

An aerial photograph of a large wildfire. The fire is intense, with bright orange and yellow flames consuming a large area of land. Thick, dark grey smoke rises from the fire, filling the upper half of the frame and partially obscuring the sky. The background shows a hazy landscape with some distant structures or trees. The overall scene is dramatic and highlights the scale of the fire.

# **Wildfire in the UK**

**What has Science got to do with it?**

# Wildfire - What do we need?

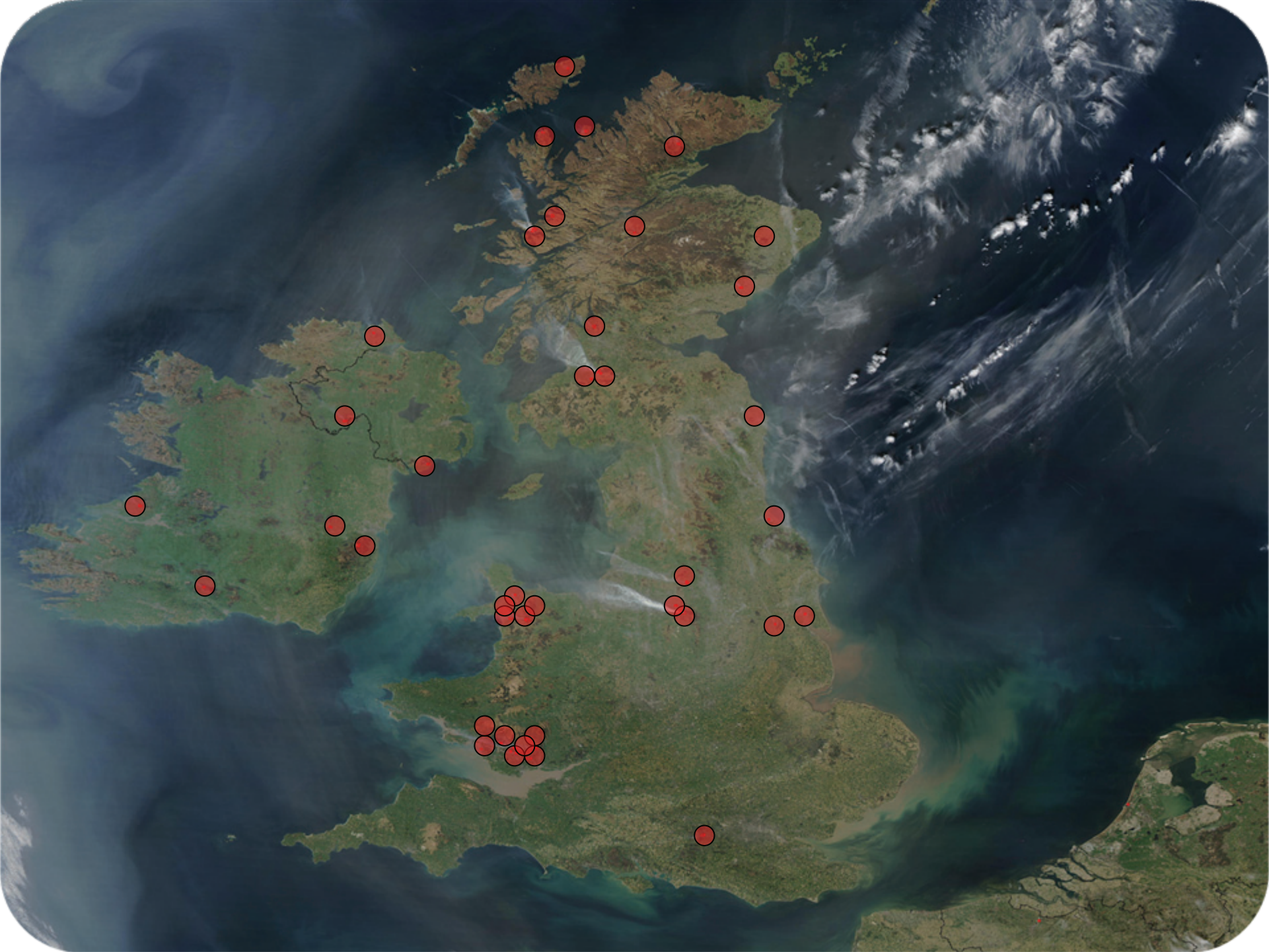
- Understand the risk
- Implement measures to reduce risk
- Prevent Wildfire
- Be prepared for Wildfire
- Provide an effective wildfire response

# The Wildfire Challenge

- **Fire Service has a strong structural fire fighting background**
- **Land managers have a secondary focus on fire**
- **Limited specific National training guidance**
- **Wildfire has not been emphasised in current safety systems**
- **Traditional understanding of wildfire behaviour / associated risks**
- **Potential inability to carry out a wildfire risk assessment**
- **Potential for Command systems to fail due to the traditional wildfire approaches**

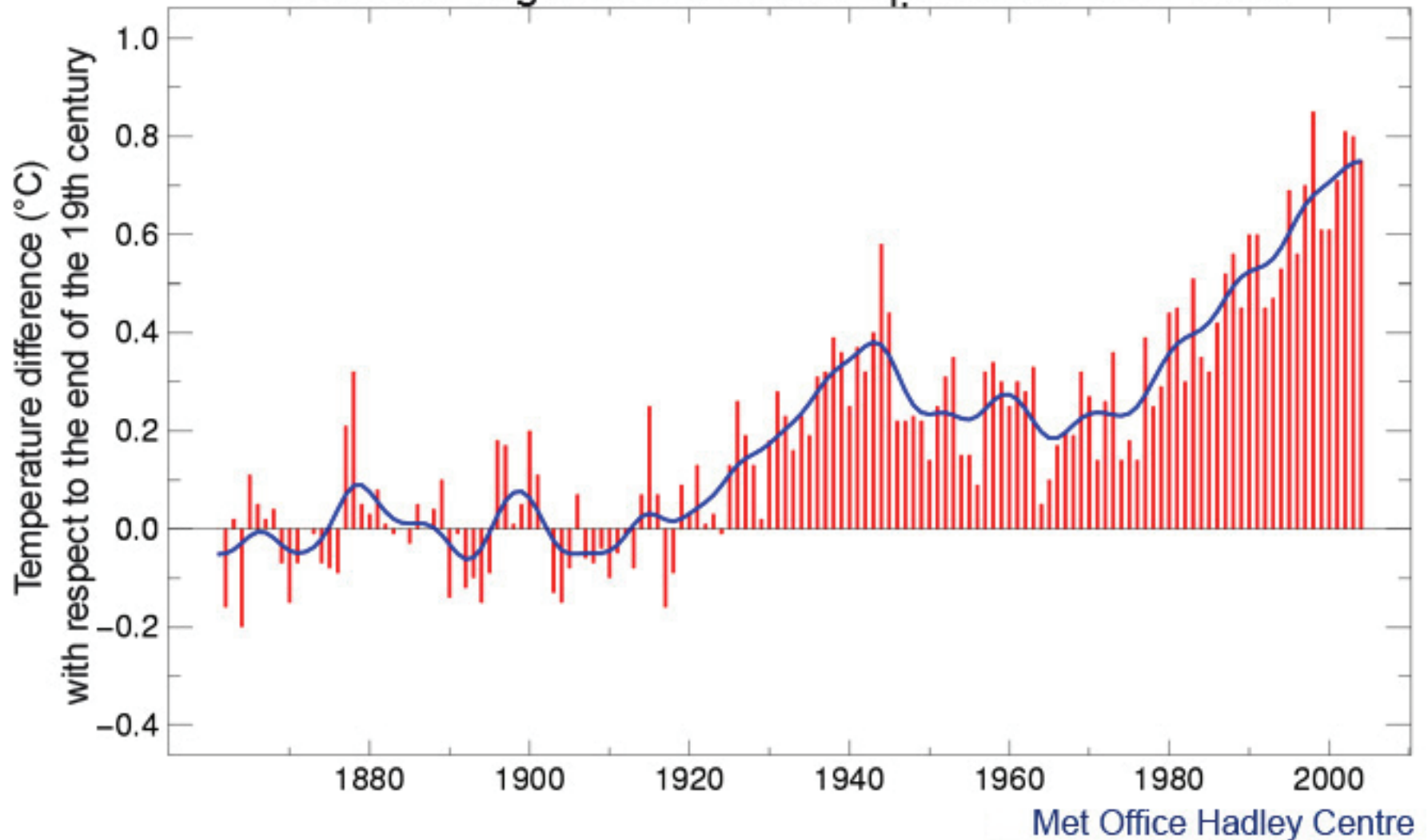
**It there really a need to  
address these wildfire  
issues?**



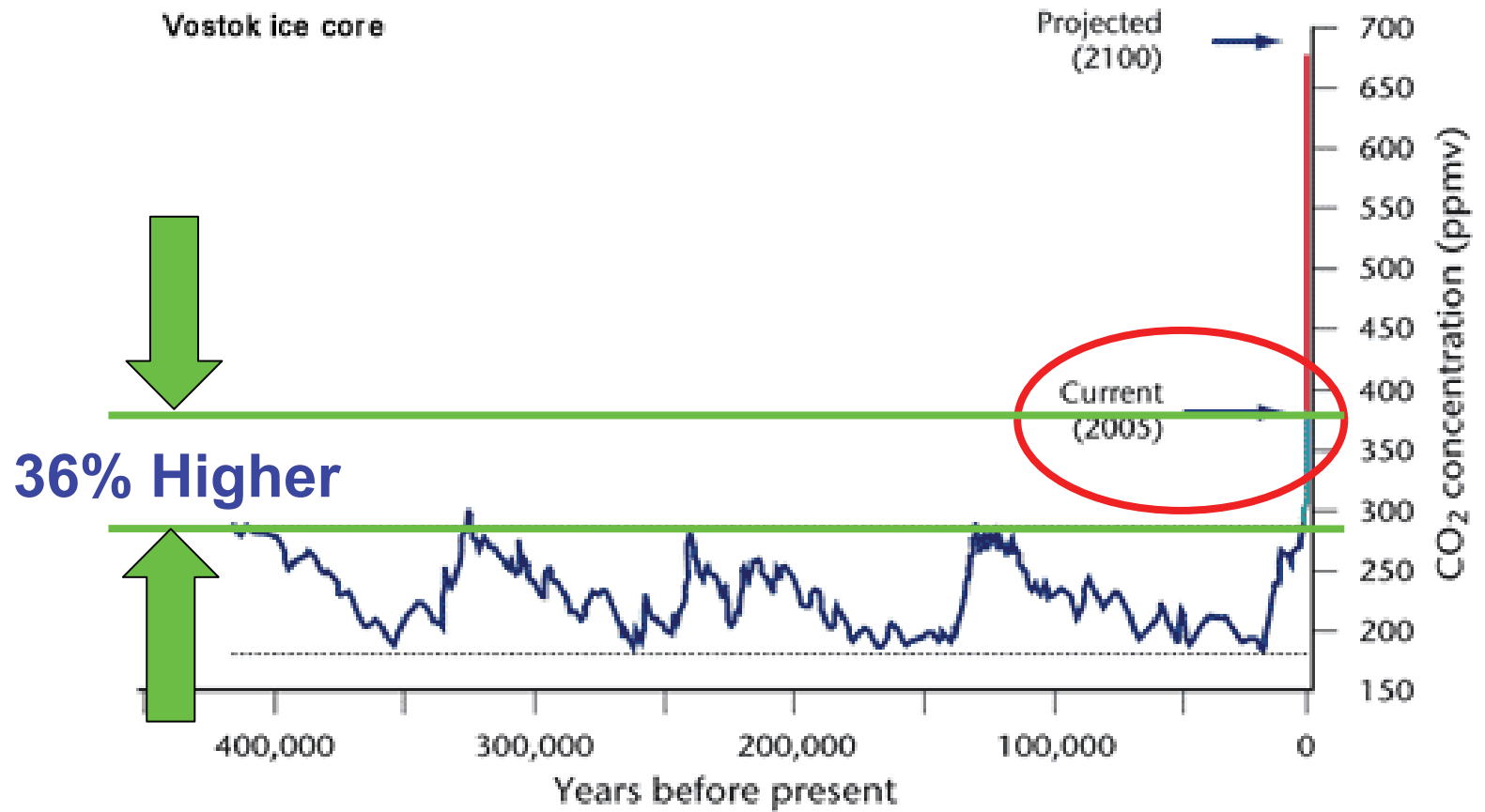


# Global average temperature

Global average near-surface temperatures 1861–2004

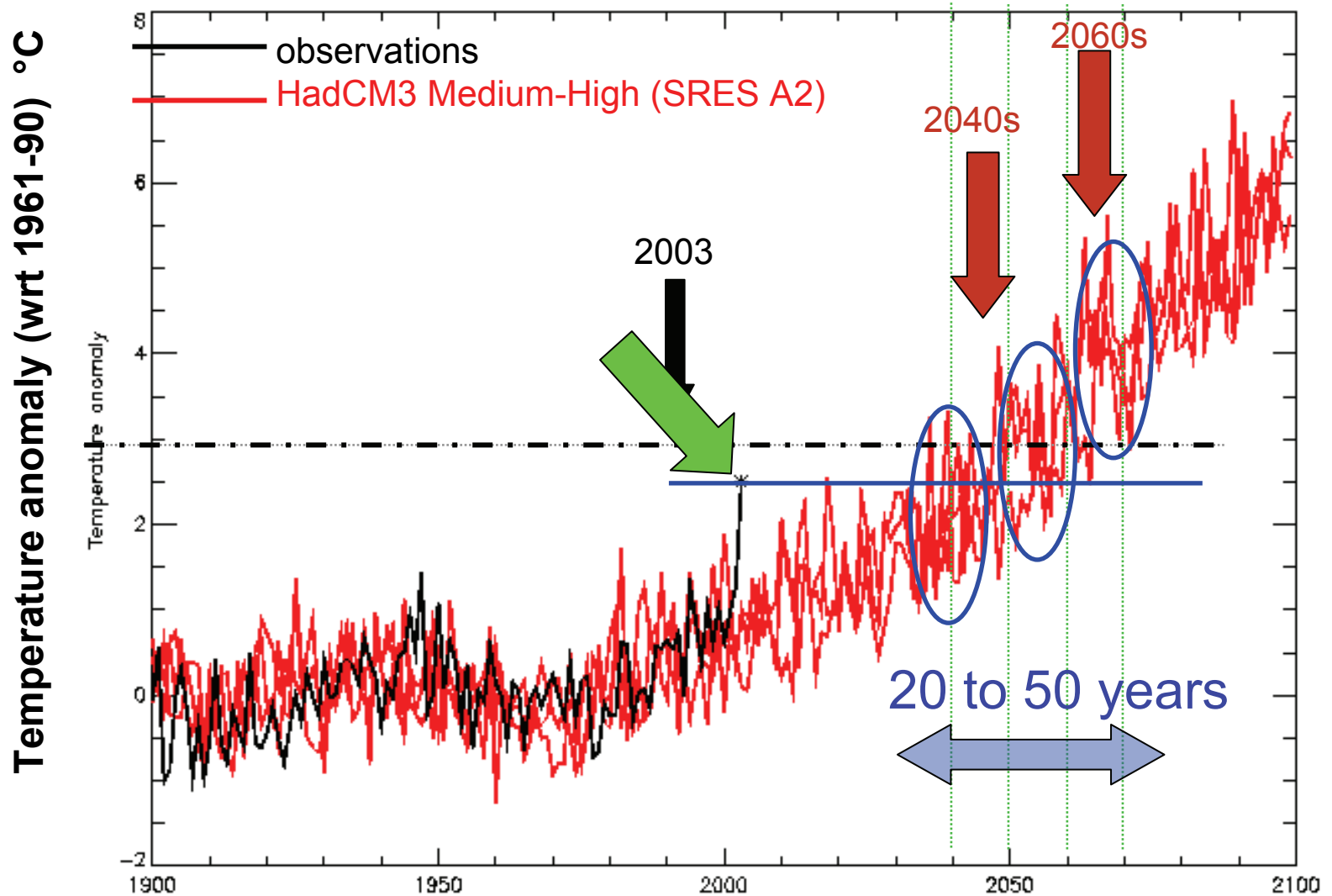


# CO2 concentrations





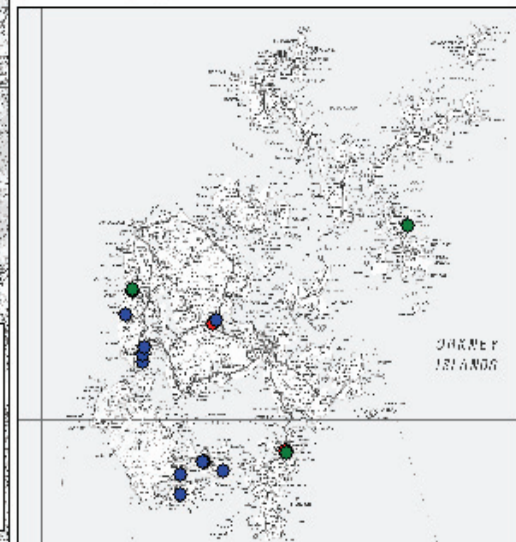
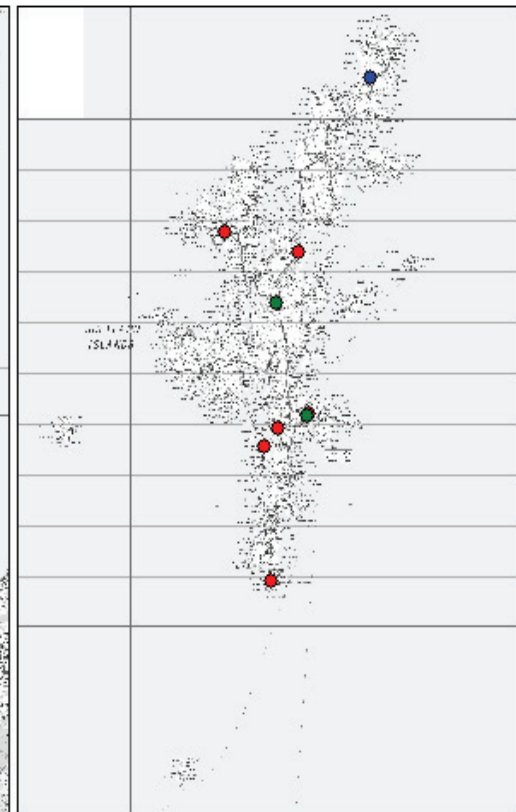
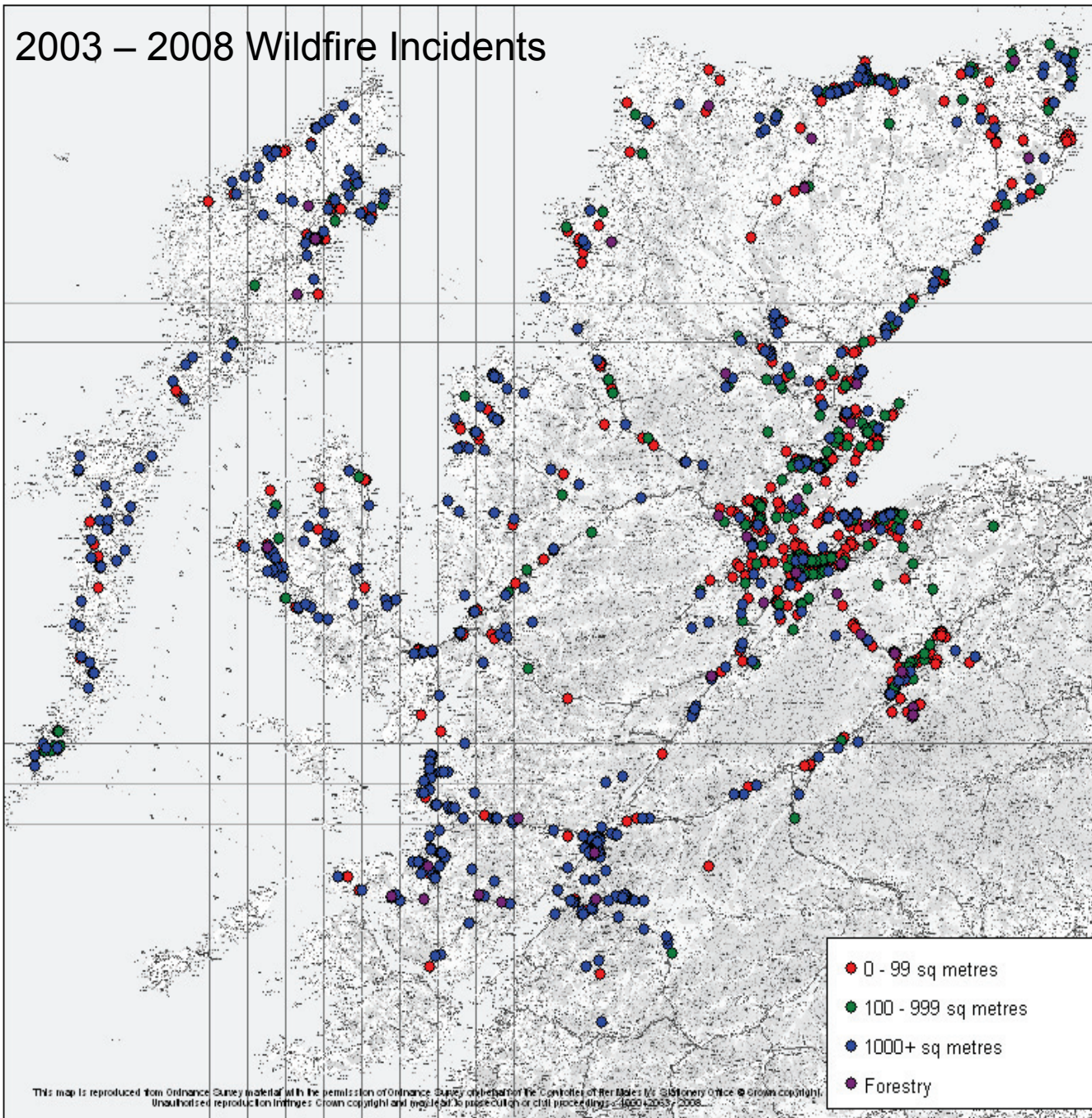
# European Summer Temperatures





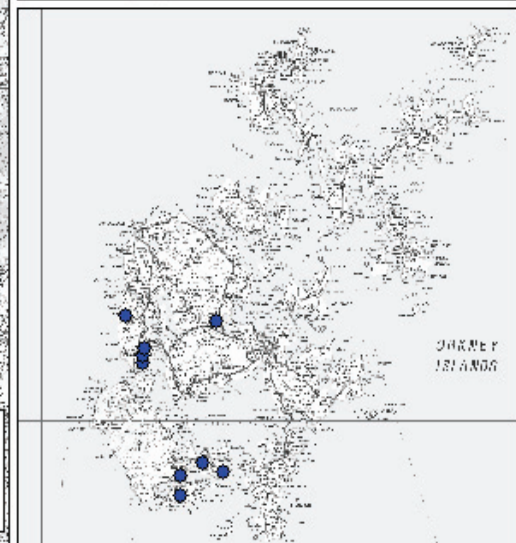
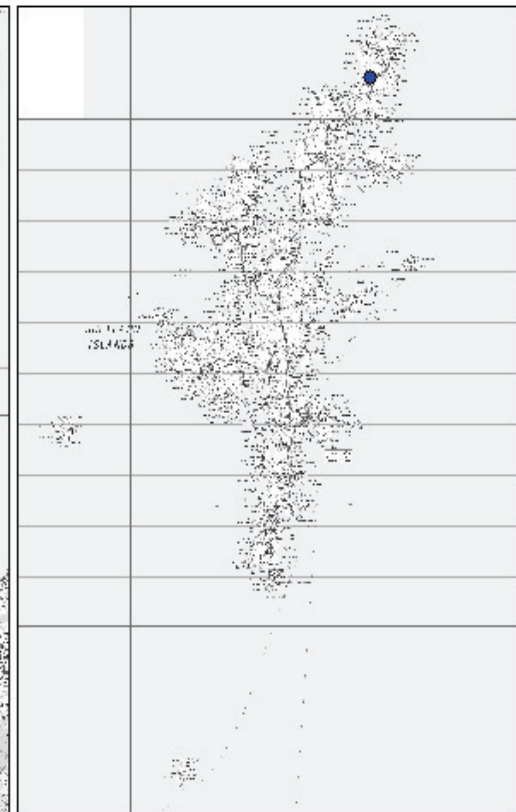
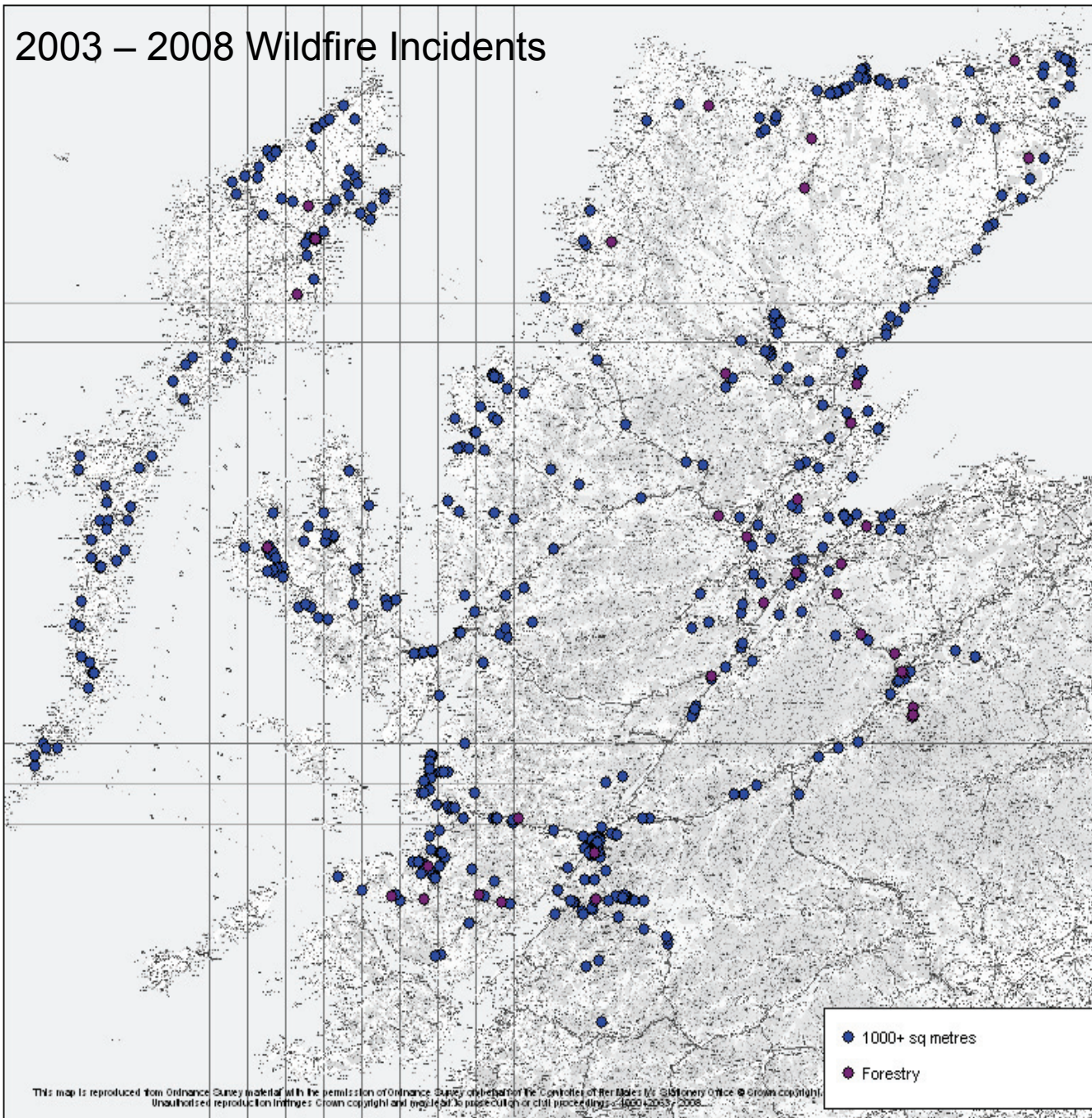
Green sign with white text and arrow pointing left. The text includes:  
Gleneloch, Gleneloch  
& B312  
Clach Linn Aillie  
Rìte of Linnhalay  
CA 91001

# 2003 – 2008 Wildfire Incidents



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# 2003 – 2008 Wildfire Incidents



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# The Cost? - Highlands and Islands Fire and Rescue

Average loss per year

**12,000 hectares of moor**  
**1,000 hectares of forestry**

Estimated sporting cost

**£10 million**

Additional costs -

local economies?  
tourism?  
environmental?  
carbon release?  
property loss?  
potential loss of life?

# Major risks

**Most injuries and fatalities are not as a result of huge forest fires;**

- **They occur at smaller incidents**
- **Usually 'quiet' parts of larger incidents**
- **Where personnel are working upslope of a fire**
- **Where there is an unexpected wind change**



Flame length	Fire fighting Tactic
?	<b>Hand tools &amp; direct attack</b>
?	<b>Water &amp; flanking attack</b>
?	<b>Water, flanking &amp; indirect attack</b>



Flame length	Fire fighting Tactic
< 1.5m	<b>Hand tools &amp; direct attack</b>
1.5 – 3m	<b>Water &amp; flanking attack</b>
> 3m	<b>Water, flanking &amp; indirect attack</b>

**If these questions cannot be answered on the fire ground then personnel could be put at risk.**

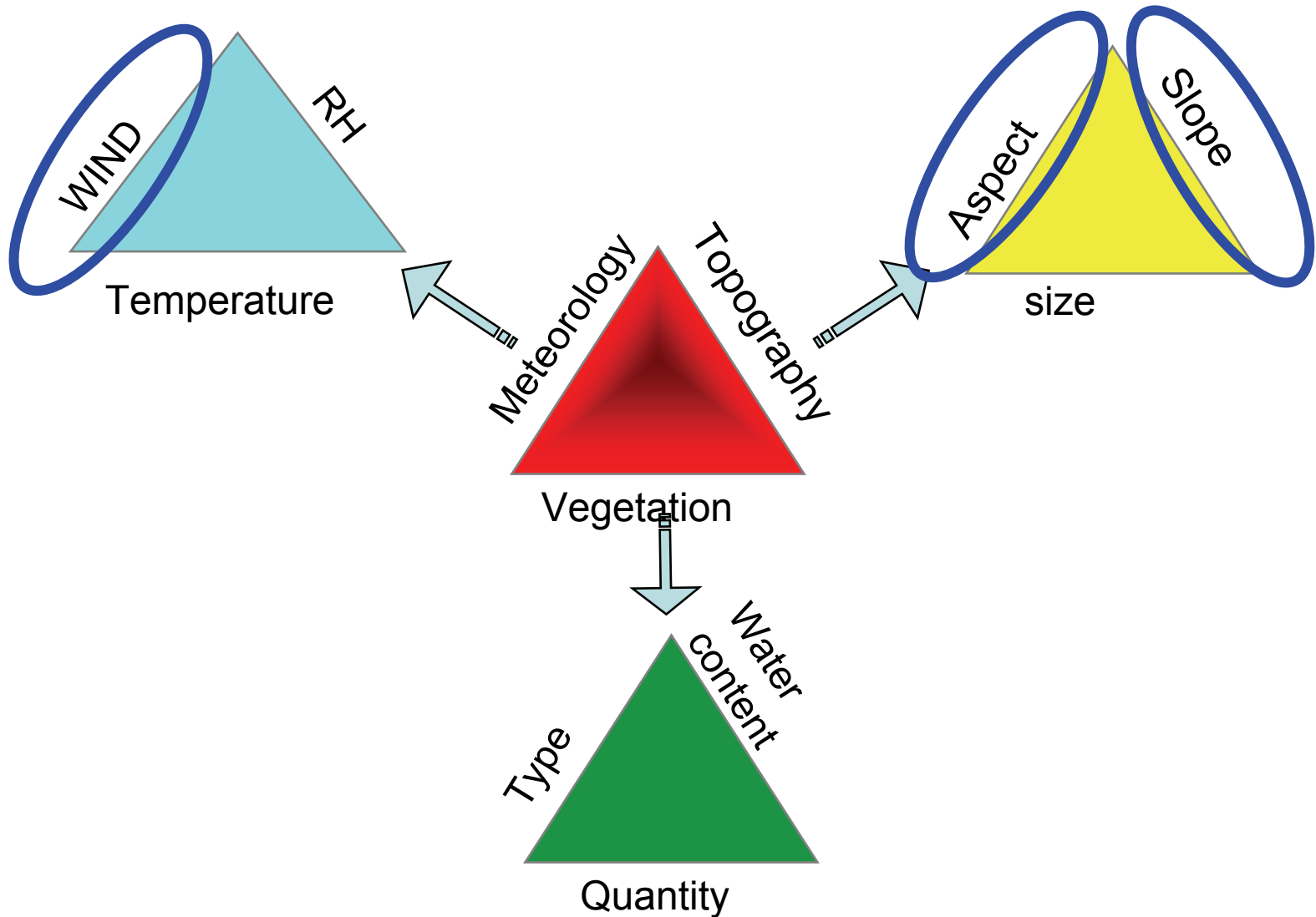
Where does the fire have most potential?

What are the resource requirements and where should these be placed?

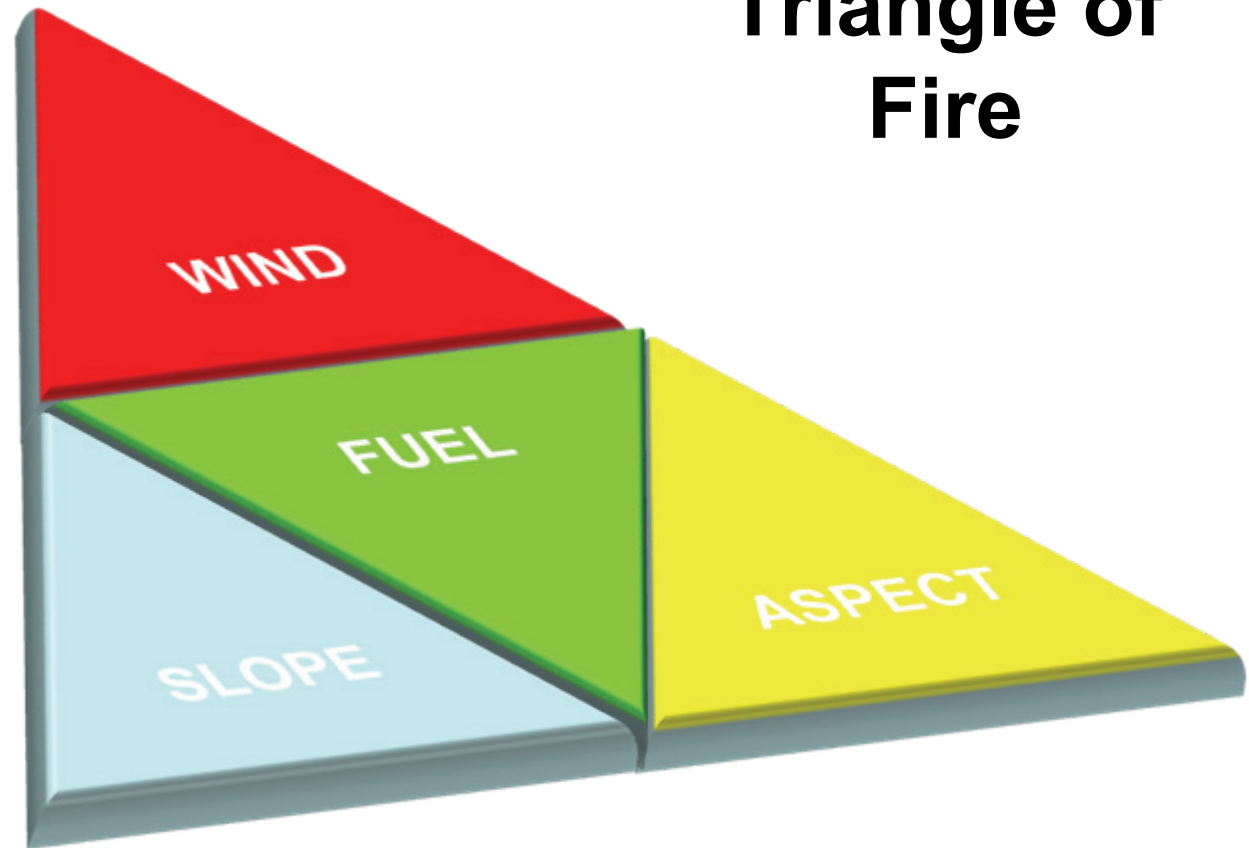
How & Where can the fire most effectively be suppressed?

Where will the fire behaviour change and how will this effect the suppression tactics?

# The Wildfire Prediction System



# Wildfire – Triangle of Fire



**Fire Alignment Grading – F1, F2, F3**

Wind

Wind

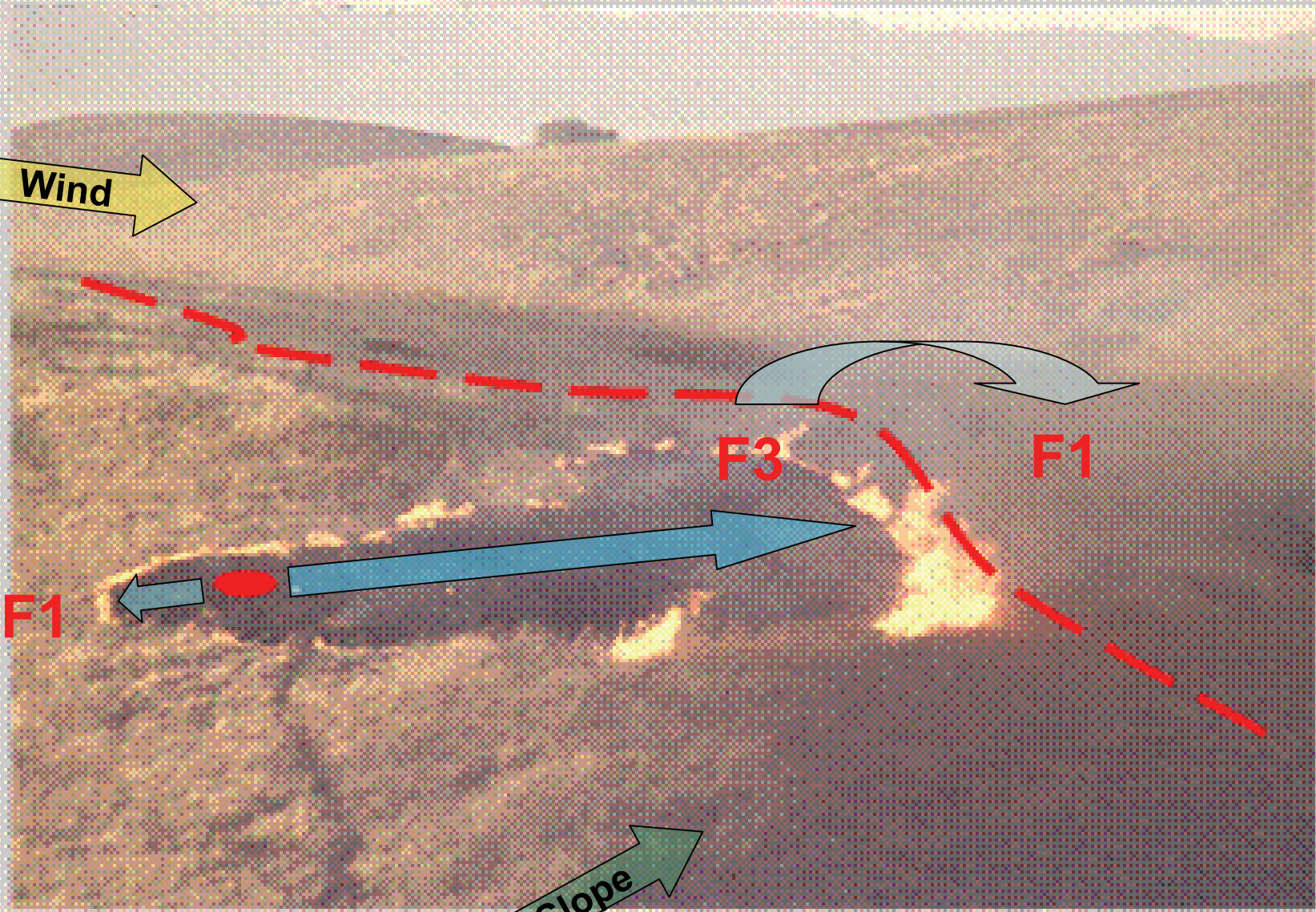
F3

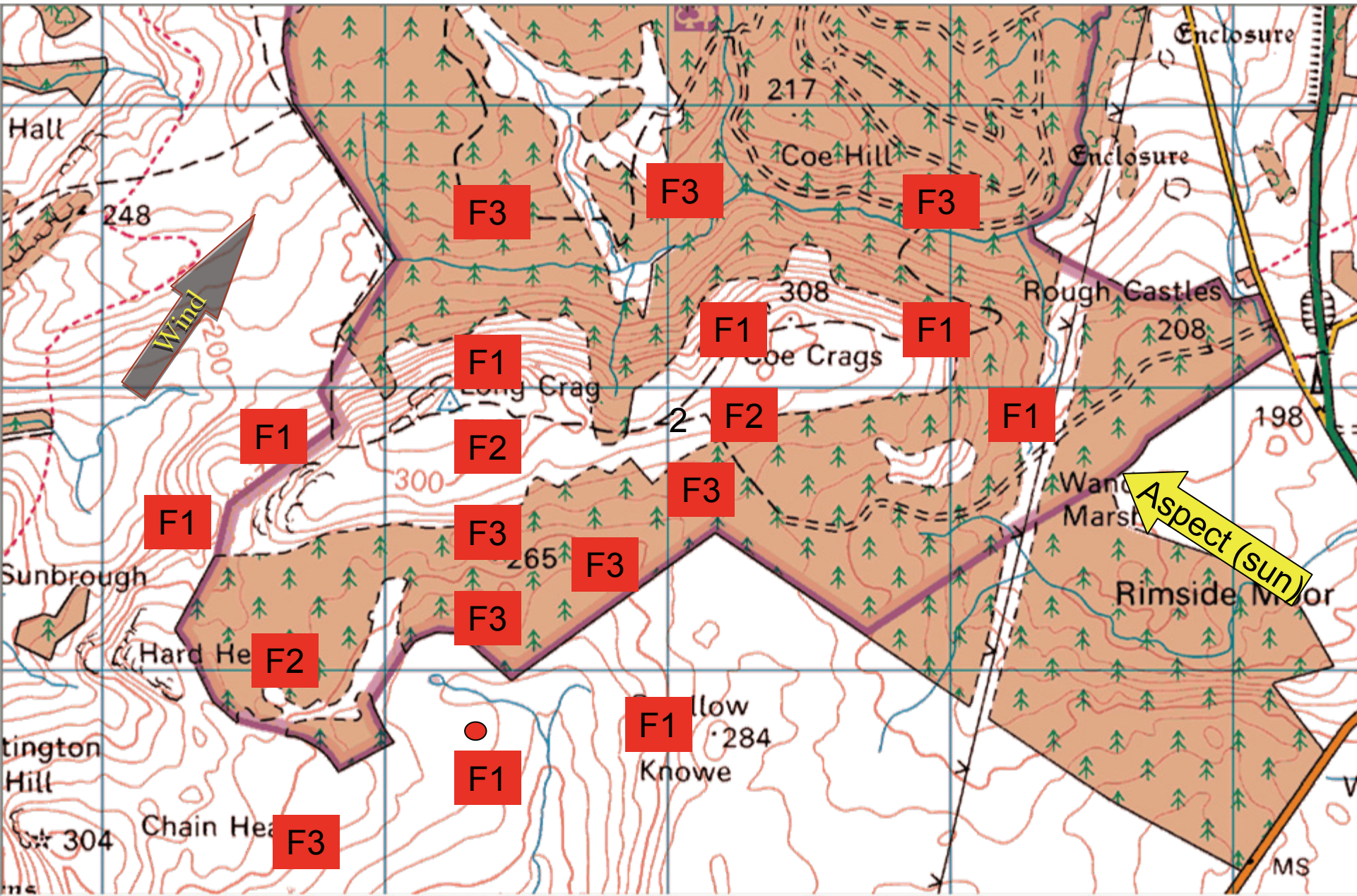
F1

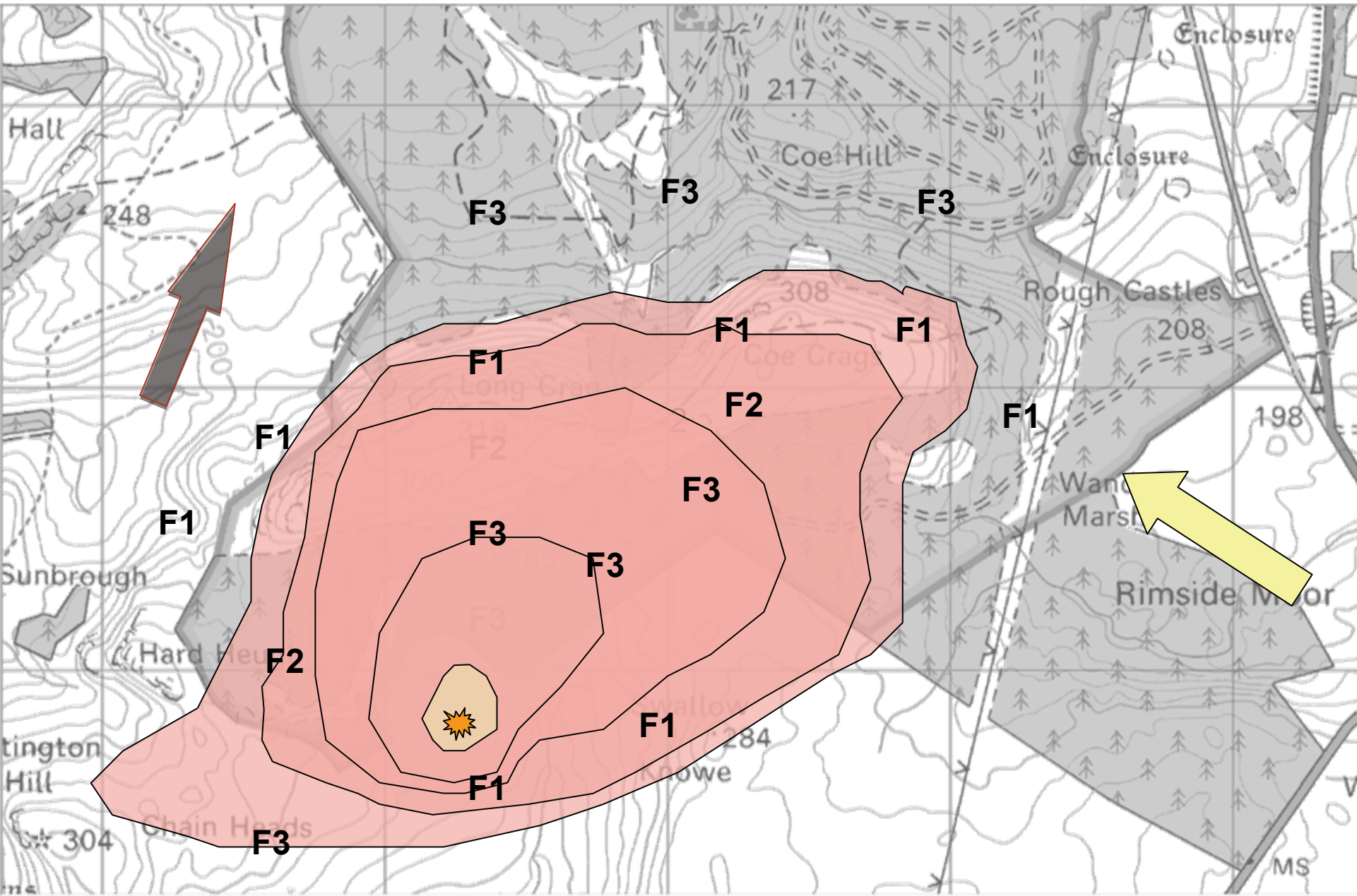
F1

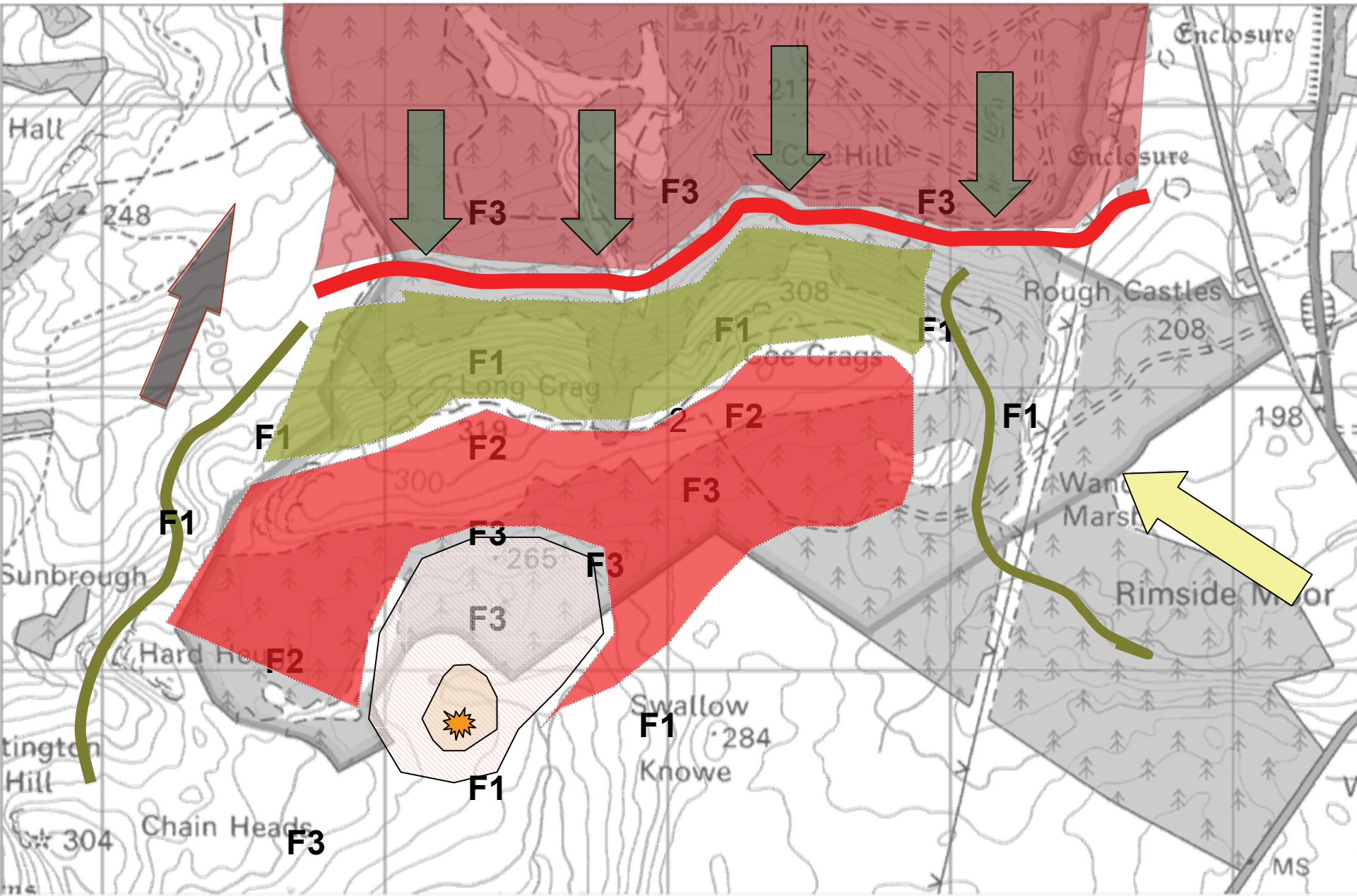
Slope

Slope









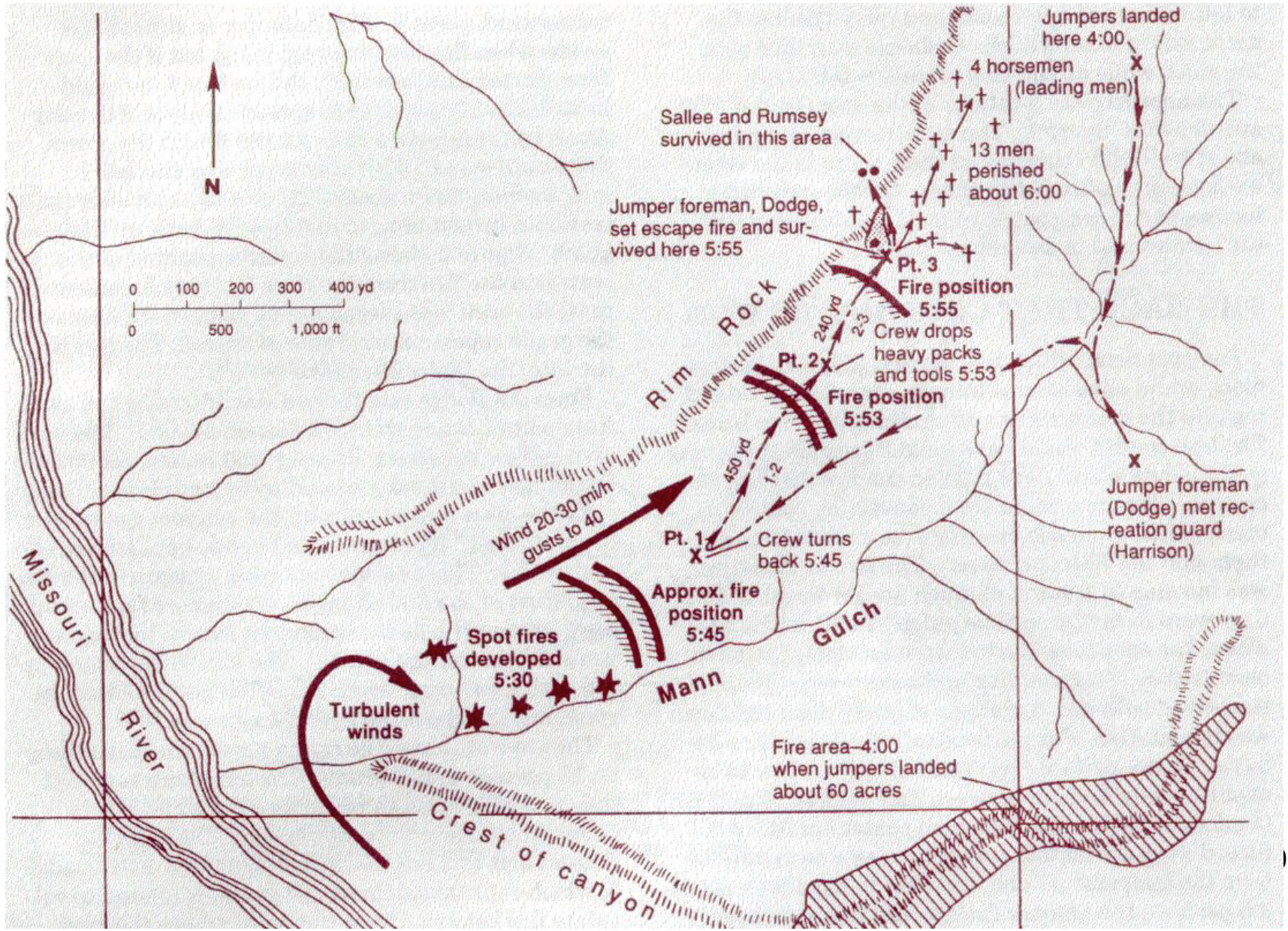


# Mann Gulch Fire

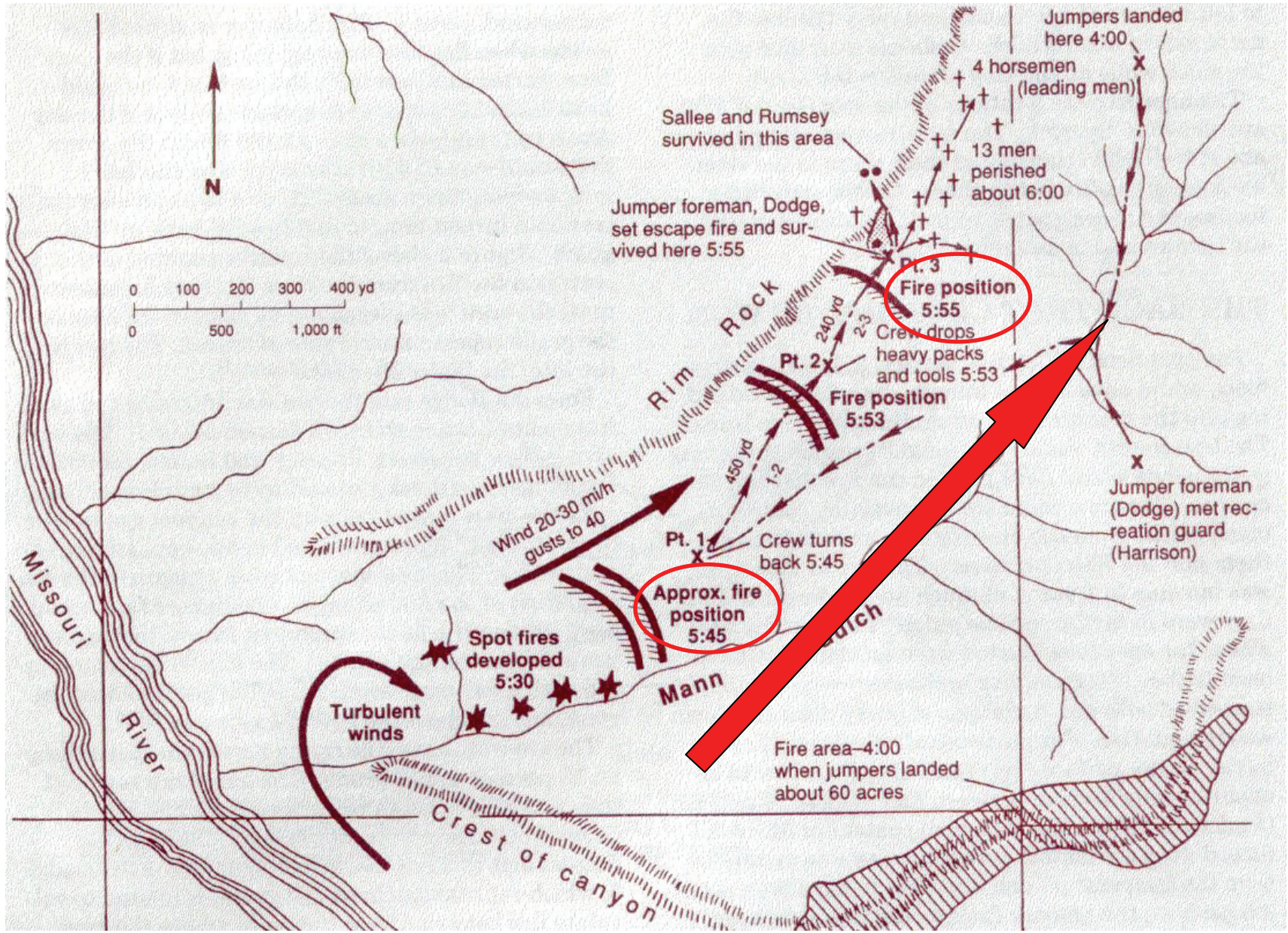
- USA 1949
- 13 Victims



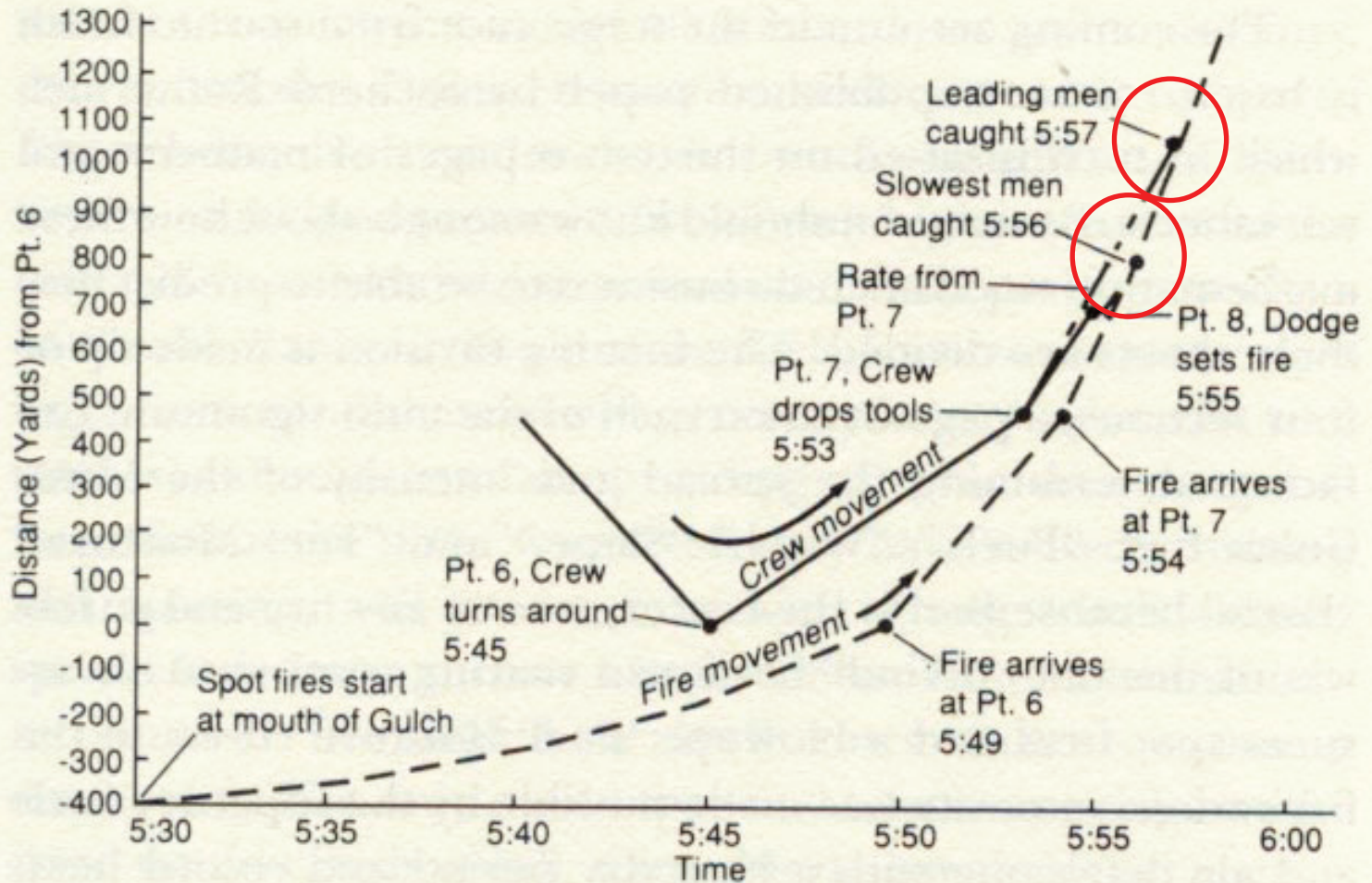
# Mann Gulch accident description



# Mann Gulch accident description

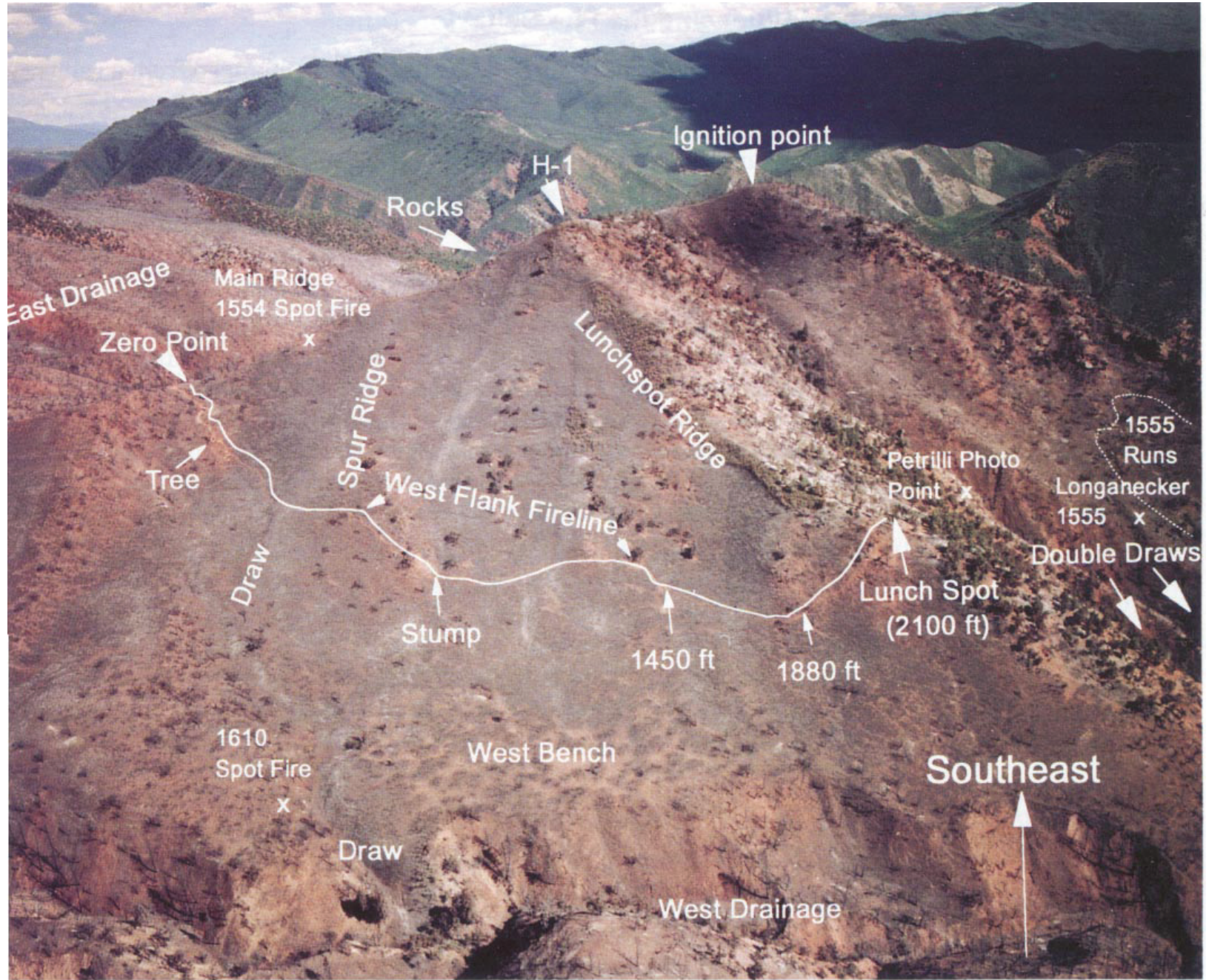


# “A race that could not be won”

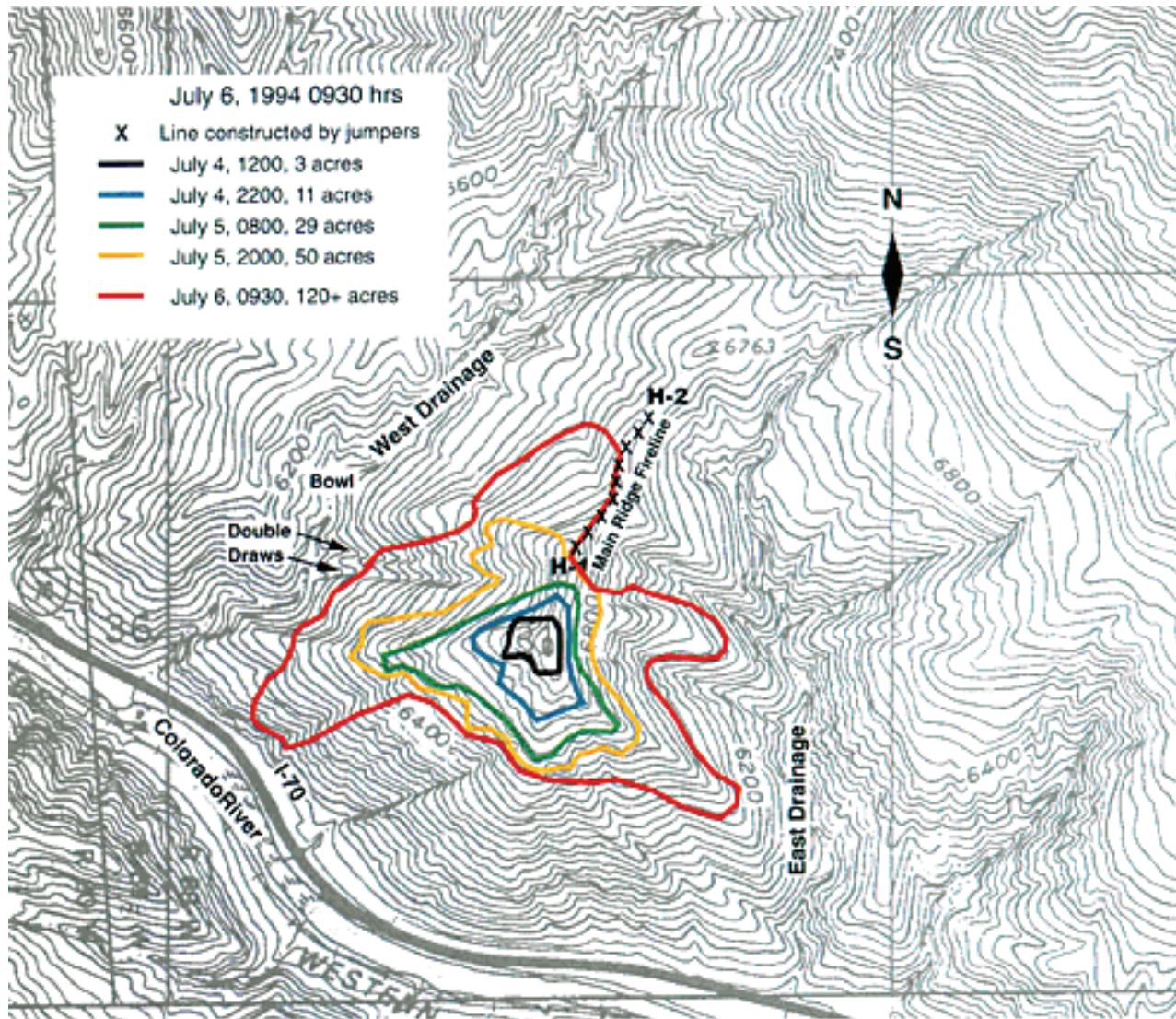


Time and position of fire and crew at Mann Gulch on August 5, 1949.  
Graph by Richard C. Rothermel.

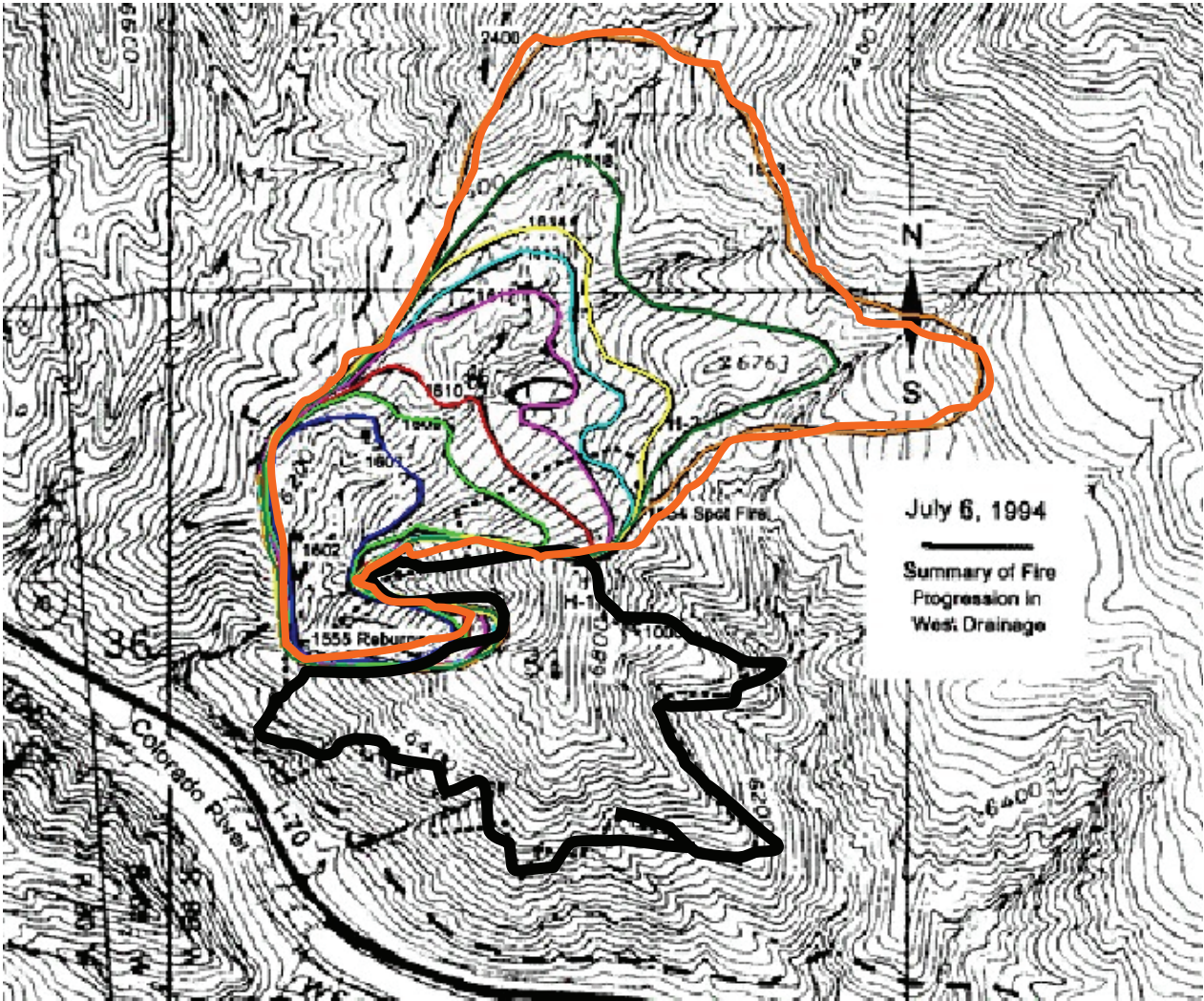
# South Canyon (Storm King Mountain)



# Fire spread before the accident



# Fire spread during the accident



50 Hours

20 Minutes







00:00



Manchester, March  
2009

DXV Fire Behaviour

38



Manchester, March  
2009

DXV Fire Behaviour

39





Manchester, March  
2009

DXV Fire Behaviour

41





Manchester, March  
2009

DXV Fire Behaviour

43







Manchester, March  
2009

DXV Fire Behaviour

45





Manchester, March  
2009

DXV Fire Behaviour

47





Manchester, March  
2009

DXV Fire Behaviour

49





Manchester, March  
2009

DXV Fire Behaviour

51



Manchester, March  
2009

DXV Fire Behaviour

52





Manchester, March  
2009

DXV Fire Behaviour

53



Manchester, March  
2009

DXV Fire Behaviour

54



Manchester, March  
2009

DXV Fire Behaviour

55







Manchester, March  
2009

DXV Fire Behaviour

58





Manchester, March  
2009

DXV Fire Behaviour

60







Manchester, March  
2009

DXV Fire Behaviour

62



Manchester, March  
2009

DXV Fire Behaviour

63



Manchester, March  
2009

DXV Fire Behaviour

64





Manchester, March  
2009

DXV Fire Behaviour

66





Manchester, March  
2009

DXV Fire Behaviour

68







Manchester, March  
2009

DXV Fire Behaviour

70



Manchester, March  
2009

DXV Fire Behaviour

71



Manchester, March  
2009

DXV Fire Behaviour

72



Manchester, March  
2009

DXV Fire Behaviour

73





Manchester, March  
2009

DXV Fire Behaviour

75



Manchester, March  
2009

DXV Fire Behaviour

76







Manchester, March  
2009

DXV Fire Behaviour

78



Manchester, March  
2009

DXV Fire Behaviour

79



Manchester, March  
2009

DXV Fire Behaviour

80



Manchester, March  
2009

DXV Fire Behaviour

81



Manchester, March  
2009

DXV Fire Behaviour

82



Manchester, March  
2009

DXV Fire Behaviour

83



Manchester, March  
2009

DXV Fire Behaviour

84





Manchester, March  
2009

DXV Fire Behaviour

85



Manchester, March  
2009

DXV Fire Behaviour

86



Manchester, March  
2009

DXV Fire Behaviour

87



Manchester, March  
2009

DXV Fire Behaviour

88



Manchester, March  
2009

DXV Fire Behaviour

89



Manchester, March  
2009

DXV Fire Behaviour

90



Guadalajara - 17 July 2005





# Eleven victims

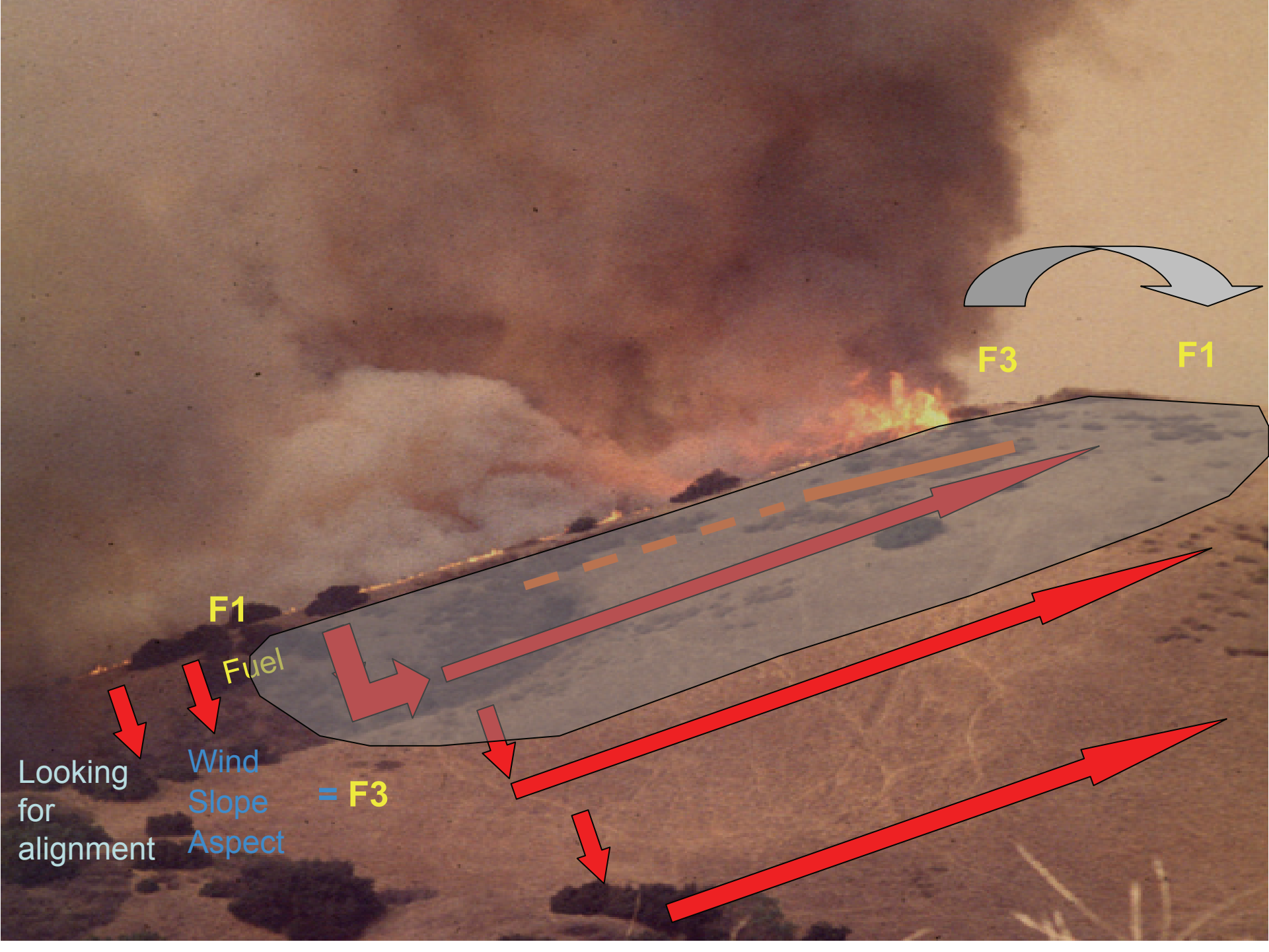




From the CA 91  
Inverness  
Glenfiddich  
Glenloch  
A.832  
Cairn Loch Ailich  
Kyle of Lochalsh  
E.A.890







F3

F1

F1

Fuel

= F3

Wind  
Slope  
Aspect

Looking  
for  
alignment



Trevor Johnson

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Thanks to;

Domingos Viegas

Jose Torero

Northumberland FRS