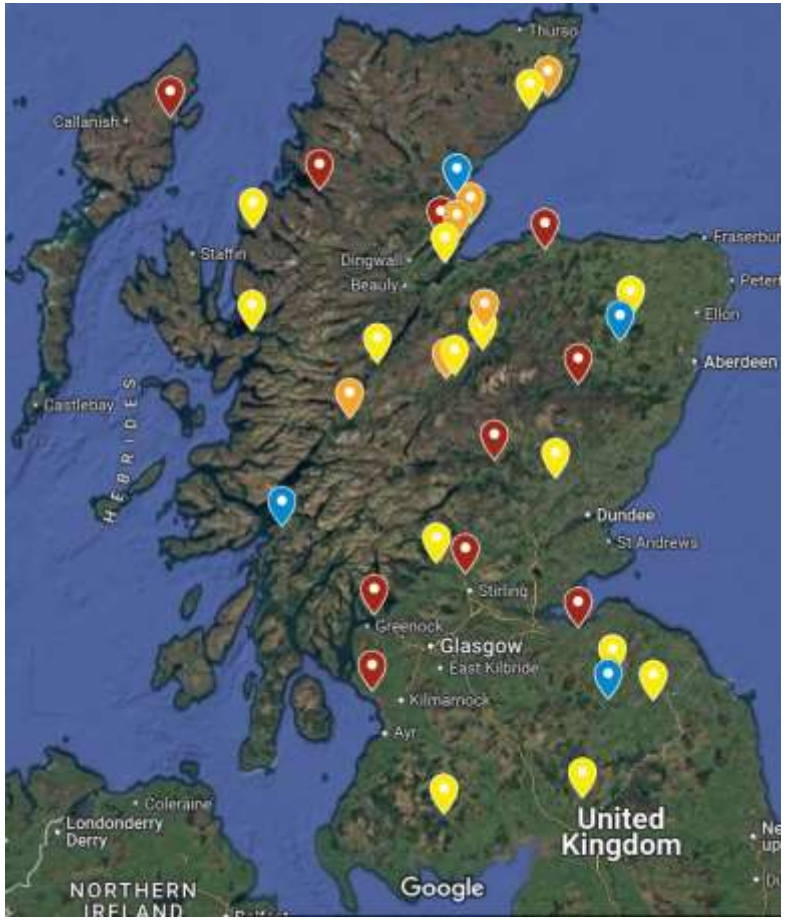
Table 13.1 Integrated fire management contrasts with suppression-centered fire management. Both are designed to protect people and property

	Suppression-centered fire management	Integrated fire management
Objectives and overall approach	Minimize area burned. Large fires equate to higher losses	Minimize fire-induced damage and the difference between the negative and positive impacts of fire. Larger fires do not necessarily equate to higher impacts. Holistic
Society & policy	Wildfire perceived solely as an emergency to be addressed by civil protection. Separation between fire and forest management. Unbalanced allocation of resources to fire suppression	Living with fire. Integration of fire and forest management. More equitable allocation of resources between suppression and fire mitigation/forest and land management
Fire suppression	Rigid, full force, regardless of resources at risk, burn conditions, and costs. Focus on civil protection decreases effectiveness	Flexible. Variable in effort and timing. Deliberate planned response, weighing consequences, and including monitoring and limited or no-suppression options. Rationalized costs. Increased effectiveness
Environmental/ ecological issues	Fire is solely a damaging disturbance.	Ecosystems require fire regimes that are consistent with current and future ecological and social goals
Socioeconomic issues	Traditional burning subject to social coercion. No consideration for Traditional Ecological Knowledge	Fire provides ecosystem services. Traditional Ecological Knowledge is considered. Involvement with local communities and reinstatement or regulation of their burning practices
Fuels management	Absent or restricted to an isolation strategy (fire- and fuel-breaks)	Extended fuel reduction/modification programs, including preventive silviculture and area-wide/mosaic treatments, often through prescribed burning

Multi-stakeholder strategy development

- Fire groups established Scotland, England 1990’s
- Wildfire conference series starts 2003-4.
- Scottish Wildfire Forum 2004, England & Wales Wildfire Forum 2005
- Northumberland FRS training with Catalonia Fire Service, starts 2007
- Scottish Government, Wildfire Operational Guidance, 2013
- Scottish Wildfire Forum strategy, 2019-21
- Scottish Fire & Rescue Service Wildfire Strategy 2023
- Wales Wildfire Charter 2023
- Wildfires in Northern Ireland – Draft Strategic Way Forwards 2023

SFRS Wildfire Strategy 2023



- Investment in new specialist resources, training & roles
- Resources allocated to stations on a risk basis in tiers (yellow, orange, red & blue)
- Investment and promotion of wildfire prevention materials
- Total investment £1.6m+

Political processes

- SPICe 2018 briefing to MSPs, Scottish Parliament
- UK Parliament Wildfire note, 2019
- Werrity Report Grouse Moors 2020
- 3rd UK Climate Change Risk Assessment (CCRA3) 2021
- Kate Forbes MSP (Deputy 1st Minister) Wildfire mini-summit 2023
- Consultation – enactment Wildlife & Muirburn Scotland Act 2024
    - *A lot of MSPs involved in discussions as progressed through Parliament*
    - *Prescribed burning still allowed on peat & out-of-season for wildfire prevention*
- UK Parliament Wildfire note, 2024

Refresh SWF strategies, 2023 – Cross-mapped to IFM & UNEP guidance

Integrated Fire Management			Spreading Like Wildire Recommendation	What we are doing already	What Needs to be Done?	By Who?
Risk Reduction	Awareness and Eduction	Ignition Avoidance/restriction of high risk activity	7. Empower Communities and Local Auhorities	Wildfire Danger Assessments. SFRS and partners public Comms messaging.		
		Personal Evacuation Plans	7. Empower Communities and Local Auhorities	SFRS Wildfire Leaflets.		
		Asset Protection	7. Empower Communities and Local Auhorities	SFRS Wildfire Leaflets.		
		Training	7. Empower Communities and Local Auhorities 8. Improve Firefighter safety	Lantra Muirburn Foundation Training.		
	Landscape Management	Fuel Management	4. Support and integrate Indigenous, traditional, and contemporary fire management practices into policy 6. Rebalance investments spent on reactive suppression to proactive wildfire mitigation and management	Muirburn Code. Lantra Muirburn Foundation Training		
		Firebreak Creation and Maintenance	4. Support and integrate Indigenous, traditional, and contemporary fire management practices into policy 6. Rebalance investments spent on reactive suppression to proactive wildfire mitigation and management	Muirburn Code. Lantra Muirburn Foundation Training		
		Land Use Planning	3. Promote an integrated fire management approach 6. Rebalance investments spent on reactive suppression to proactive wildfire mitigation and management		Government Policy	National and Local Government?
		Fire Regime Restoration and Management	4. Support and integrate Indigenous, traditional, and contemporary fire management practices into policy 6. Rebalance investments spent on reactive suppression to proactive wildfire mitigation and management		Government Policy	National Government?
	Fire Use Laws and Enforcement	Building Codes	3. Promote an integrated fire management approach 6. Rebalance investments spent on reactive suppression to proactive wildfire mitigation and management		Government Policy	National and Local Government?
		Regulate Fire Use	3. Promote an integrated fire management approach	CNPA fire byelaw	Government Policy	National and Local Government?
		Ignition Reduction Strategies	3. Promote an integrated fire management approach	CNPA Integrated Wildfire Plan	Government Policy	National and Local Government?
	Community Based Fire Management	Promote the safe use of fire through education	7. Empower Communities and Local Auhorities	Promotion of Fire Groups		
		homeowner actions	7. Empower Communities and Local Auhorities	SFRS Wildfire Leaflets.		

The future, lots of questions?

- How do we get political support and funding for wildfire prevention and Integrated Fire Management?
  - *Improving informed discussions on wildfire behaviour & strategies with the public, environmental organizations and politicians?*
  - *Attracting political interest to get the national Forums work & their strategies funded?*
  - *Developing an accepted language for the debate?*
- How do we improve working together?
  - *Scale: local, regional, national, UK, international?*
  - *Issue / topic: always work together, independently, or collaboratively?*