Mapping the Spring 2011 fires

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Wildfire 2011, Buxton, Derbyshire, 14 -15 Sep 2011

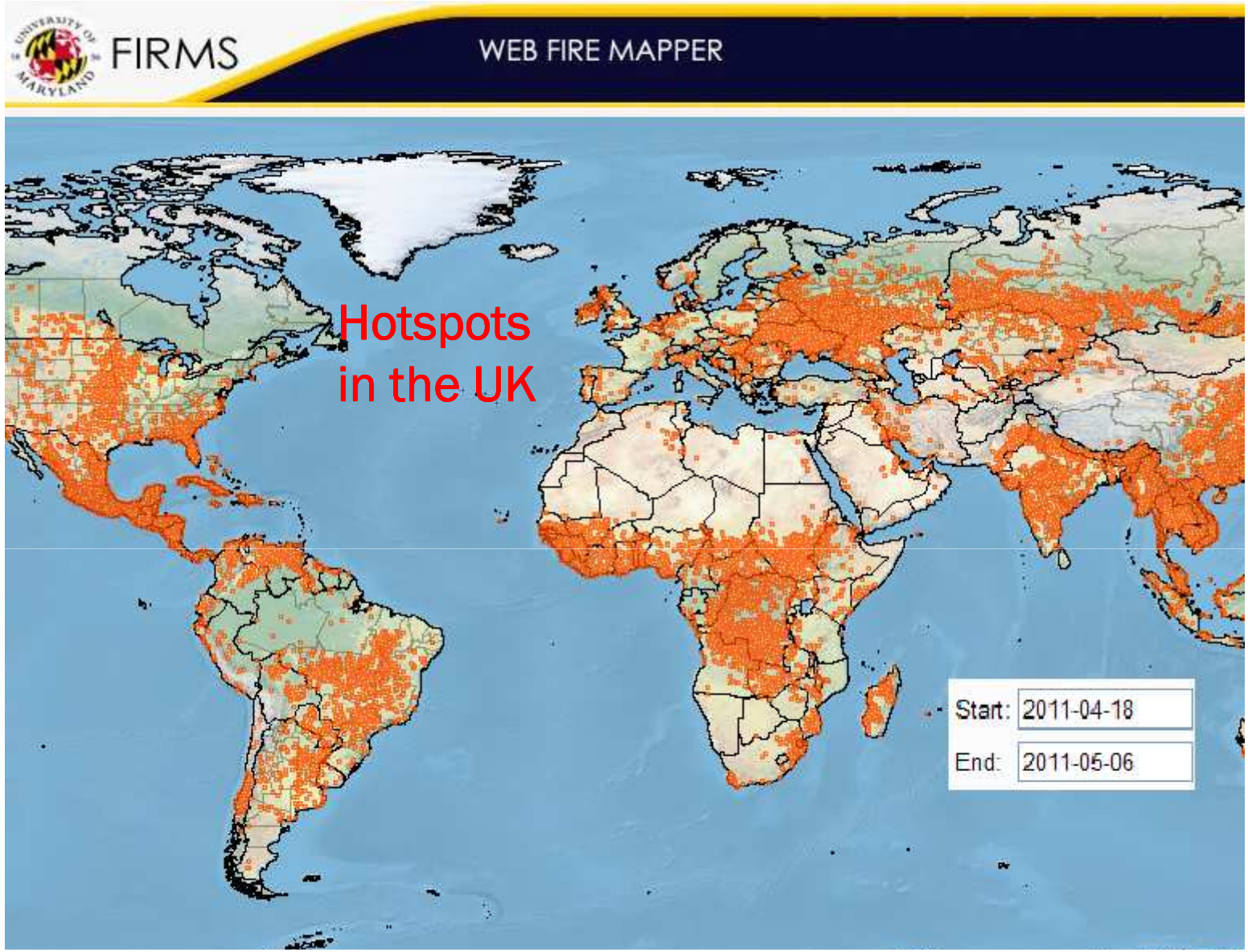
Aims and Data

Aims

- To produce a map of ‘wildfires’ for the England and Wales Wildfire Forum (EWWF)
- To scope data-handling issues for future GIS analysis using Incident Recording System (IRS) data, to answer simple ‘where & when’ questions [and eventually ‘why, what if’]

Data

- Satellite databases: MODIS (Moderate Resolution Imaging Spectrometer) on Terra and Aqua satellites. See poster
- Raw IRS data from Department of Communities and Local Government (DCLG); 18 April – 6 May, all 14 classes of outdoor fires



Fire Information for Resource Management System

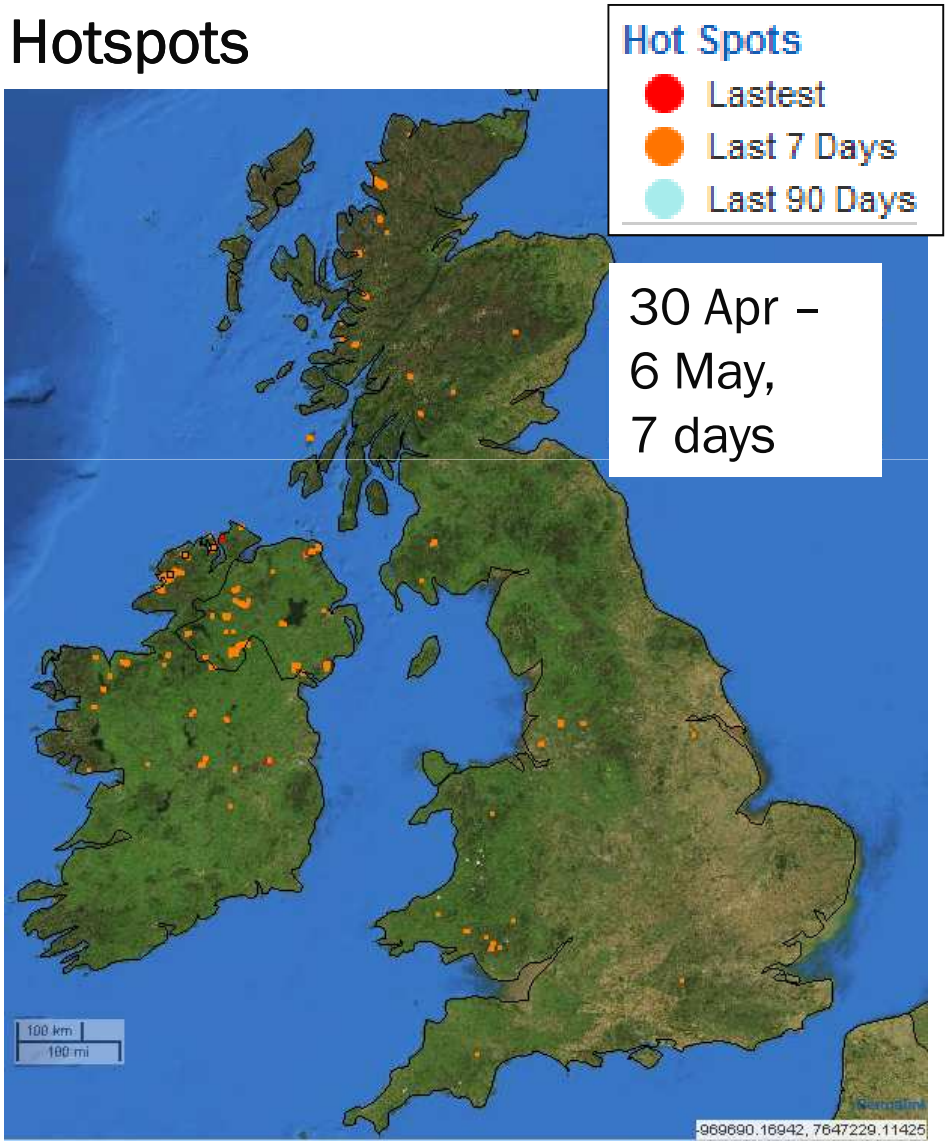
http://firefly.geog.umd.edu/firemap

European Commission
Joint Research Centre
Institute for Environment and Sustainability

European Forest Fire Information System

http://effis.jrc.ec.europa.eu/current-situation

Hotspots



Rapid Damage Assessment, Burnt Area, >40 ha

- 17,211 ha for UK so far this fire season
- 6,809 ha for GB. Available for only 17 (12%) of the 147 vegetation fire hotspots
- 1,050 ha for England, for 2 so far.

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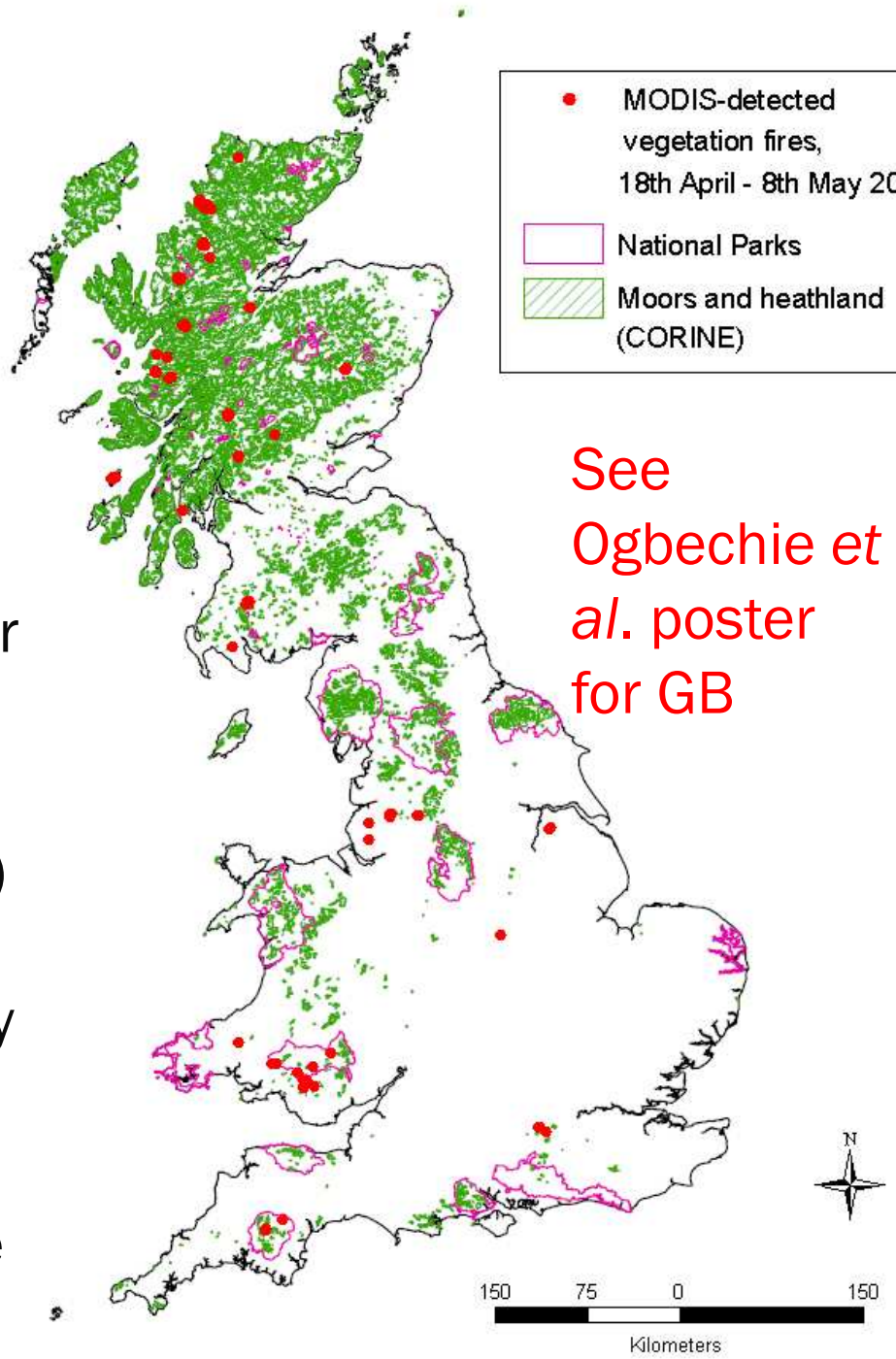
MODIS-detected vegetation fires, FIRMS database. 18 Apr – 8 May 2011

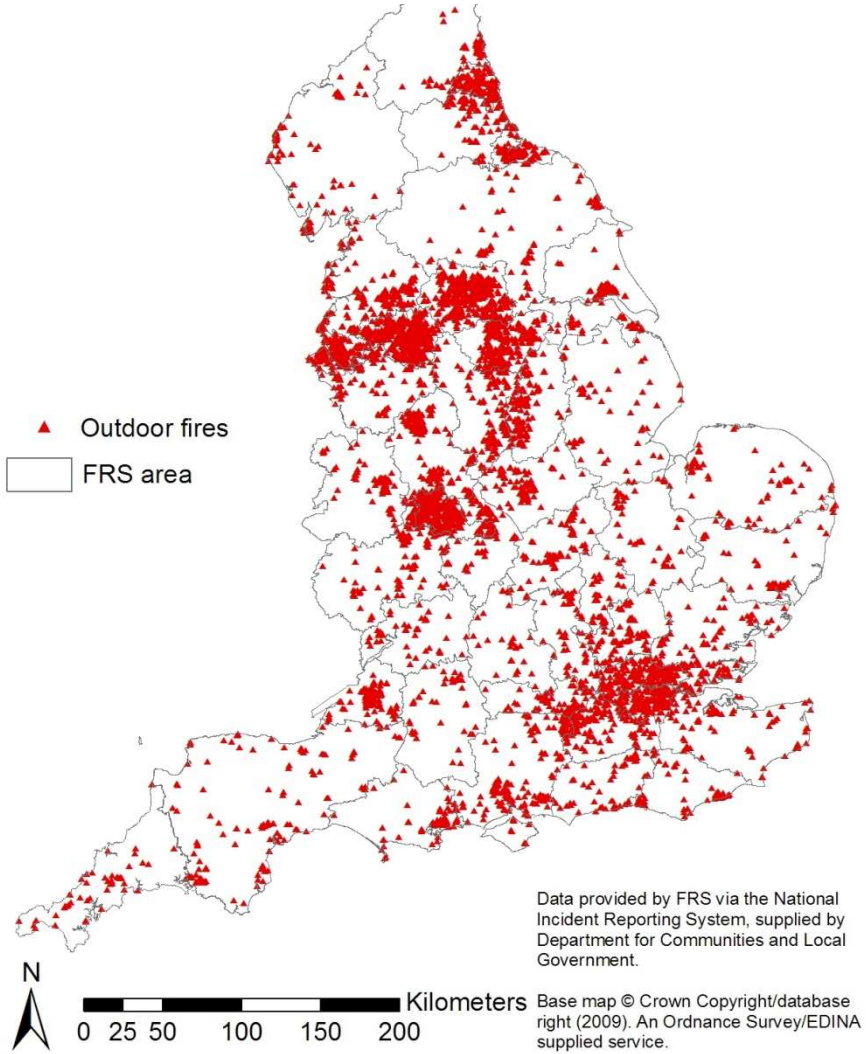
- CORINE land cover to screen out urban, construction, water → 'vegetation fire' hotspots
- 21 veg fire hotspots for ~14 fires in England (>1 for some)
- But IRS has 23 - 250 'large' fires, so MODIS detecting only the very largest, hottest fires, when sky clear and satellite overhead. So IRS is the prime datasource



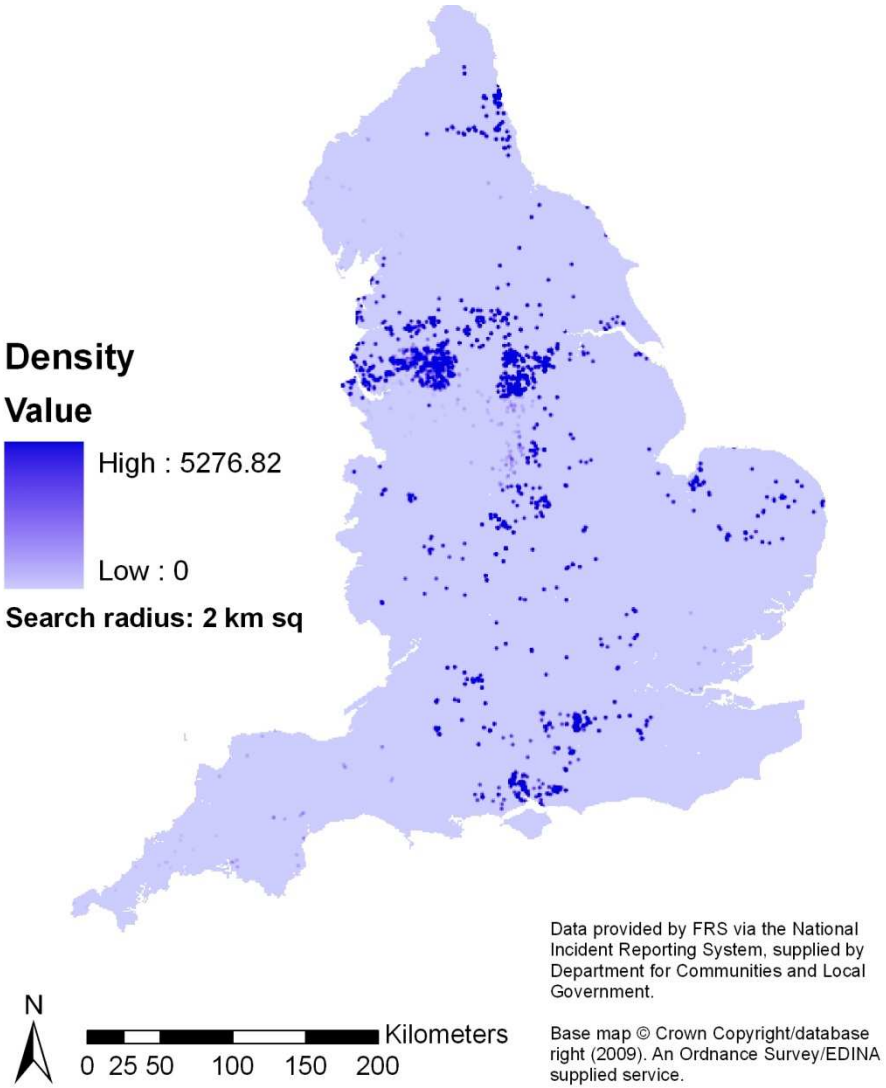
See Ogbechie *et al*. poster for GB

IRS: All outdoor fires, 18 April – 6 May

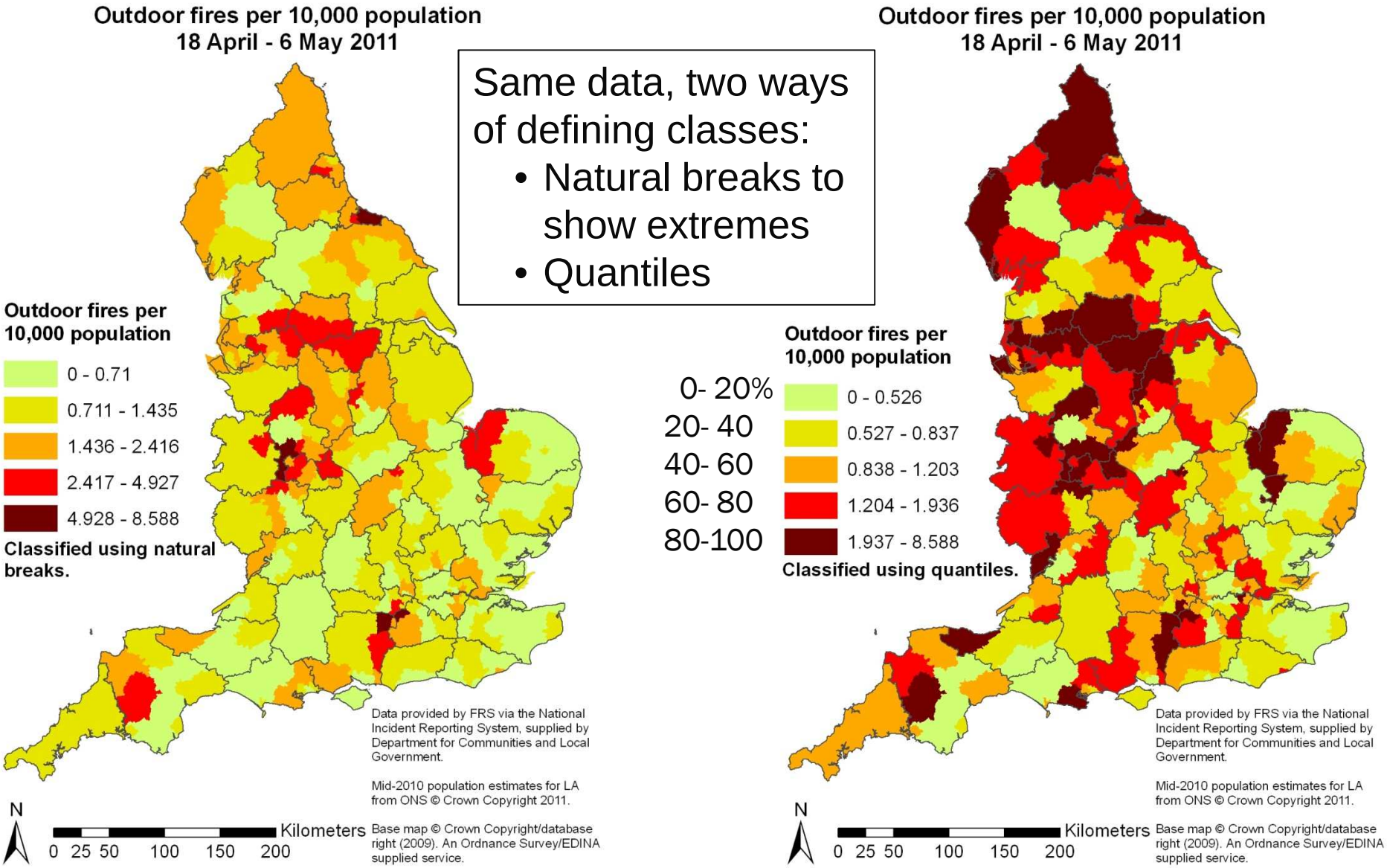
>7100 geolocated fire ground points



Density surface for GIS modelling



All outdoor Spring 2011 fires: Rate per resident population, Local Authority areas



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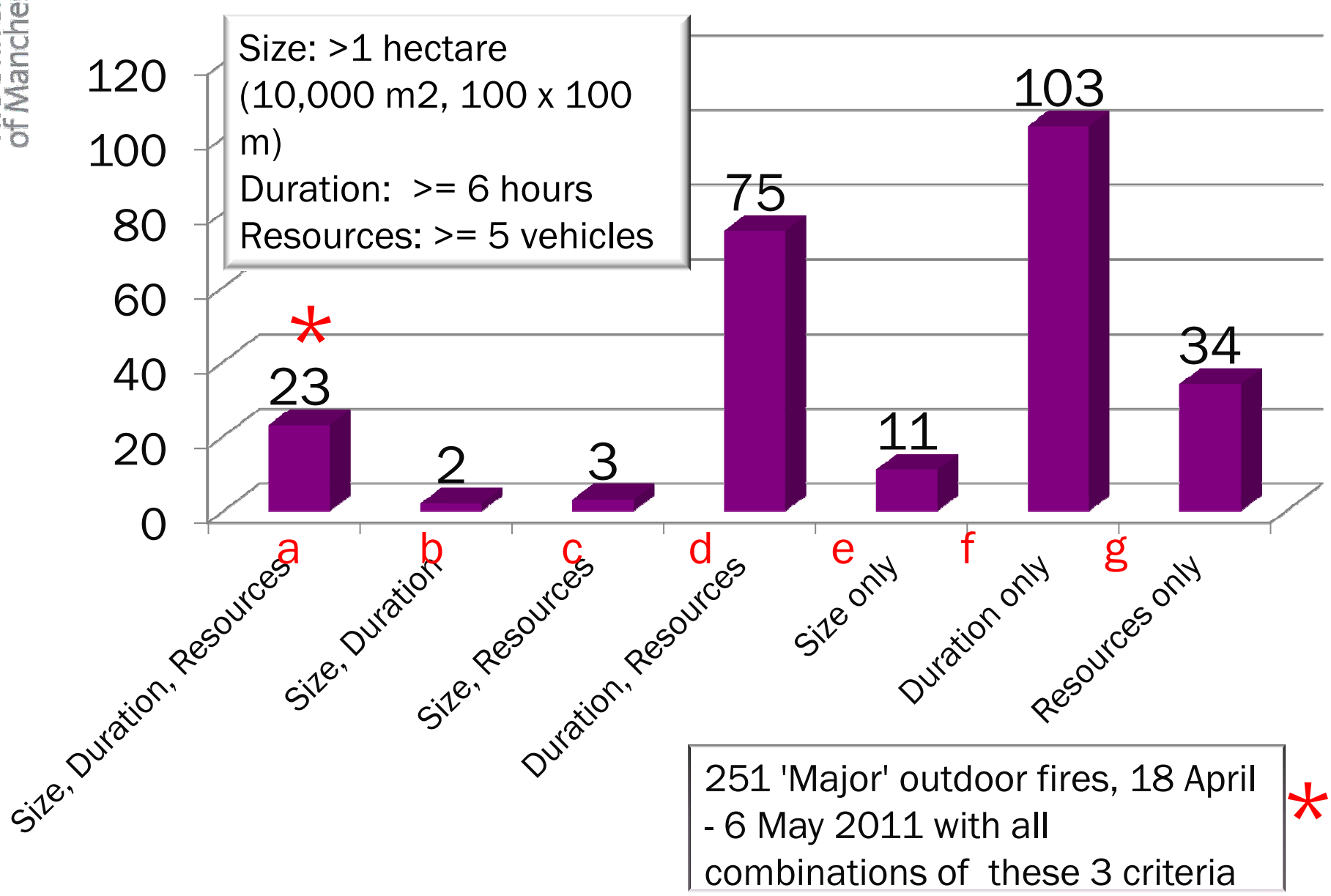
How many were 'major fires?
...what is a 'major fire'/'wildfire' in IRS??

Decisions (in consultation with EWWF)

1. Data fields
   - Size (damage area), Duration (call-out to close), Resources (vehicles, crew), [Primary fire, others?]
2. Thresholds
   - >1 ha, >= 6 hours call-out to close, >= 5 vehicles
3. Combinations of criteria
   - E.g. All 3 criteria (AND), any of the criteria (OR), etc
4. Or devise a single new combined criterion?
   - weighted combination of unthresholded IRS data?

- Each produces a different set of fires to map
- So further consultation and consensus is needed
- .... and what to call them

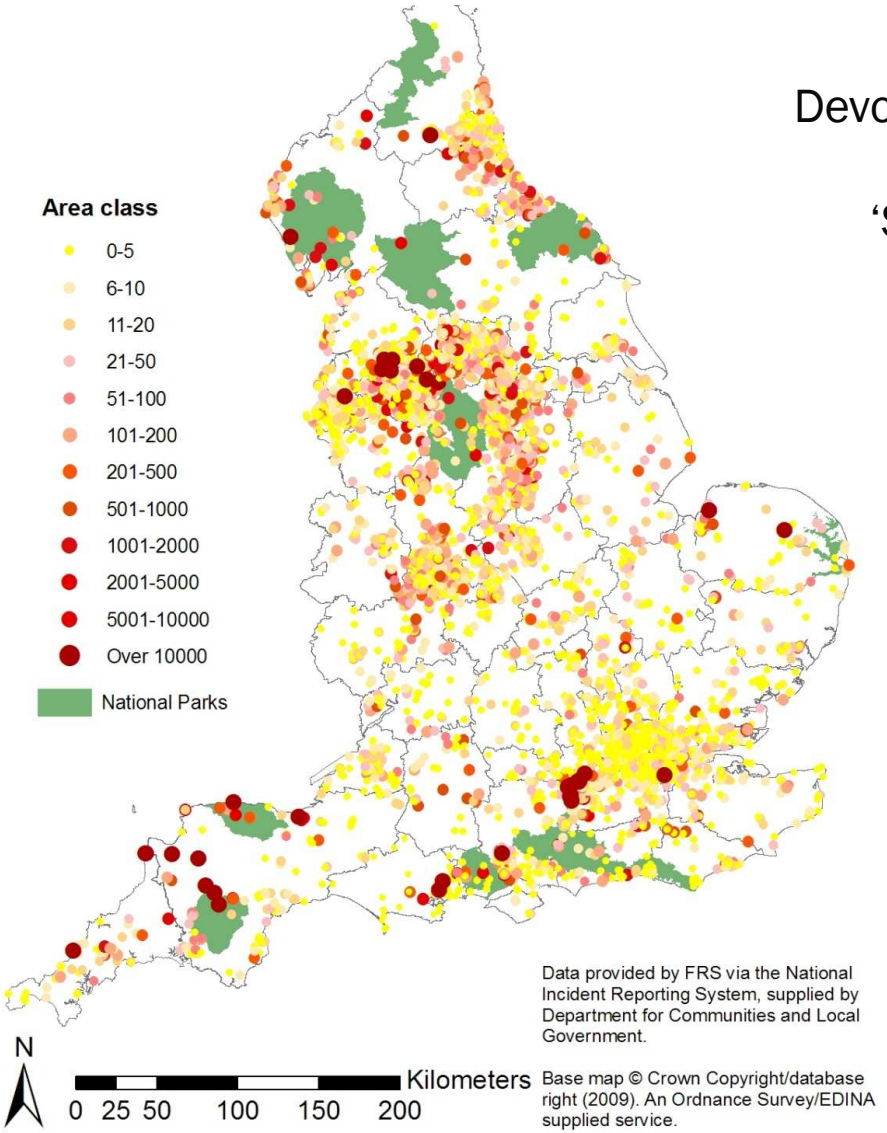
No. of ‘major fires’ varies



251 'Major' outdoor fires, 18 April - 6 May 2011 with all combinations of these 3 criteria *

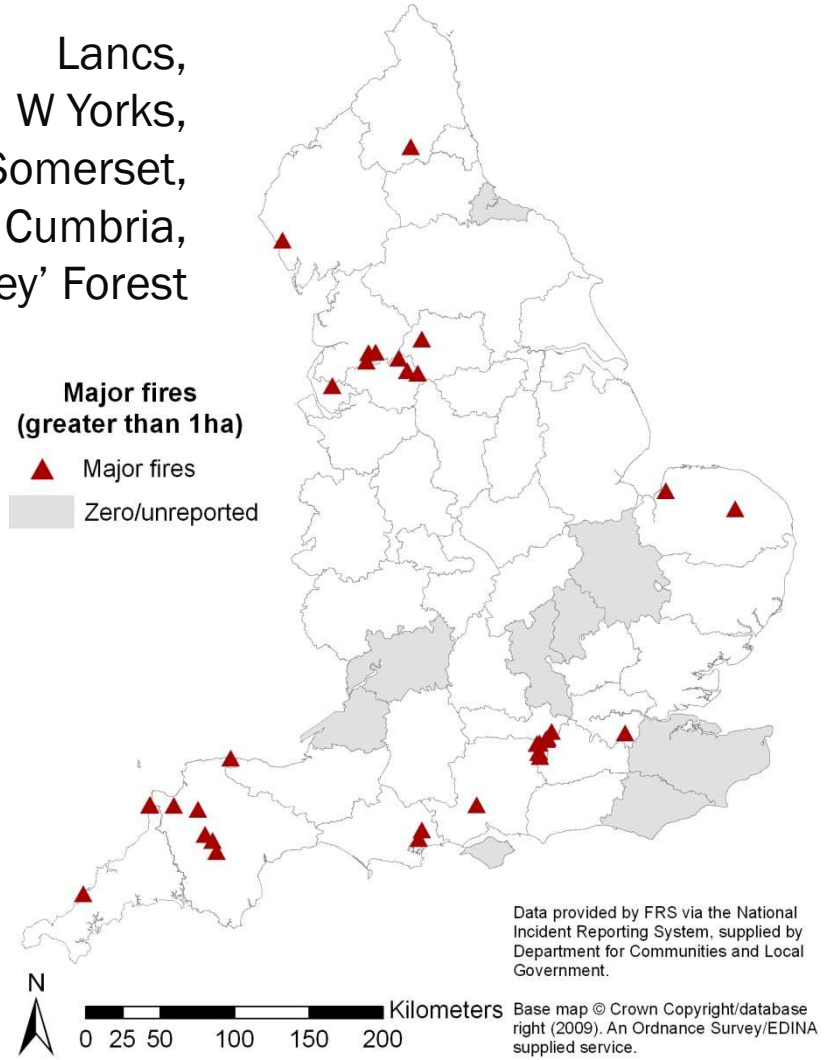
Fire size, damage area

All outdoor Spring 2011 fires by damage area



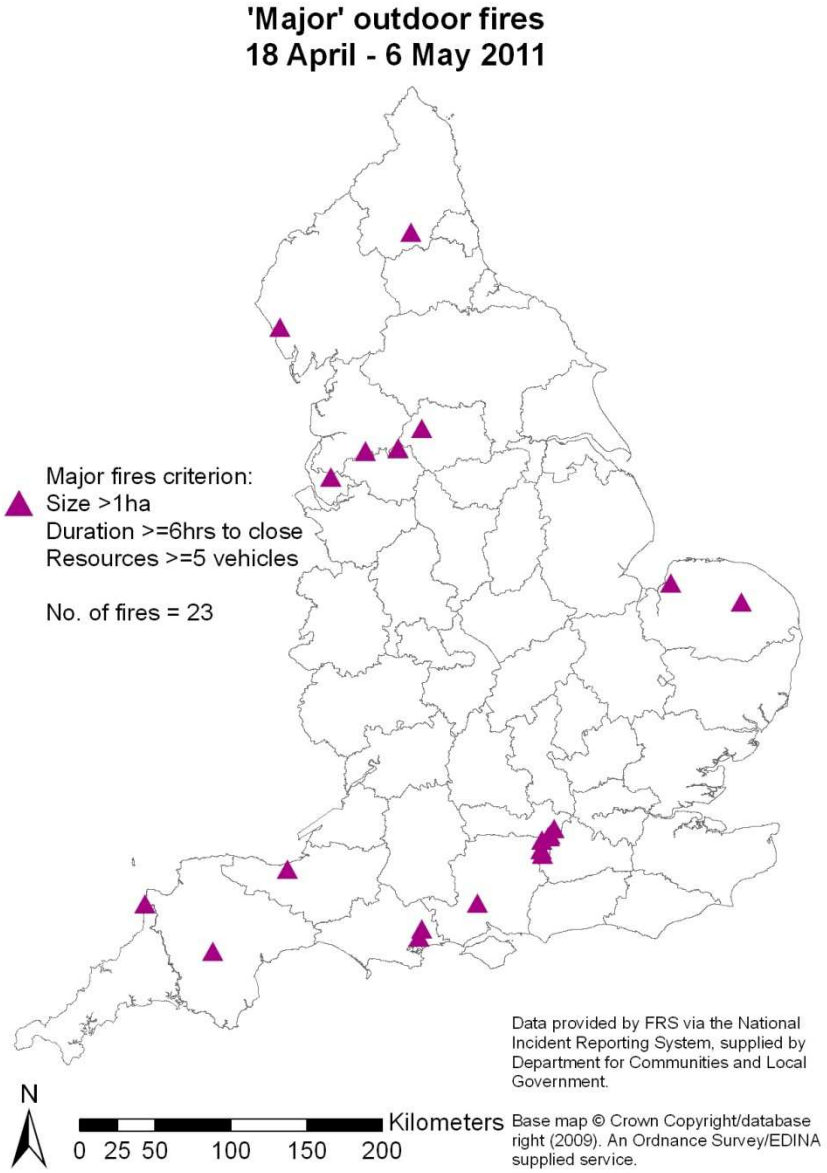
>1 hectare, 10,000 m² (39)

Lancs,
W Yorks,
Devon & Somerset,
Cumbria,
'Swinley' Forest

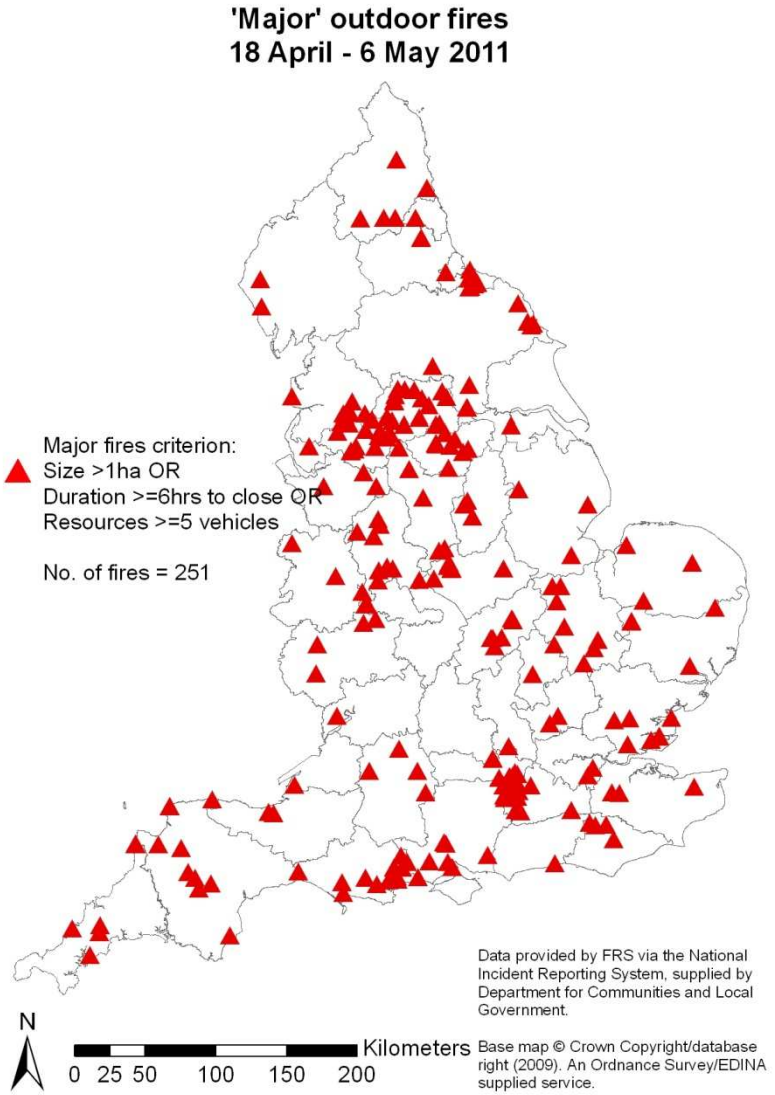


Reliability of area estimates?

Size AND Duration AND Resources (23)

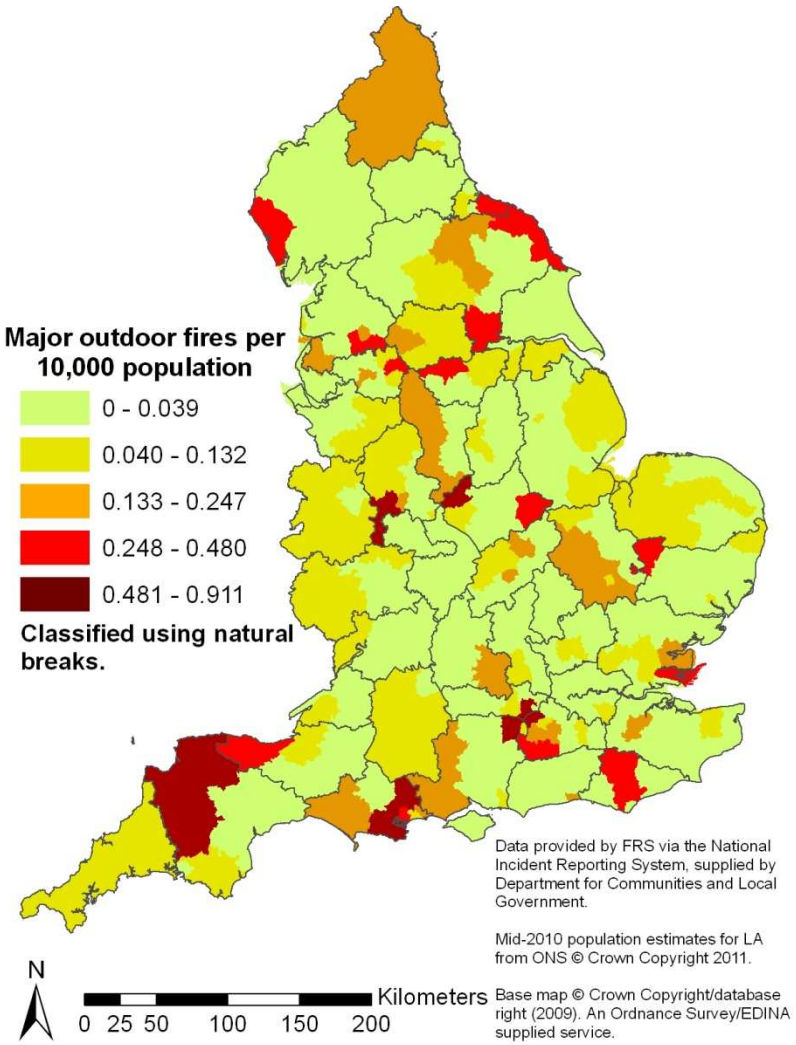


Size OR Duration OR Resources (251)

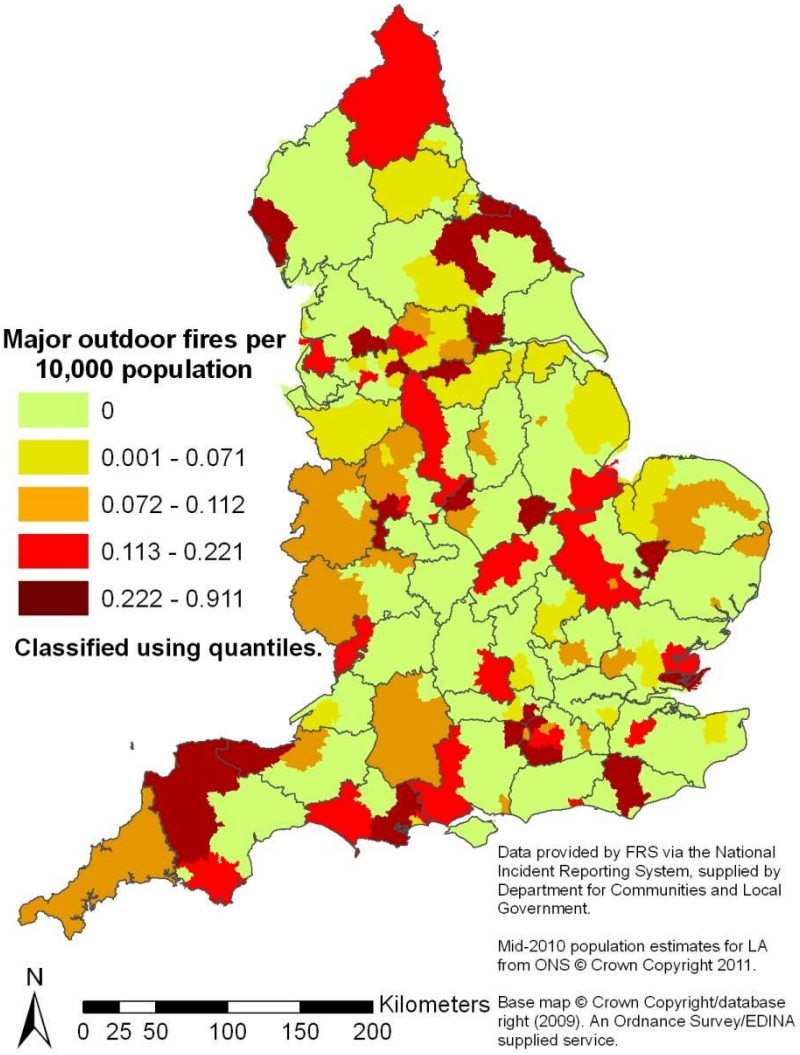


251 major fires; rate per 10,000 resident population, Local Authority areas

Natural breaks

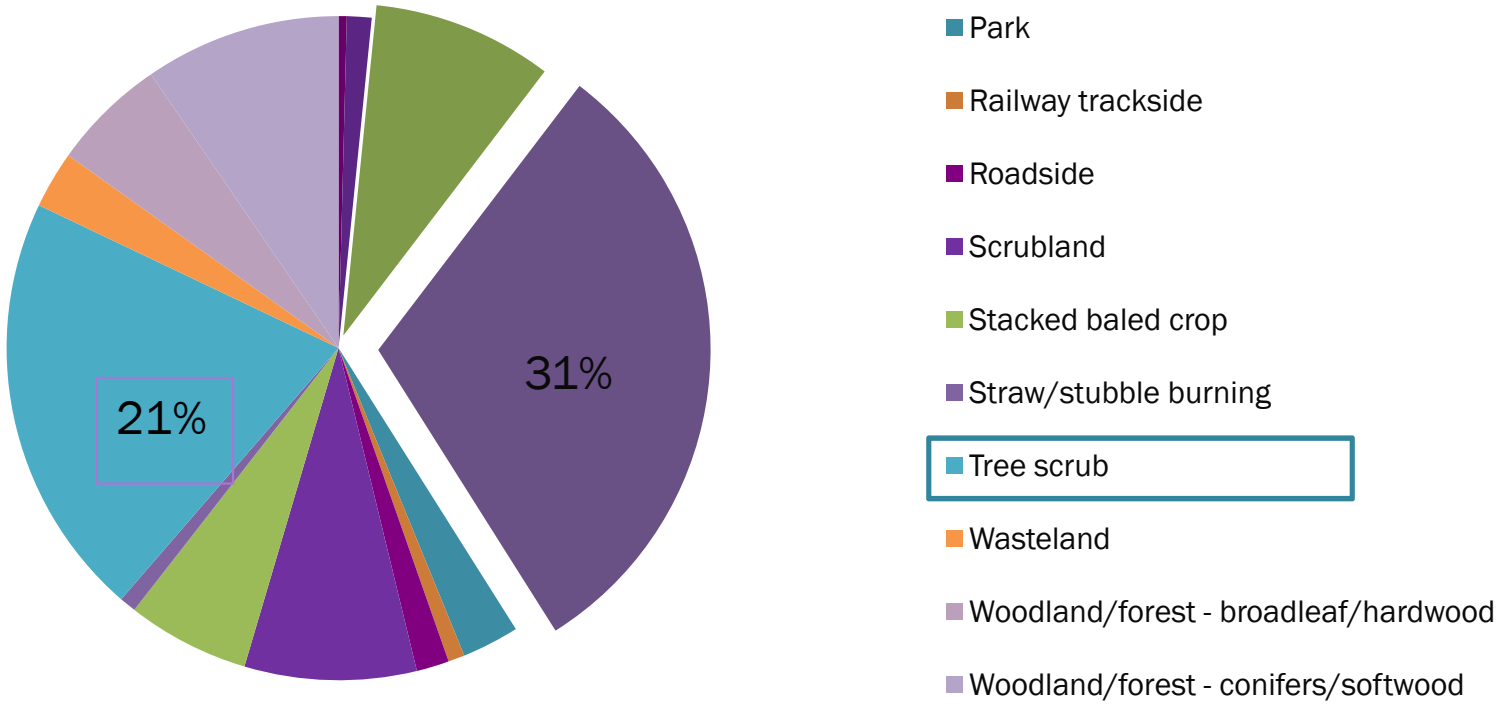


Quantiles



Major fires by property type

- Over half logged as Heathland/ moorland or Tree scrub
- These classes had largest damage area



MODIS CORINE classes and IRS classes not directly comparable
MODIS overestimates Heathland/moorland fires (including peatbogs) 52% (IRS 31%) and agriculture fires 25% (IRS 16%). Underestimates woodland & scrub

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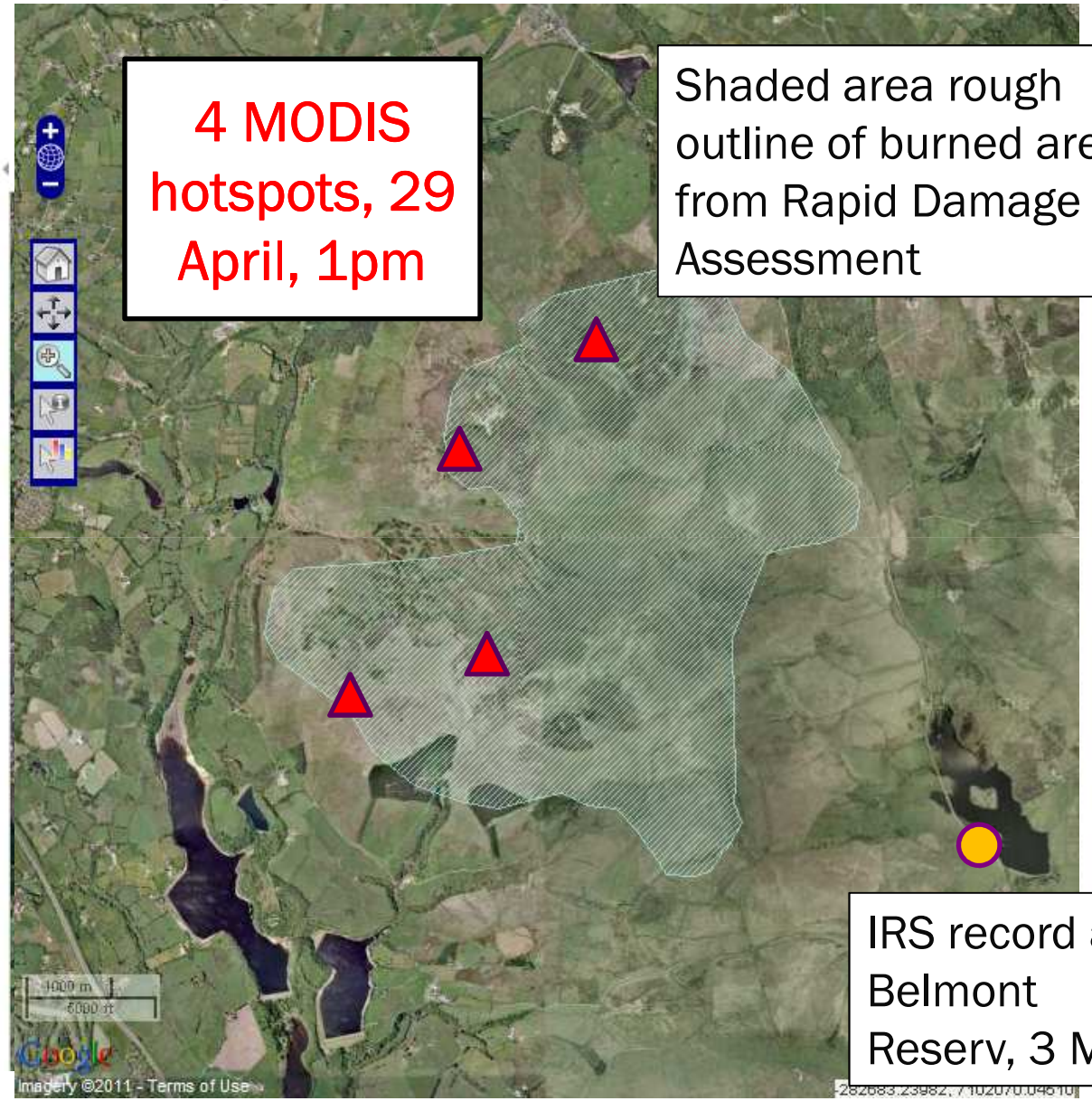
Anglezarke Moor, Lancs

EFFIS Burnt Area Locator



http://effis.jrc.ec.europa.eu/current -situation

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IRS issues & recommendations

- **How to define major fires** → Further consultation required. Regional criteria to allow for size-time–resources tradeoffs?
- **Damage area:** accuracy → Further QA, training
- **Location:** ignition/centre? MODIS records fire front →
  - Include in operational procedure e.g. 1st arrival on fire ground record co-ords.
  - Include degree of confidence field.
  - Fire perimeter would give area & centre pt, recurrence analysis, costing etc.
- **Property classes** → Review
  - Should include veg fires which damage structural property
  - Accuracy → QA against land cover in GIS. Could auto-fill from GIS database.
- **Multiple records:** re-ignitions on FC land (Swinley), peat, record overflows (Simonswood, Lancs)

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Conclusion

- Despite these issues, IRS has good potential for GIS analysis of wildfire regime, relative risk, and resource resilience.
- In return, GIS and satellite data can help QA of IRS data
- Further partnership research is justified.

Acknowledgements

- Department of Communities and Local Government, Fire Statistics for IRS data
- EWWF and FRS officers for data and advice
- Olisa Ogbechie for analysis of FIRMS data
- School of Environment and Development, University of Manchester for funding.