



AF3 Forest Fire Models Workshop

Wildland urban interface fires in the mediterranean area

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22nd June 2017



Directorate General of
Humanitarian Aid and
Civil Protection - ECHO



Wildland - Urban Interface Forest
Fire Risk Observatory and Interest Group in Europe

WUIWATCH

Grant Agreement N° ECHO/SUB/2014/694556

www.wuiwatch.org



Facing new challenges

A new paradigm?

Pedrogao Grande, June 2017



A new paradigm?

Pedrogao Grande, June 2017



A new paradigm?

Pedrogao Grande, June 2017



New dimensions in wildfires

Fort Mc Murray, May 2016

The places we live on, are still safe?



New dimensions in wildfires



New dimensions in wildfires



Foto: incendio Berrocal (Huelva), 2.004. Fuente: Junta de Andalucía

New dimensions in wildfires



Risk perception



Risk perception



A multi-scalar approach

Macroescape

Strategy

Region - Municipality



Mesoyscale

Strategy / Tactics

Municipality – Community



Microscale

Tactics

Community - Owner



Relationships between scales

- The relationship between scales: influence zones (macroscale), impact zones and settlement pattern (mesoscale), final affectation zones (microscale).
- The importance of microscale in the transformation of communities territory, from microscale (immediate) to mesoscale. The role of owners.
- Current trend: reinforce and qualify local administrations for the prevention and auto-protection against natural hazards: creating resistant and resilient communities and landscapes.

The Macroscale

Fire influence zone in the WUI



1. Friction zone
2. Intermix firebrand zone
3. Urban firebrand zone

Fire influence zone in the WUI



Fire influence zone in the WUI



First impact in the WUI



First impact in the WUI



First impact in the WUI



The “rib” effect



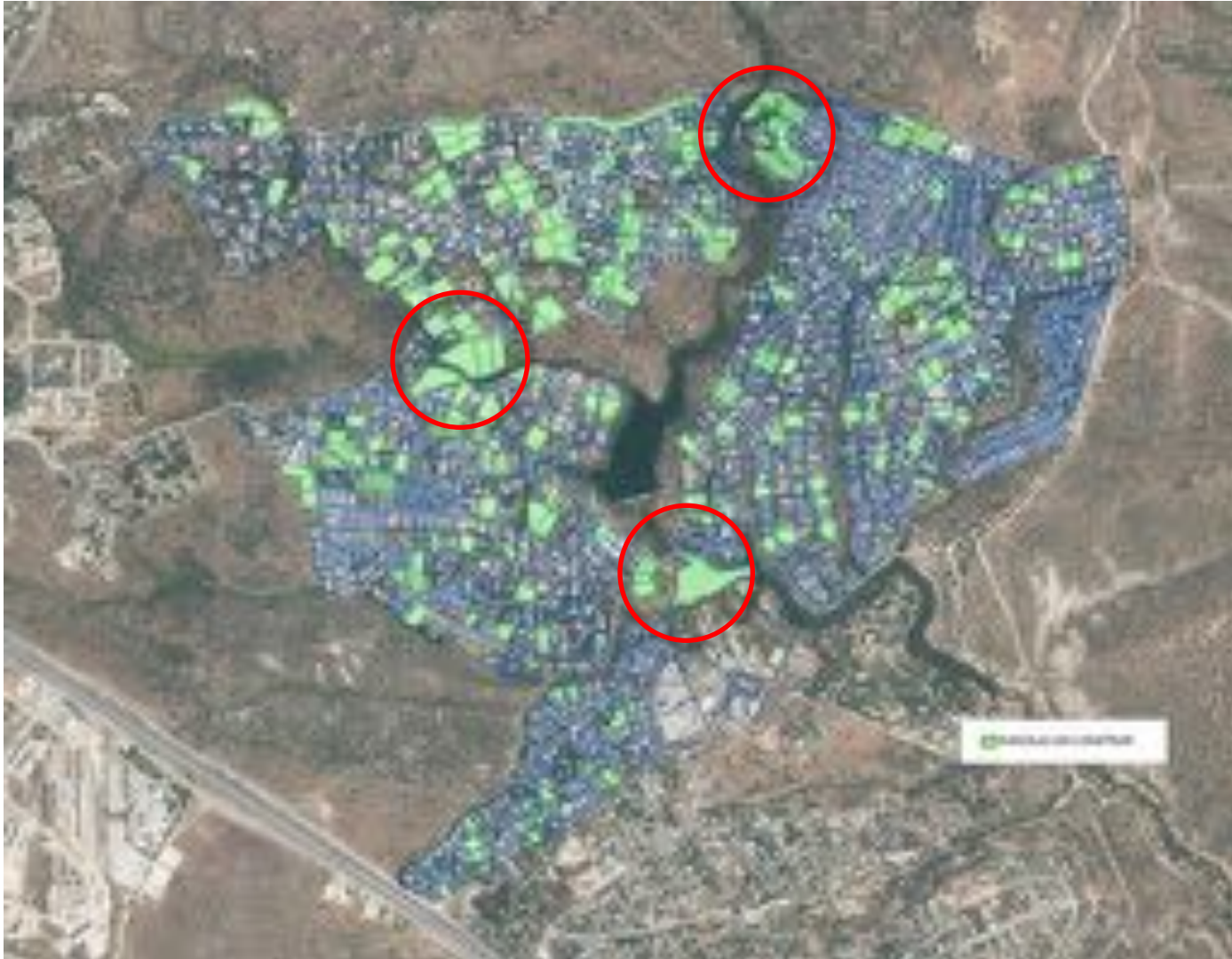
The Meso scale

Three mesoescapes

Three barriers to risk

- **Internal** Mesoescape (WUI tissue)
 - Undeveloped lots
 - Hedges
- **Perimetral** Mesoescape (impact)
 - Perimetral firebreak
 - Perimetral lots
- **External** Mesoescape (defensible area)

Undeveloped lots



Undeveloped lots



Undeveloped lots



Undeveloped lots

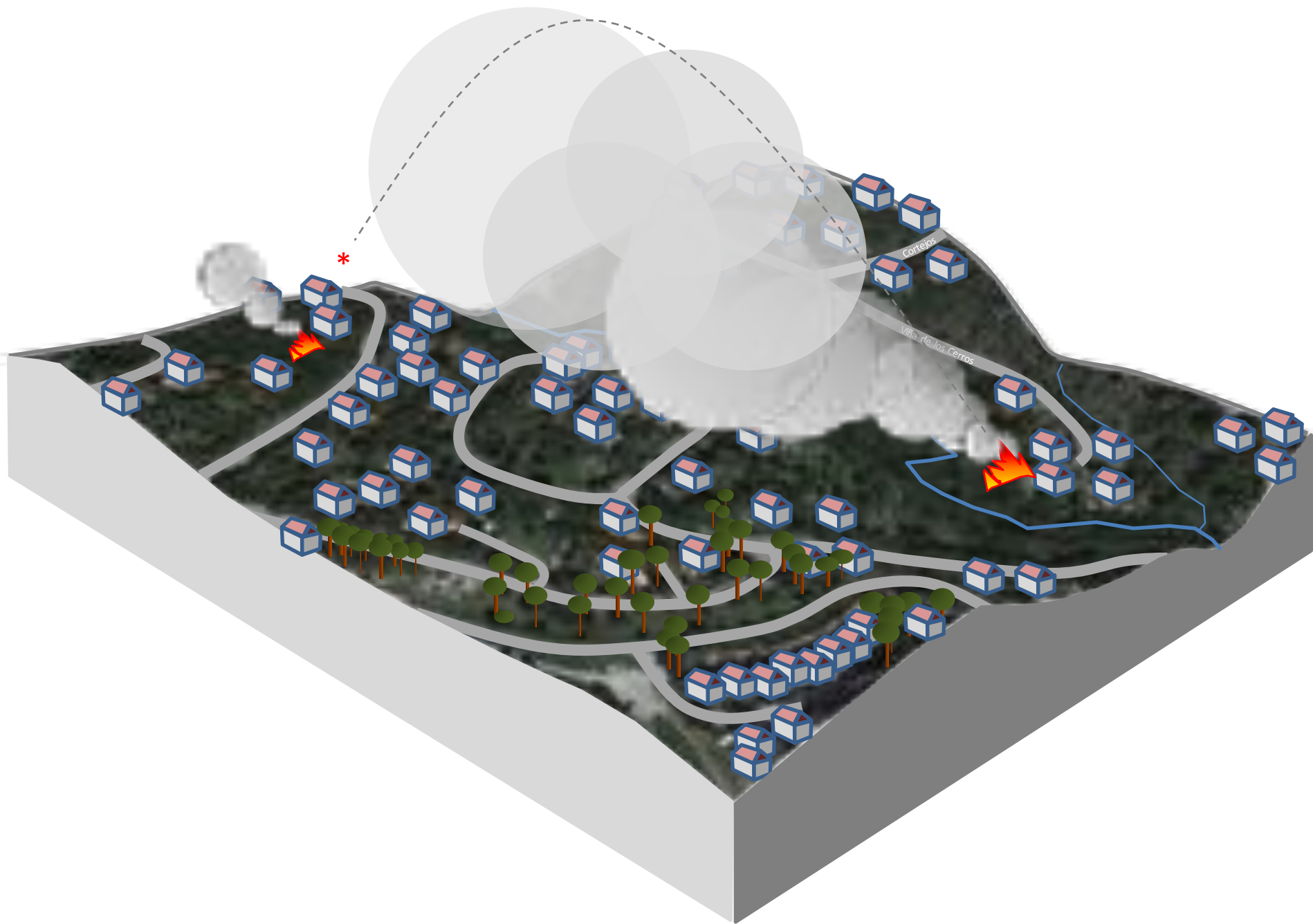


Hedges



Hedges





Fire spread in the mesoscale



Fire spread in the mesoscale



Fire spread in the mesoscale



Fire spread in the mesoscale



Fire spread in the mesoscale



- Control of fuel load in the understory
- Limit the amount of dead fine fuel load (1HR)
- Control the moisture of living plants

Fire spread in the mesoscale



Mesoscale transformation



Mesoscale transformation



Mesoscale transformation



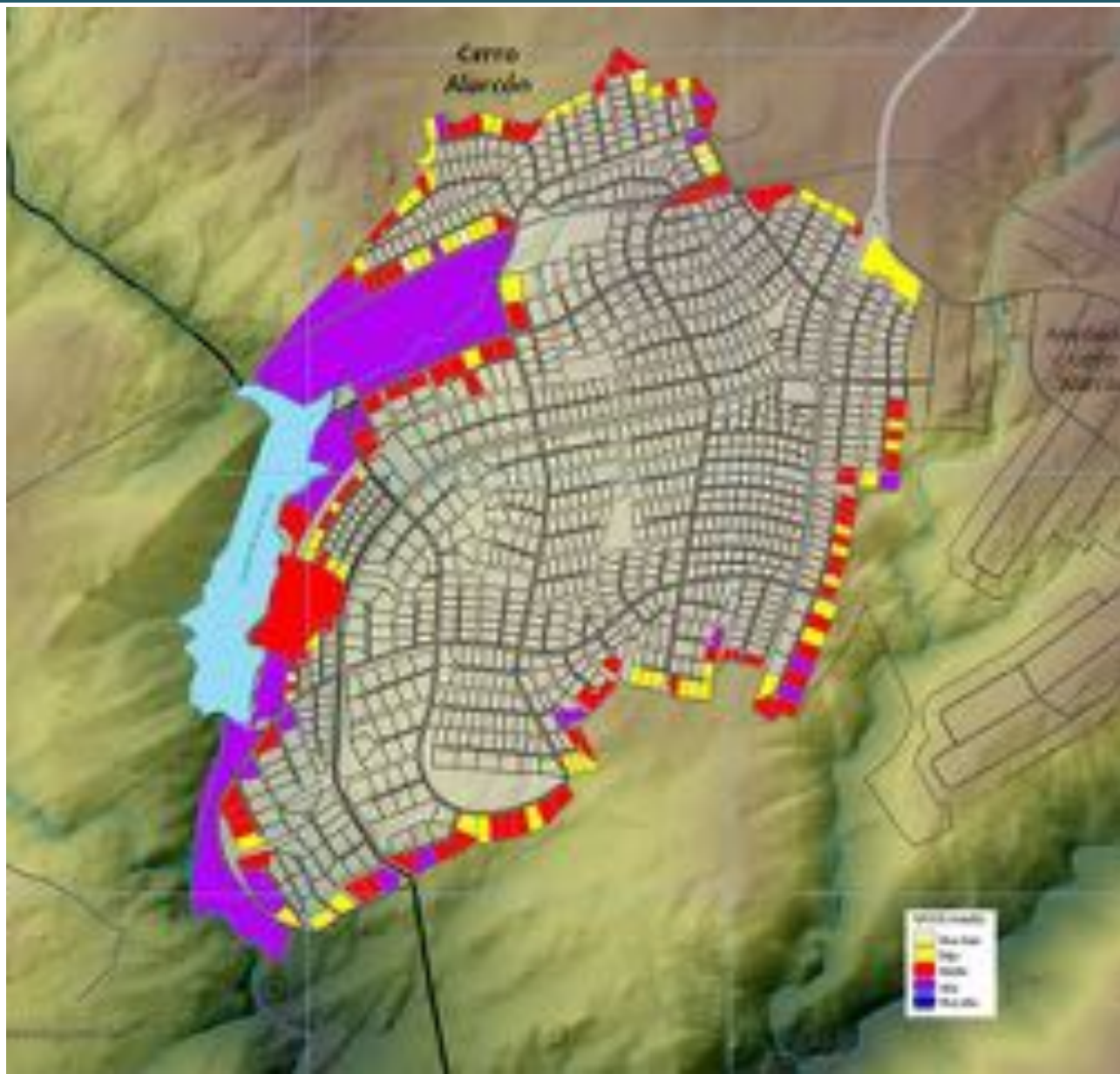
Mesoscale transformation



Mesoscale transformation



Perimetral lots



Perimetral lots



Perimetral lots



Perimetral lots



Perimetral lots



Perimetral lots



Perimetral lots



Perimetral lots



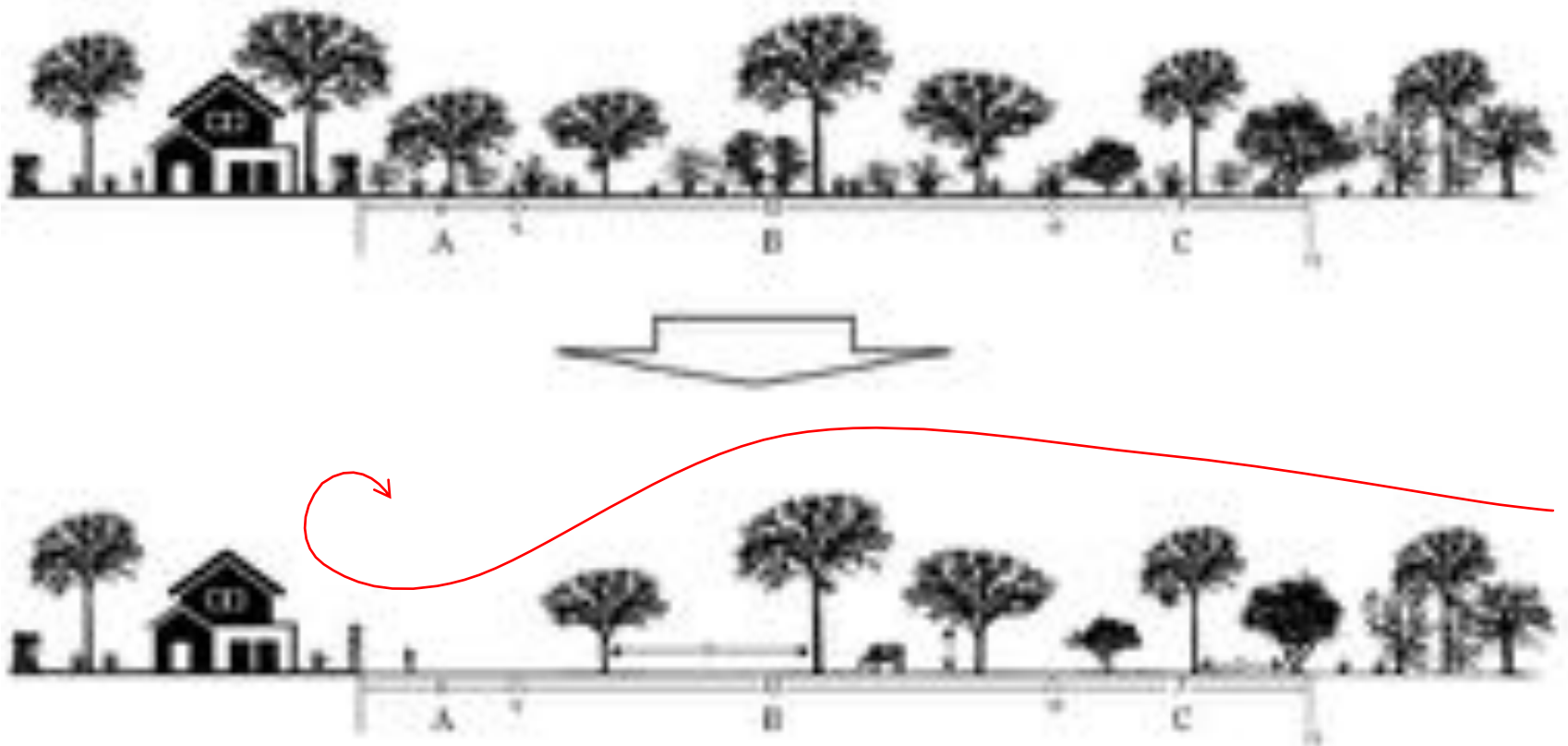
Perimetral lots



Perimetral firebreaks



Perimetral firebreaks



Perimetral firebreaks



Perimetral firebreaks



Perimetral accessibility



External mesoscale – Fuel management



External mesoscale – Fuel management



External mesoscale – Fuel management

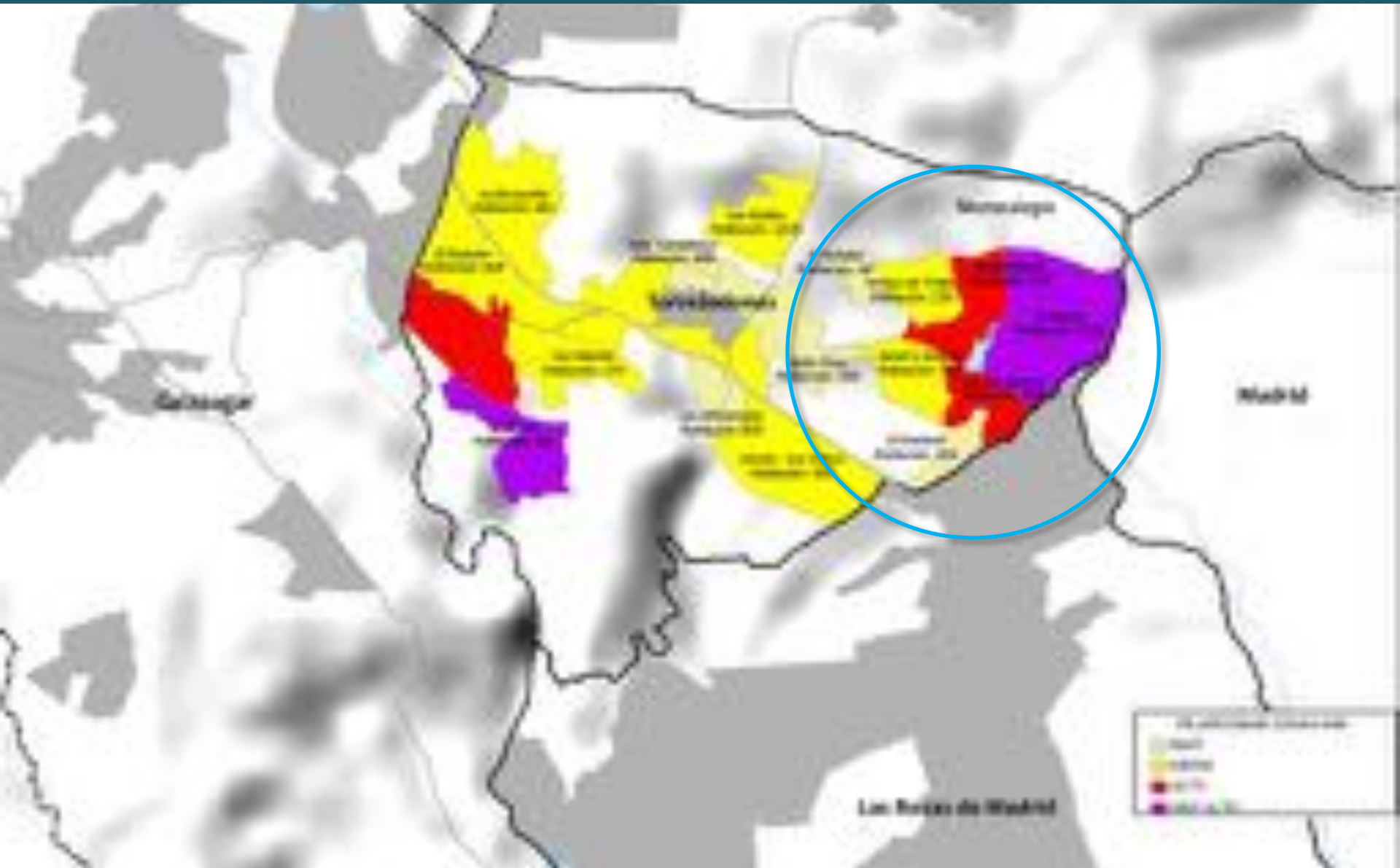


External mesoscale – Fuel management



Foto D. Caballero

Territorial planning – Municipalities



Territorial planning - Municipalities

The territorial emergency plan, the self-protection plans

- Identification of risks. Identification of fire scenarios. Elaboration of vulnerability map
- Zoning and prioritization
- Legislation, regulations, land ownership
- Transformation of macroscale, landscape strategy
- Transformation of mesoscale, community strategy
- Transformation of microscale, owners awareness and commitment
- Information, awareness and training campaign
- Implementation of organisational rules and responsables. Reseharsals

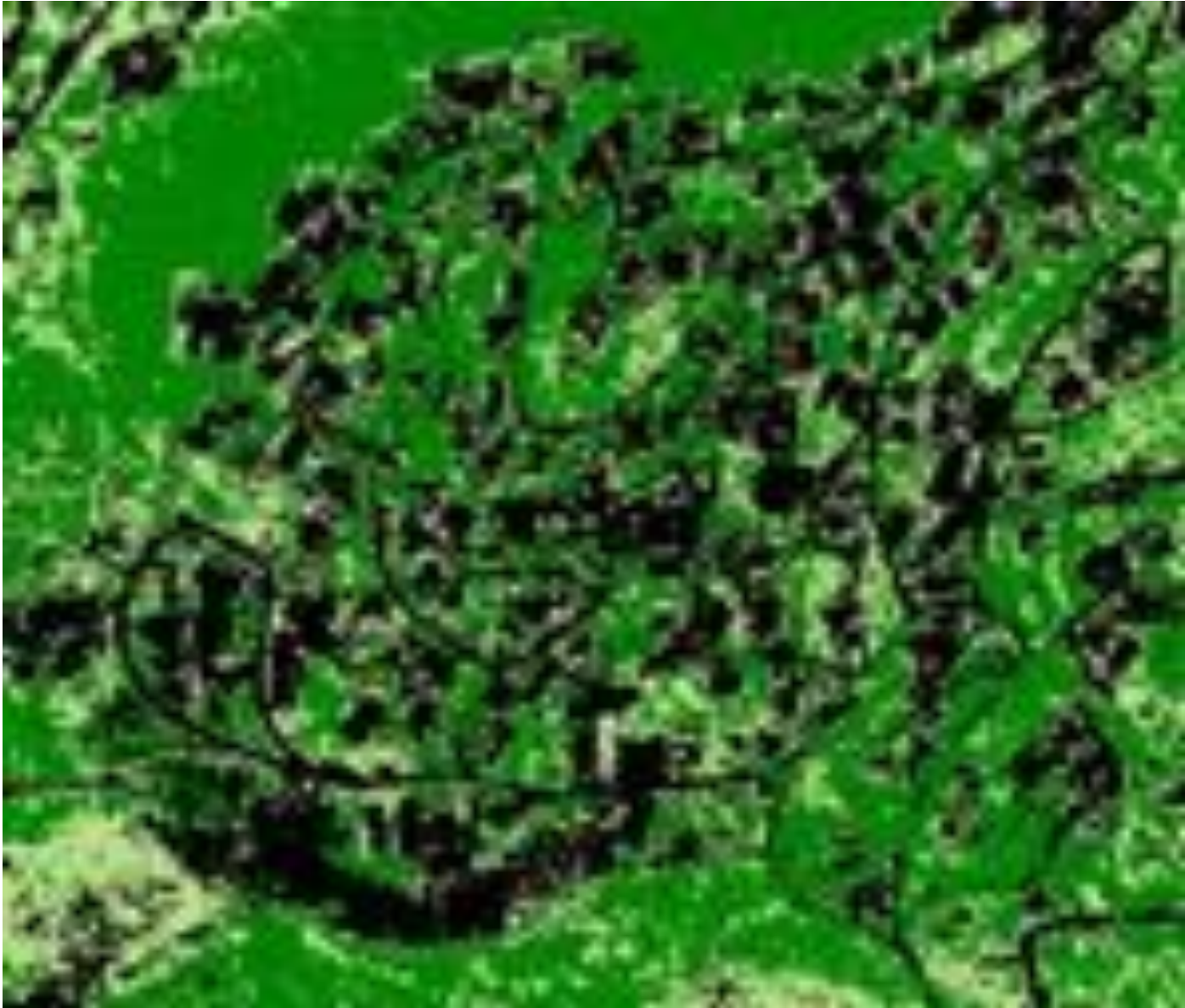
Identification of scenarios and associated risk

Risk mapping - Fuels

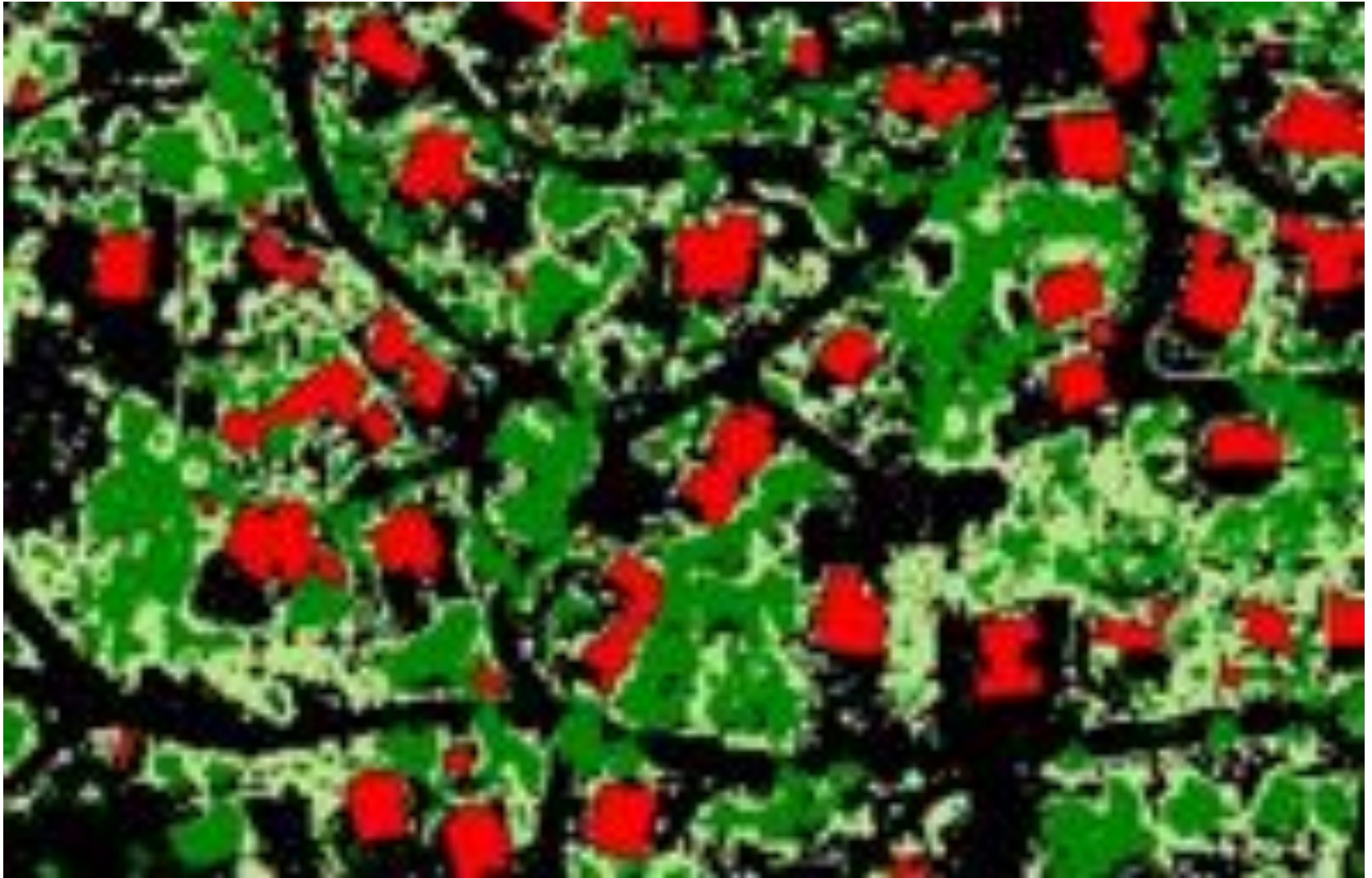
Cerro Alarcón I, Madrid. Fricción viviendas-vegetación



Risk mapping - Fuels



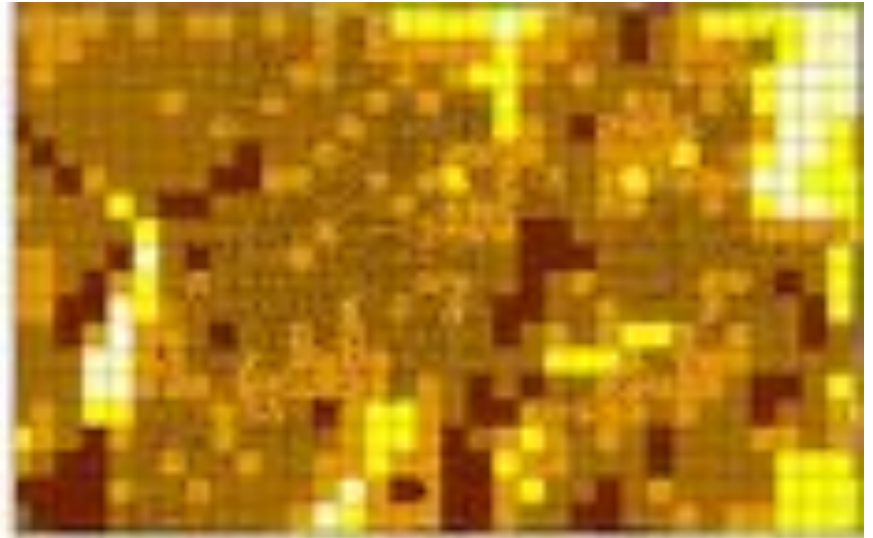
Risk mapping - Fuels



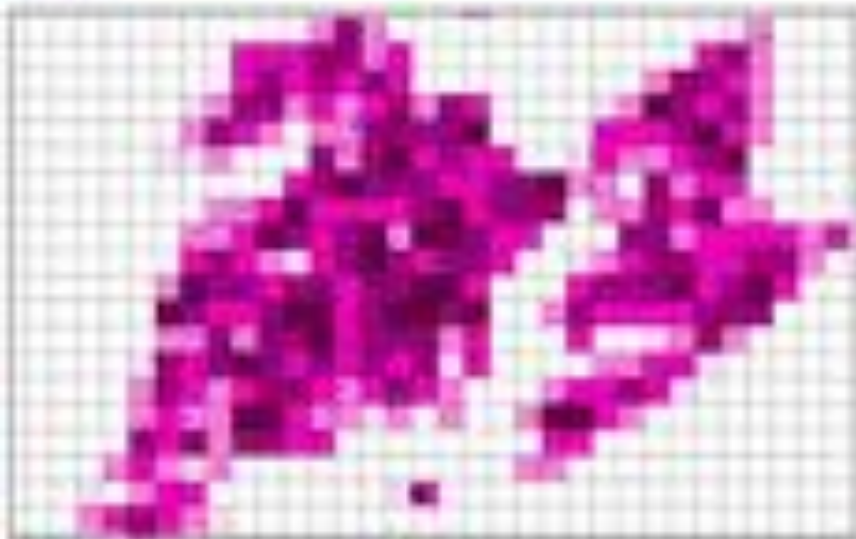
Risk mapping – WUI Index



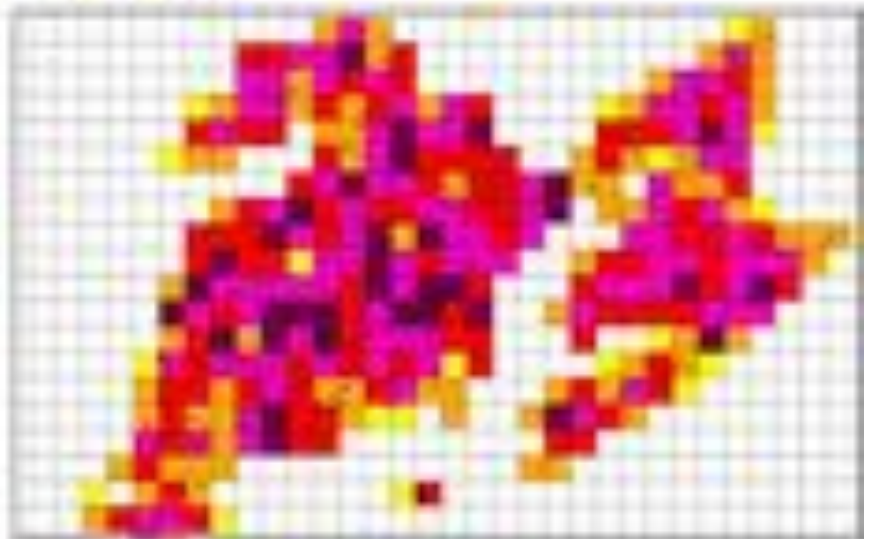
Fuel



Continuity

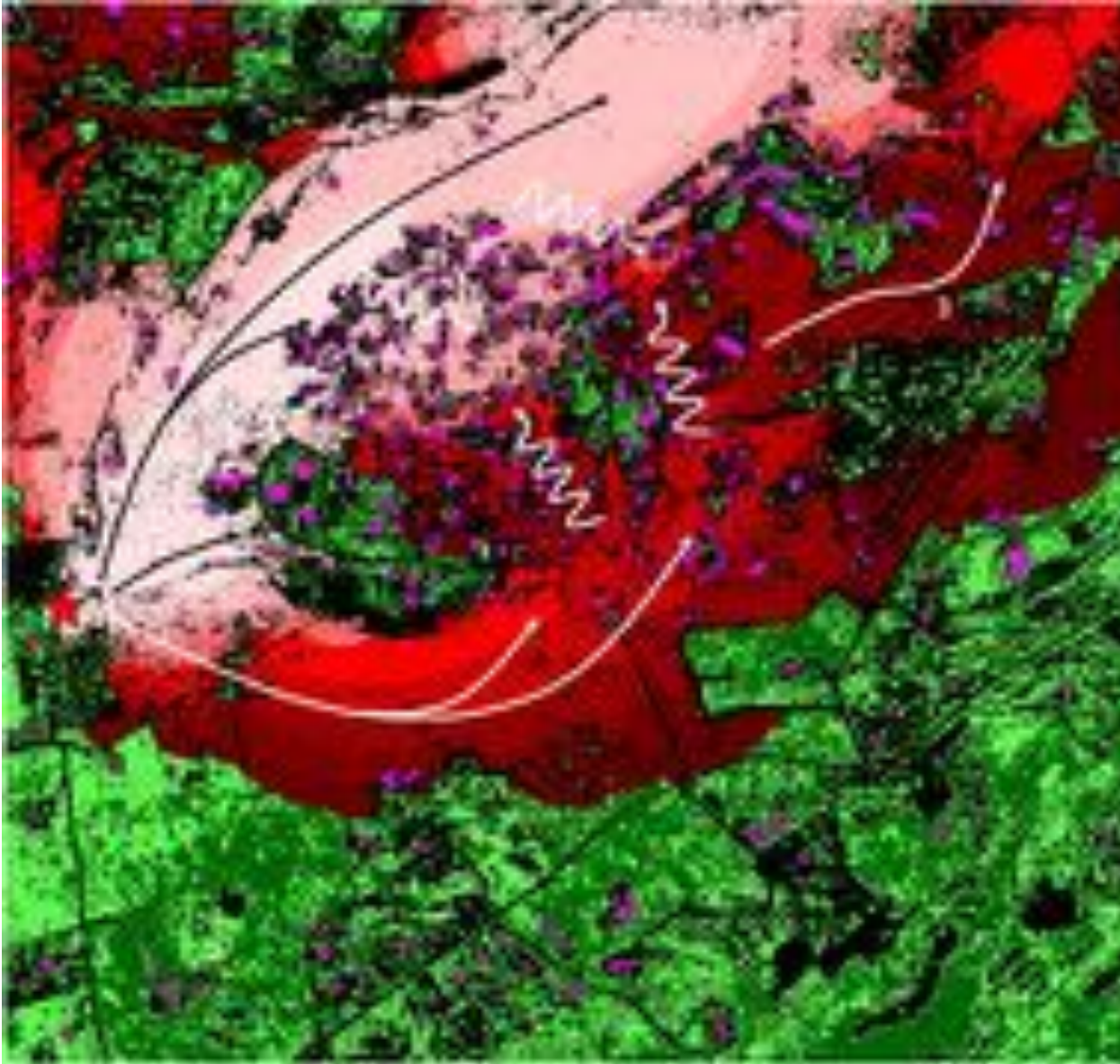


Exposition

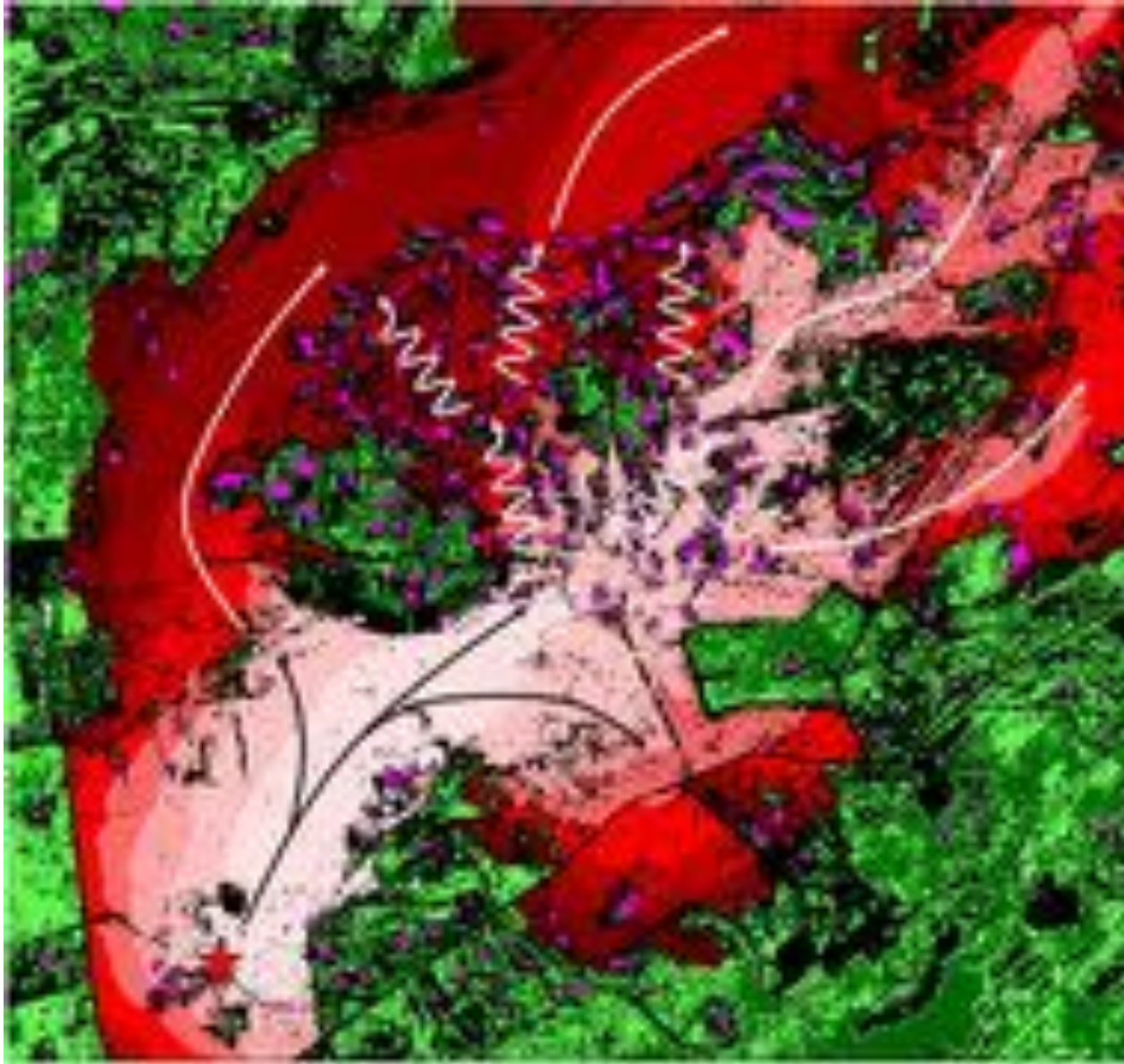


WUI Index

Risk mapping – Fire spread simulation

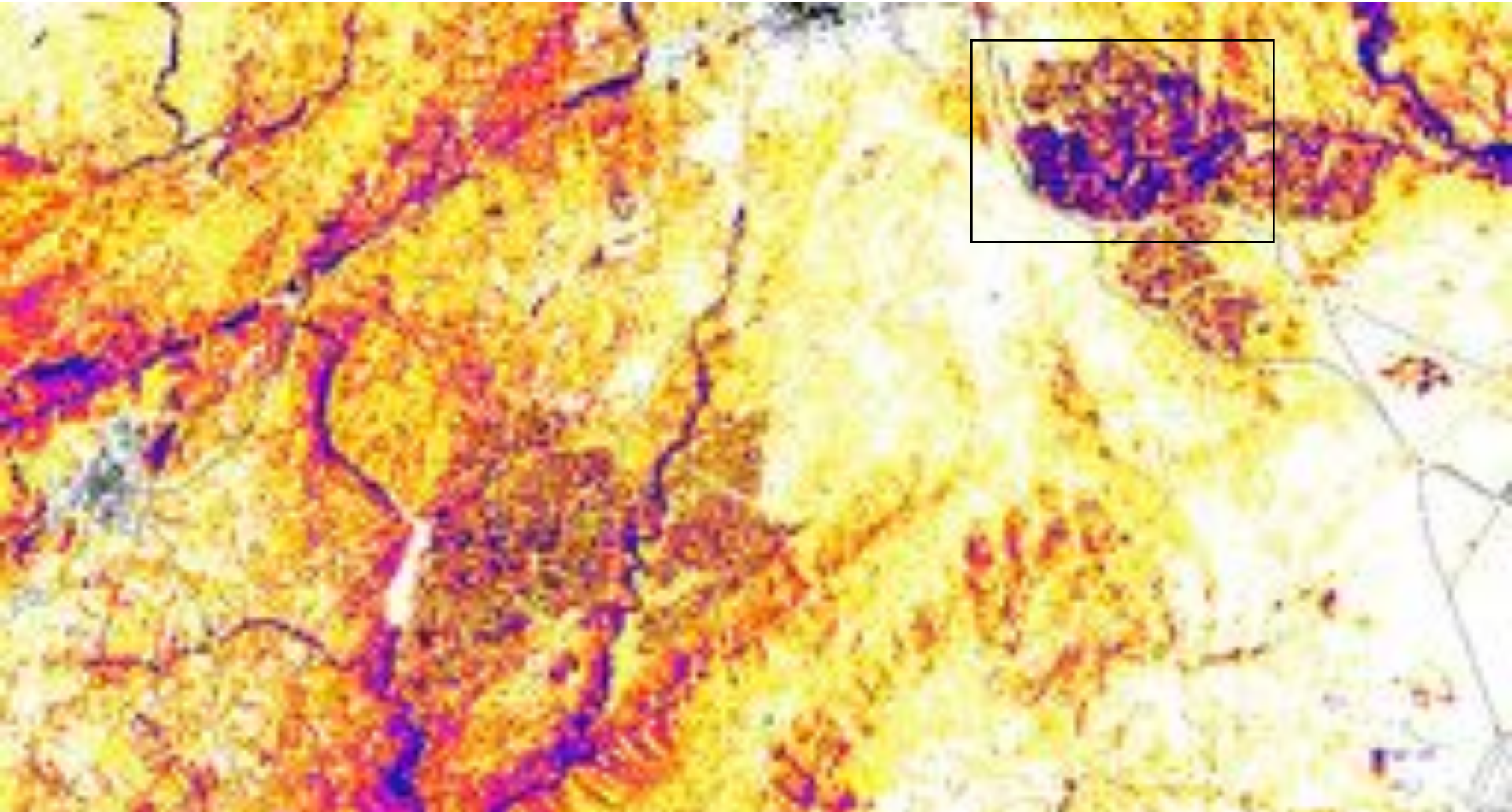


Risk mapping – Fire spread simulation

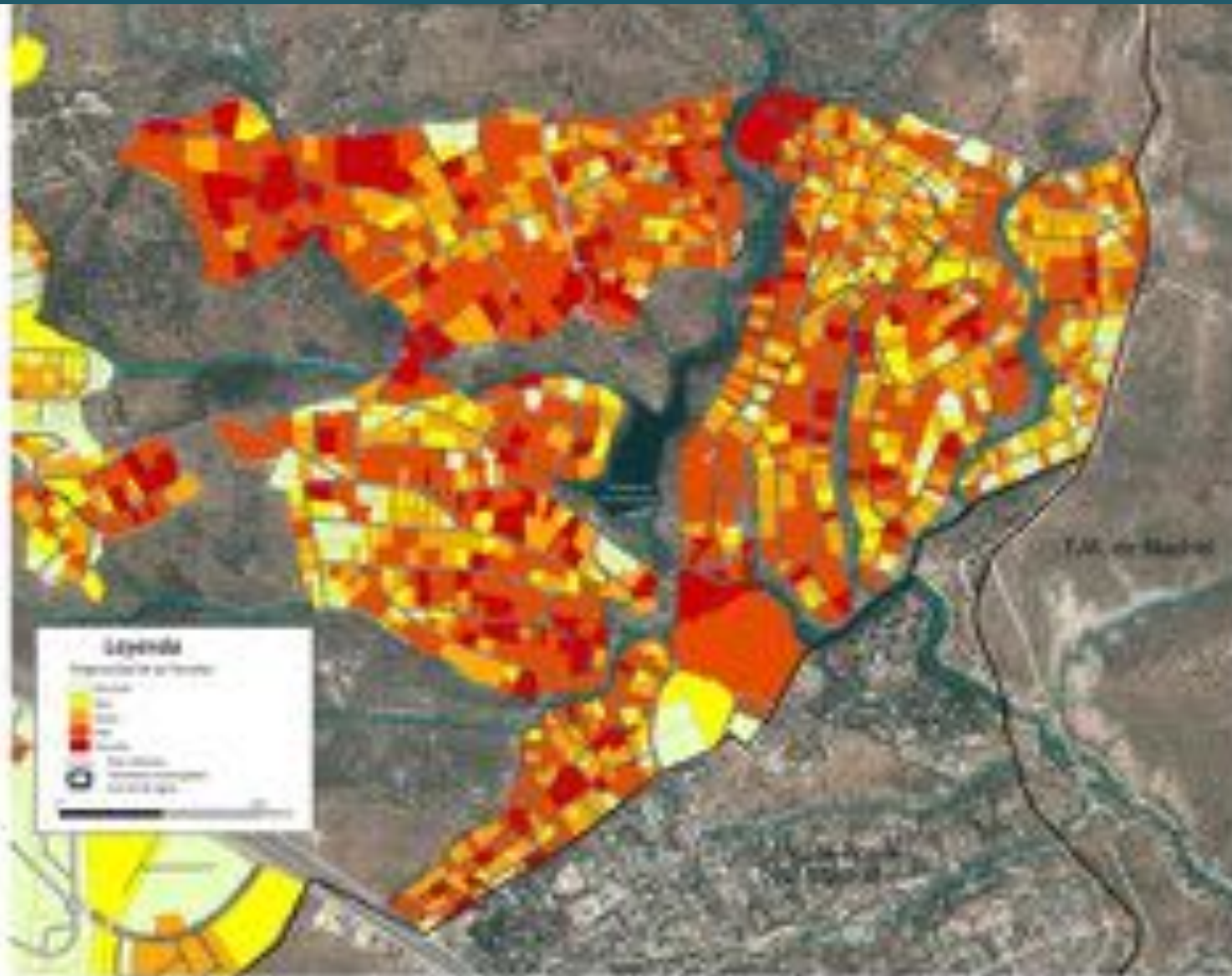


Risk mapping – Radiation

Cerro Alarcón I, Madrid. Exposure to radiation



Risk mapping – Lots assessment



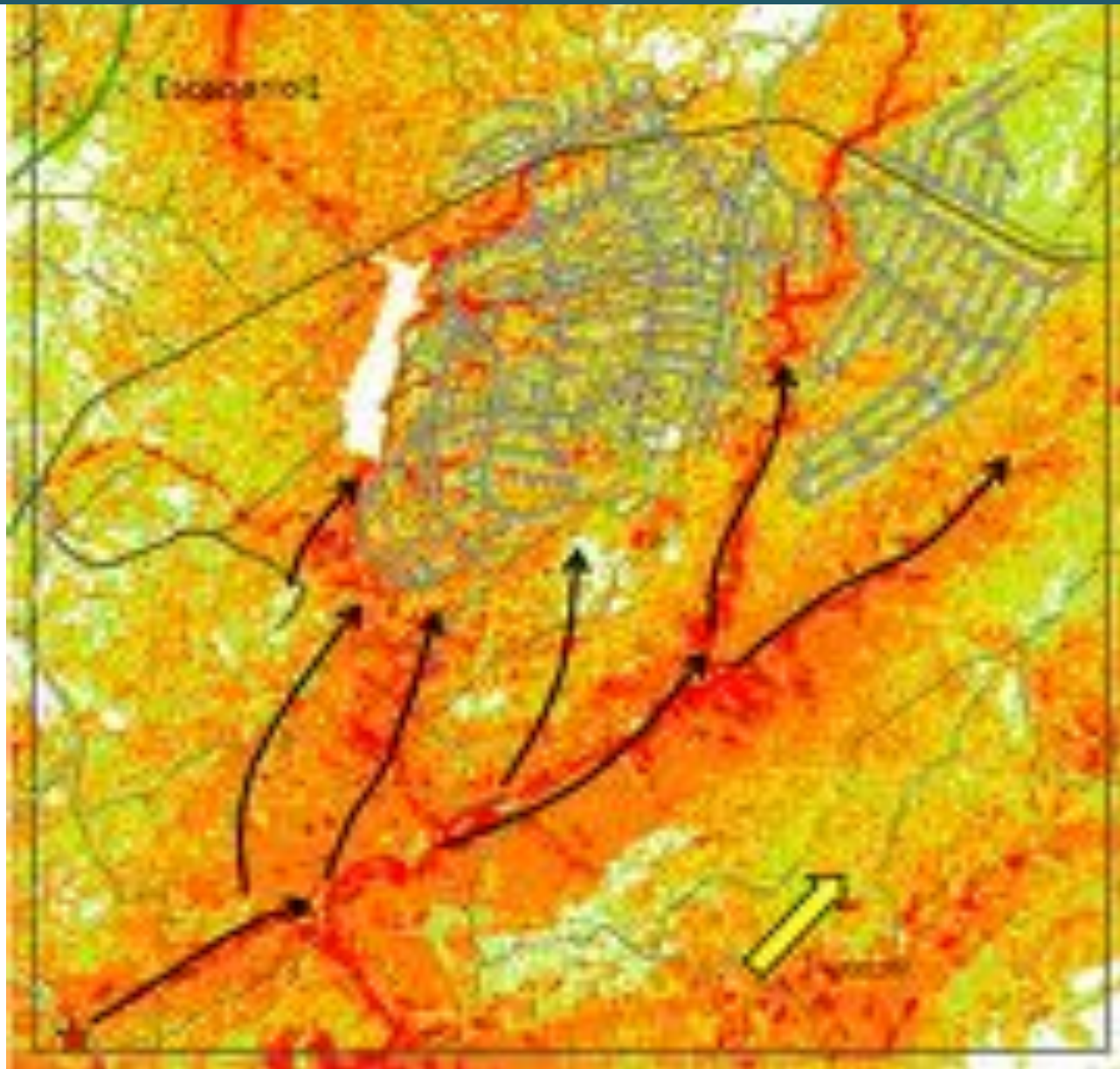
Fire scenarios



Fire scenarios



Fire scenarios



Fire scenarios – Sandbox test



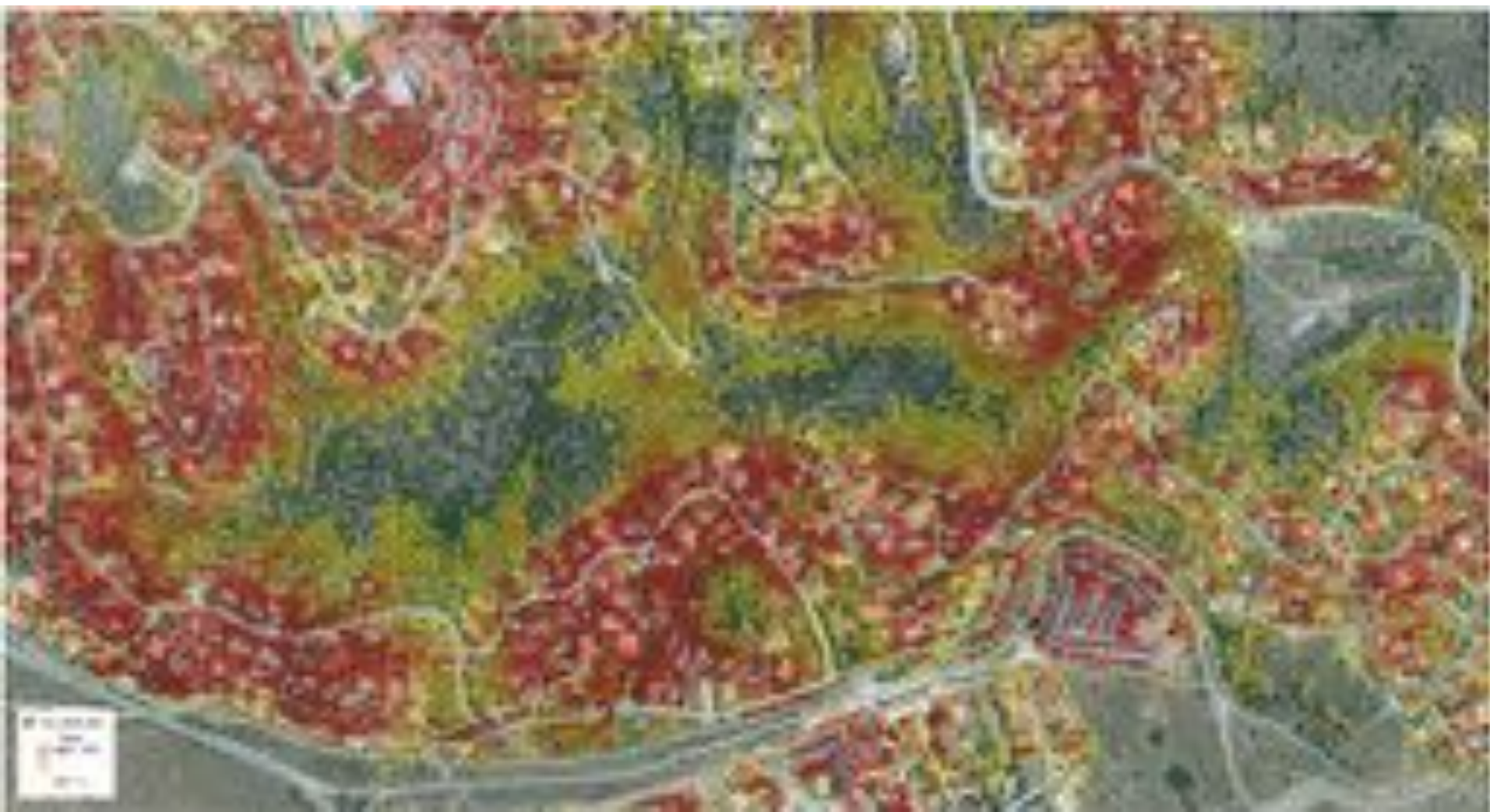
Fire scenarios – Simulation of evacuation



Fire scenarios – Simulation of evacuation



Mesoscale calculation



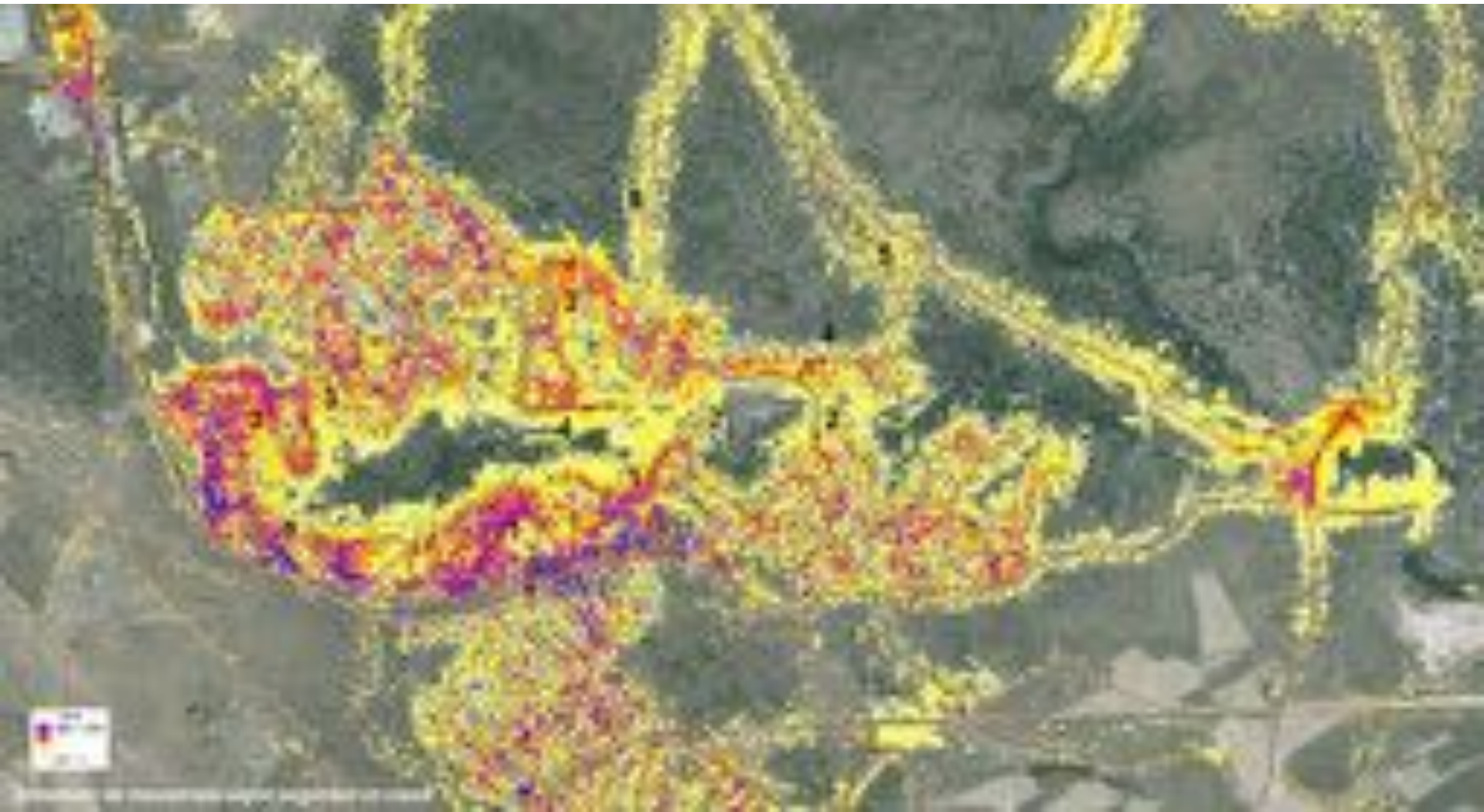
Mesoscale calculation



Mesoscale calculation



Mesoscale calculation



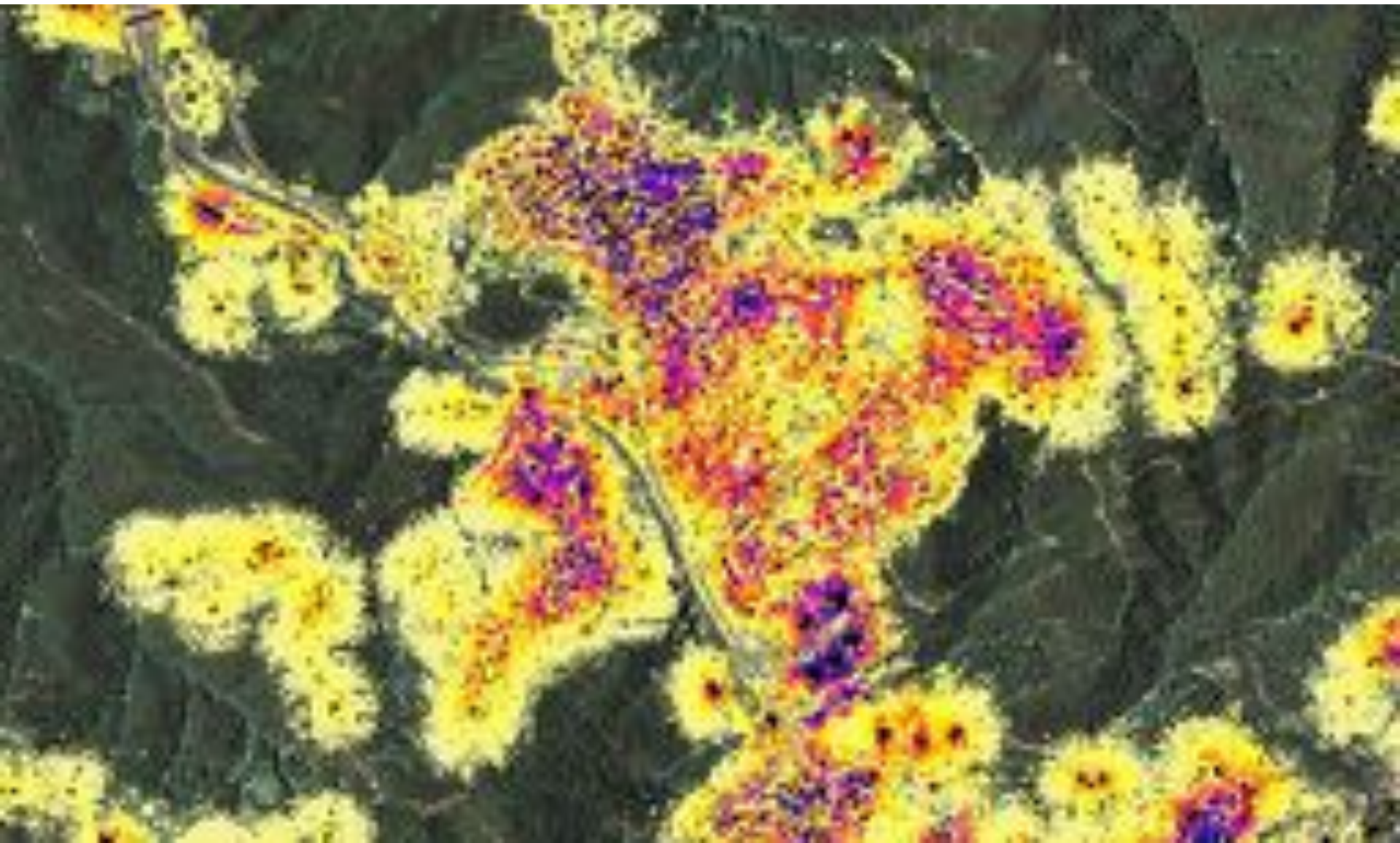
Mesoscale calculation



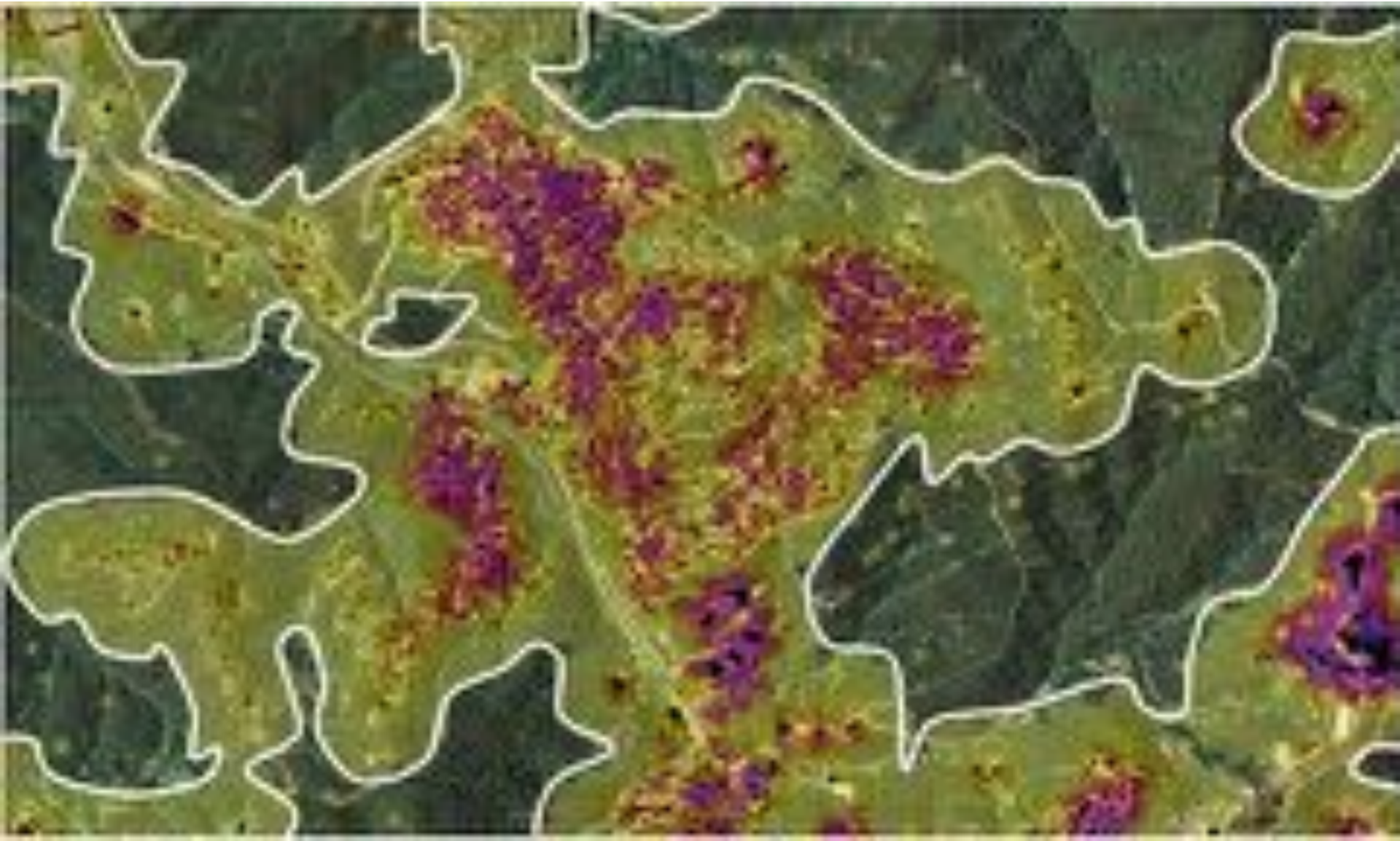
Mesoscale calculation



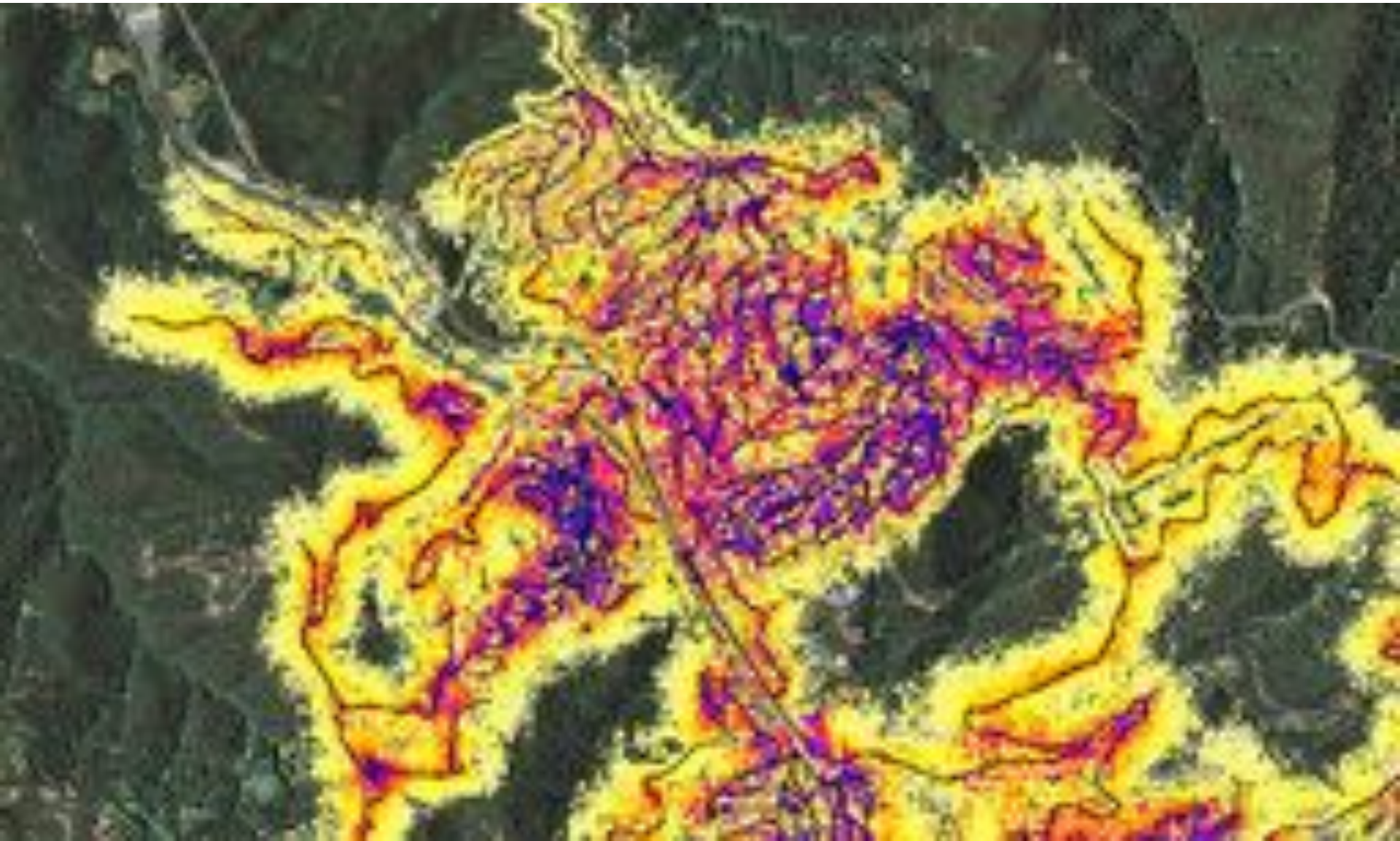
Mesoscale calculation – House defense



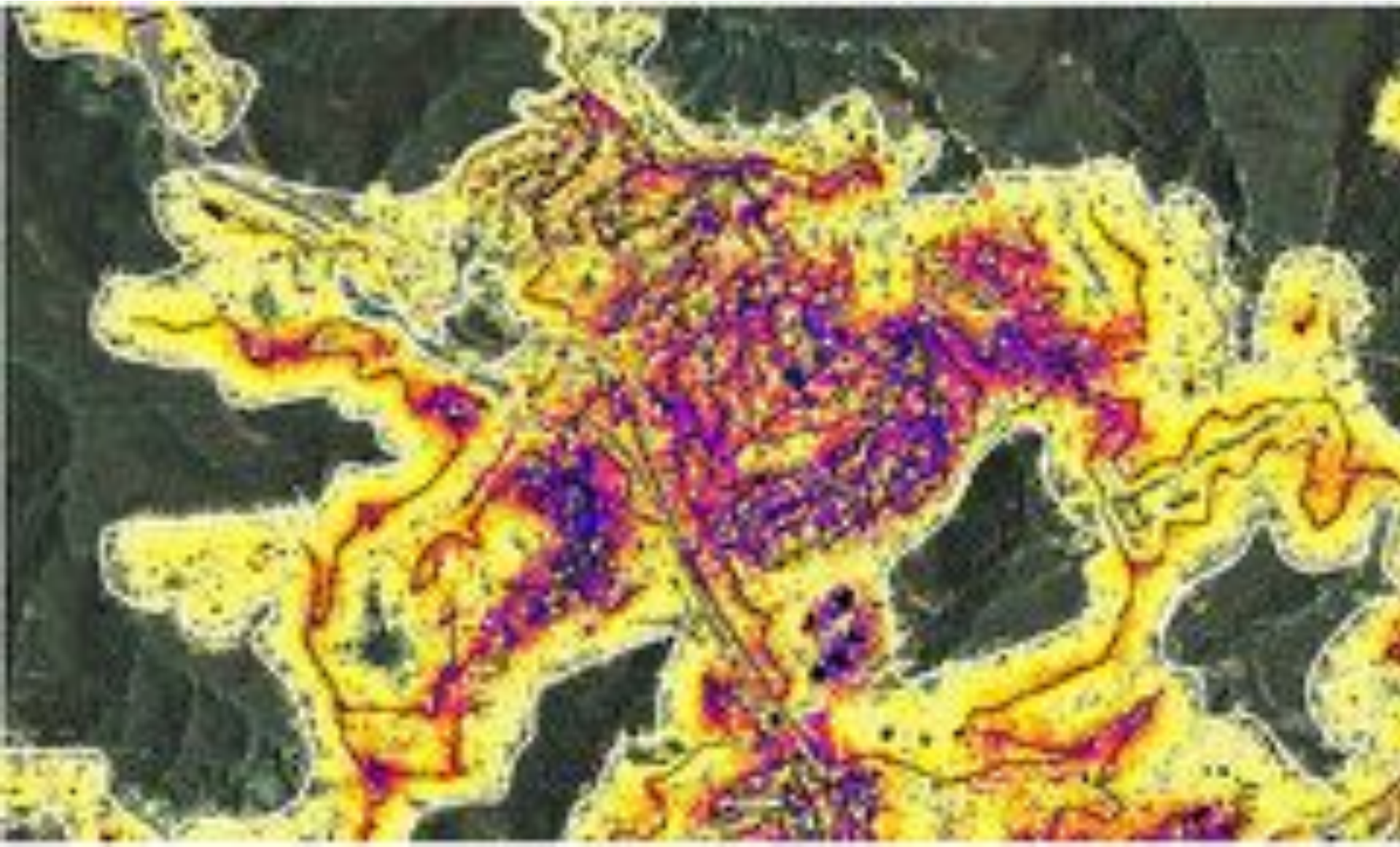
Mesoscale calculation – House defense



Mesoscale calculation – Road defense

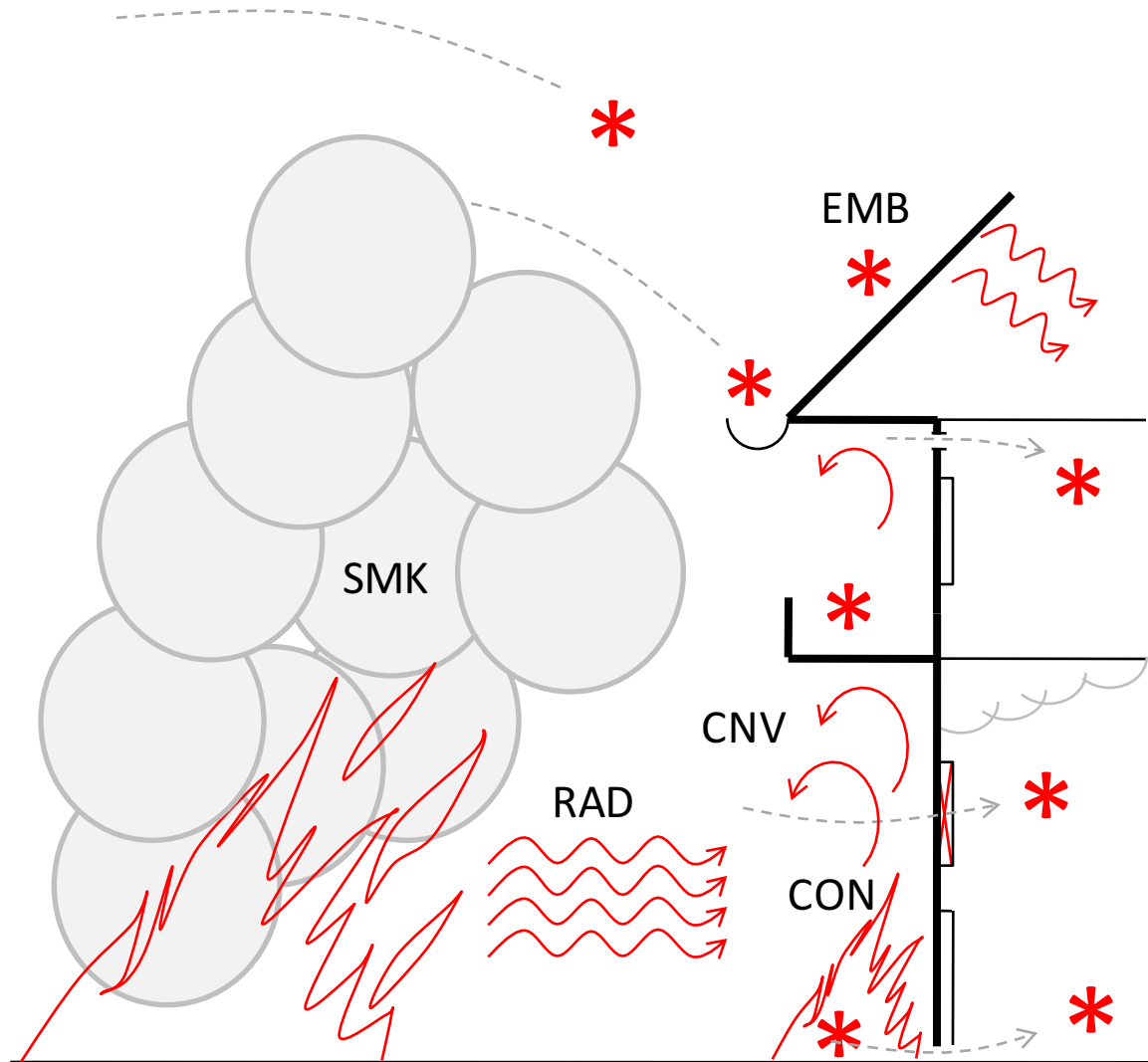


Mesoscale calculation – Total defense



The Microscale

Processes in the microscale



Hedges & gardens



Hedges & gardens



Hedges & gardens



Hedges & gardens



Hedges & gardens



Foto : La Nucia, Alicante, 2.009. Fuente: Manuel Lorenzo, AFP.

Hedges & gardens



Hedges & gardens



Hedges & gardens

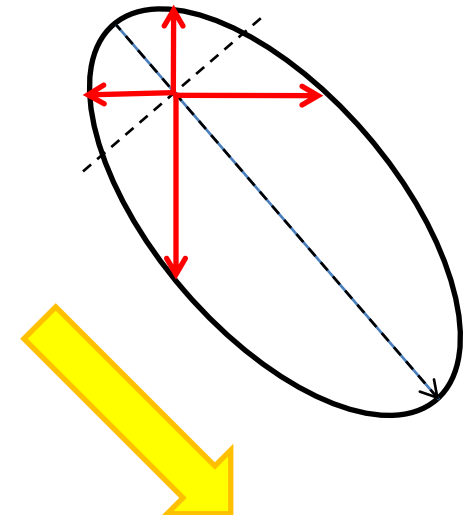
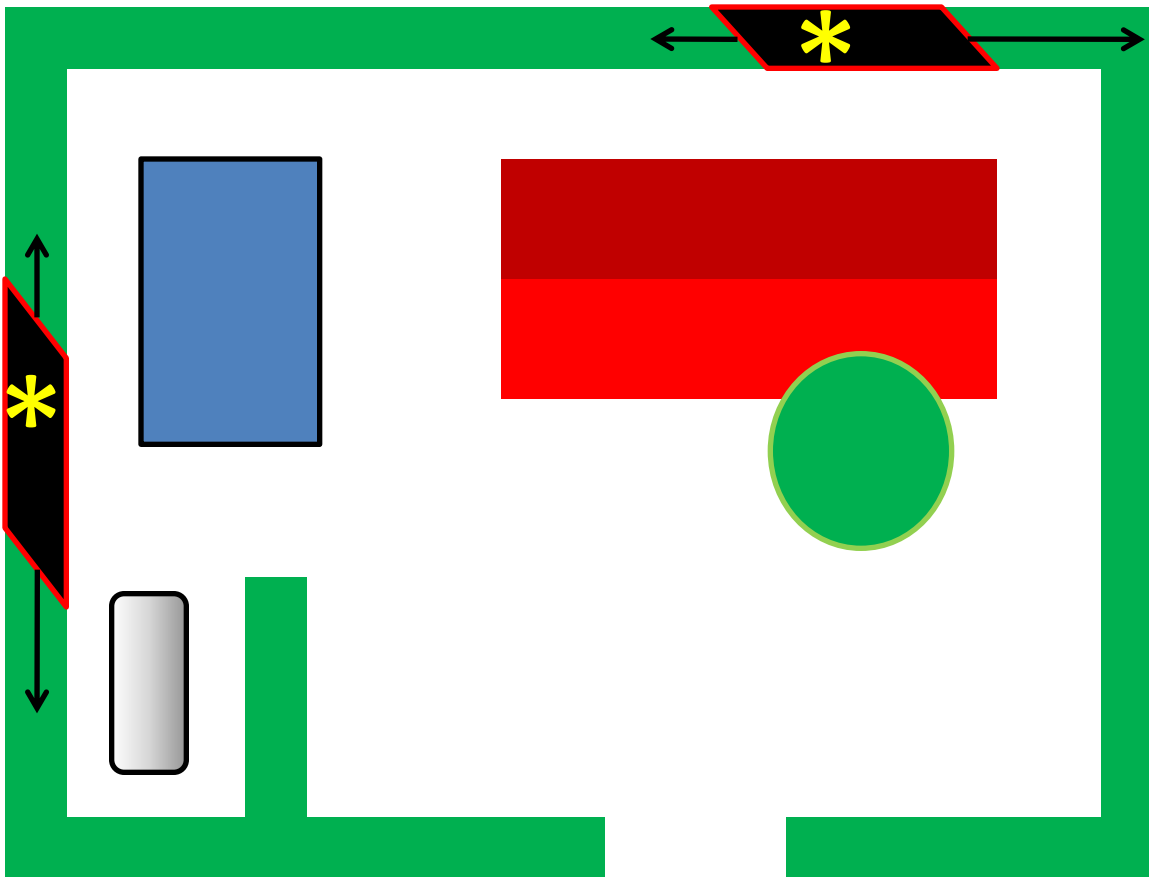


Hedges & gardens



Hedges & gardens

Fire spread in hedges



Hedges & gardens

Fire spread in hedges



Hedges & gardens



Hedges & gardens



Hedges & gardens



Hedges & gardens



Hedges & gardens



Hedges & gardens



Hedges & gardens



Hedges & gardens

- Control of fuel load in the understory
- Limit the amount of dead fine fuel load (1HR)
- Control the moisture of living plants



Materials & objects



Materials & objects



Materials & objects



Materials & objects



Materials & objects



Materials & objects



Materials & objects



Materials & objects



Materials & objects



House vulnerability



House vulnerability



House vulnerability



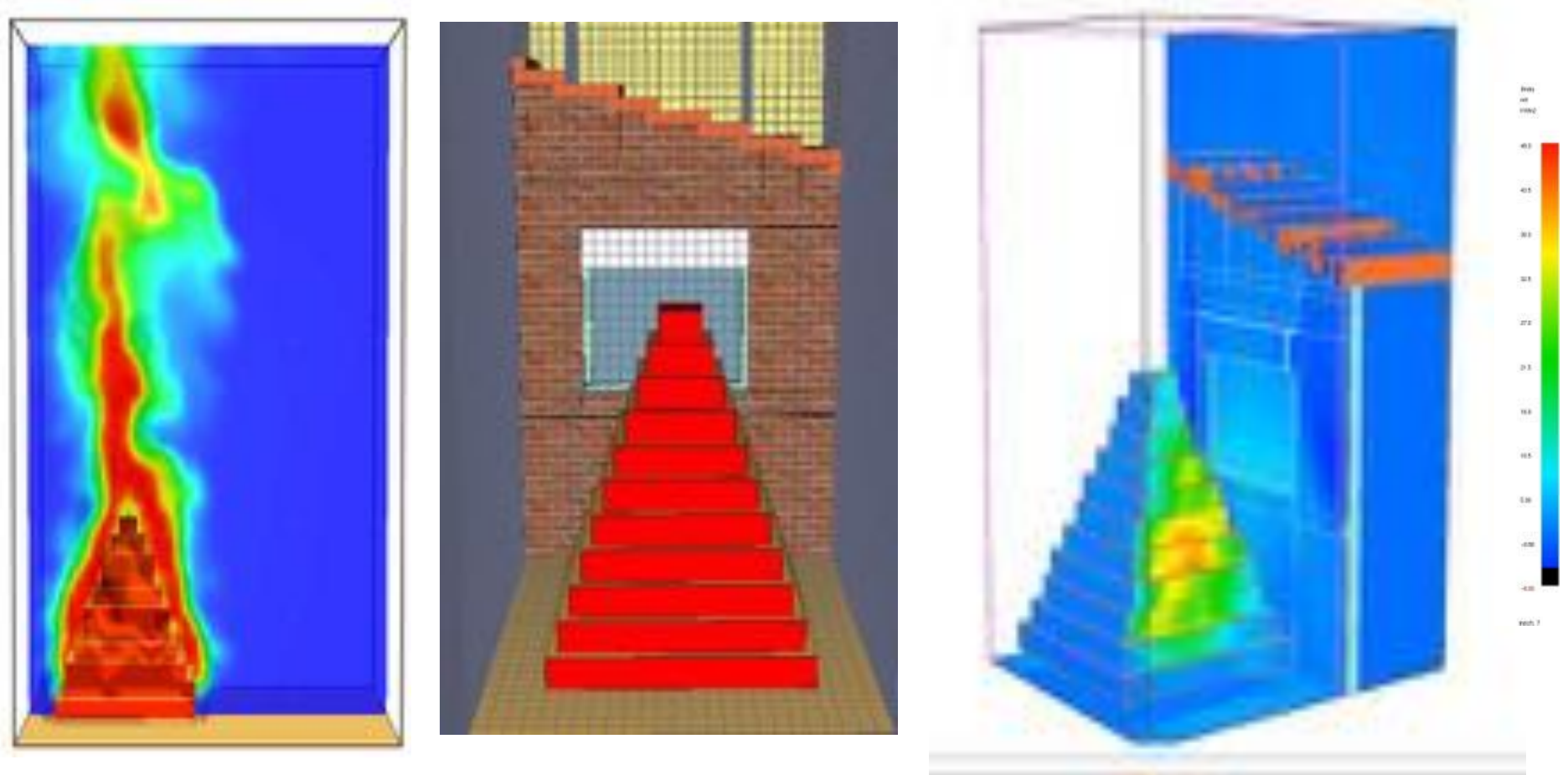
House vulnerability



House vulnerability



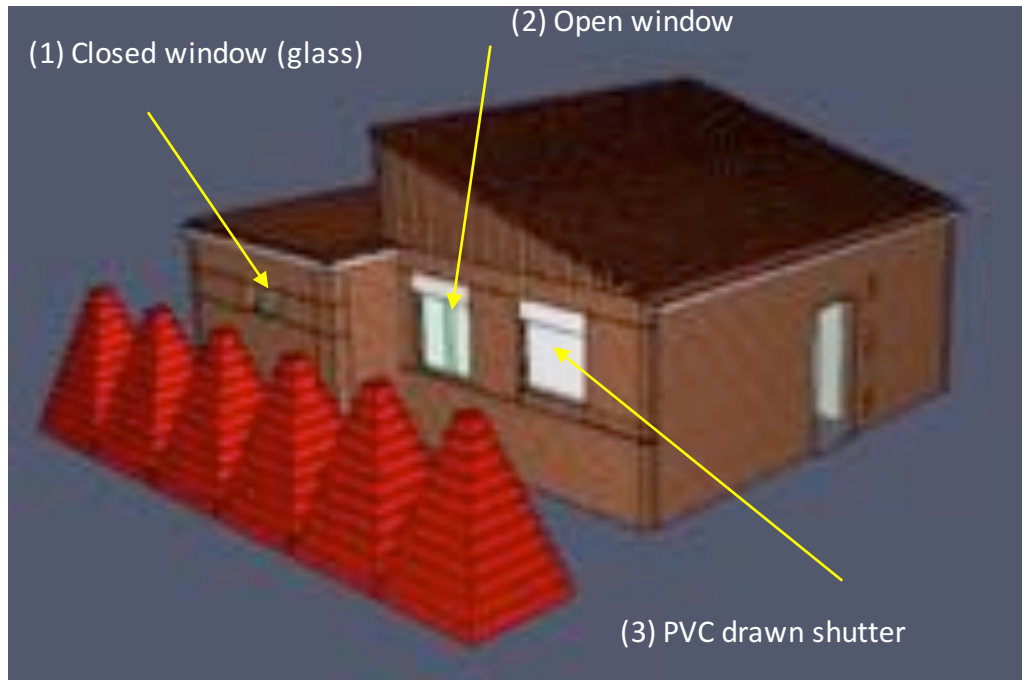
Performance-based simulation



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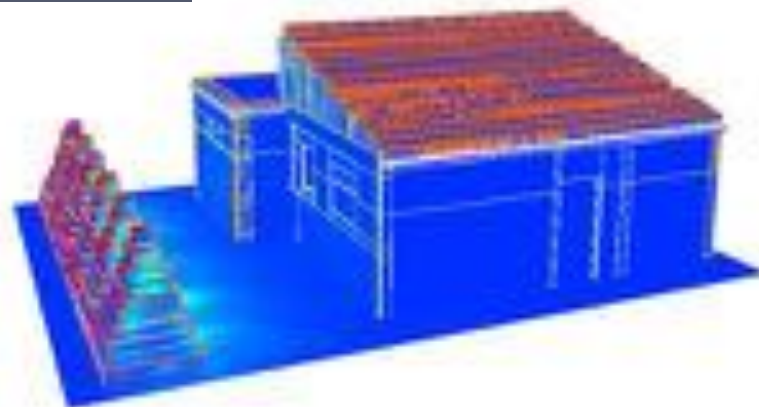
Credits: Elsa Pastor, Eulalia Planas. CERTEC Polytechnic University of Catalonia

Performance-based simulation



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Pre-triage



$$WUIX = (C_1 + C_2 + C_3) + C_4$$



Pre-triage



Pre-triage



Pre-triage



Pre-triage / defensible houses



Research - Roofing



Foto D. Caballero

Research - Roofing



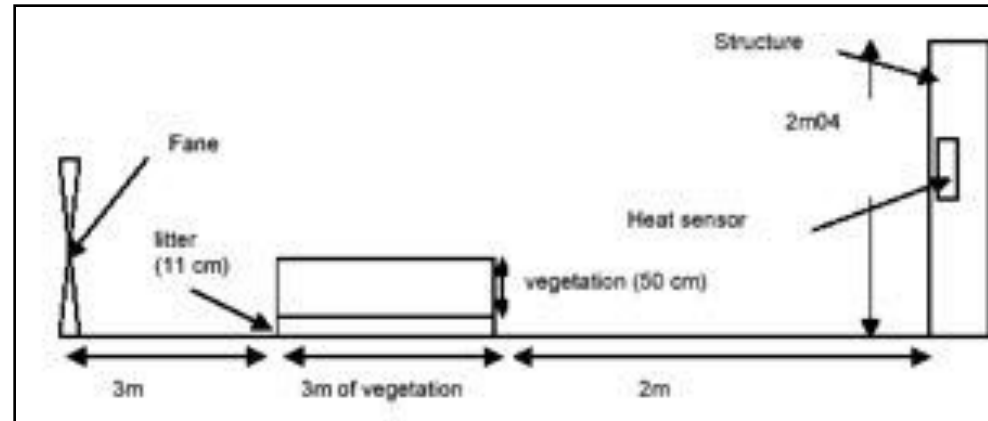
Foto D. Caballero

Research - Roofing

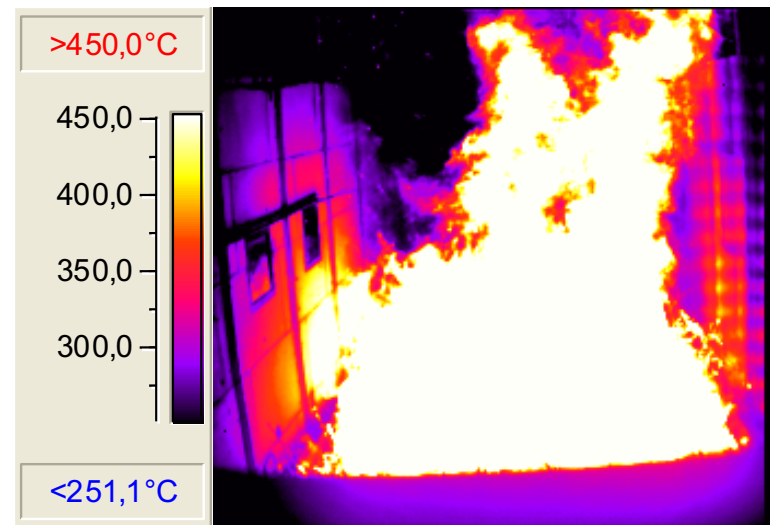
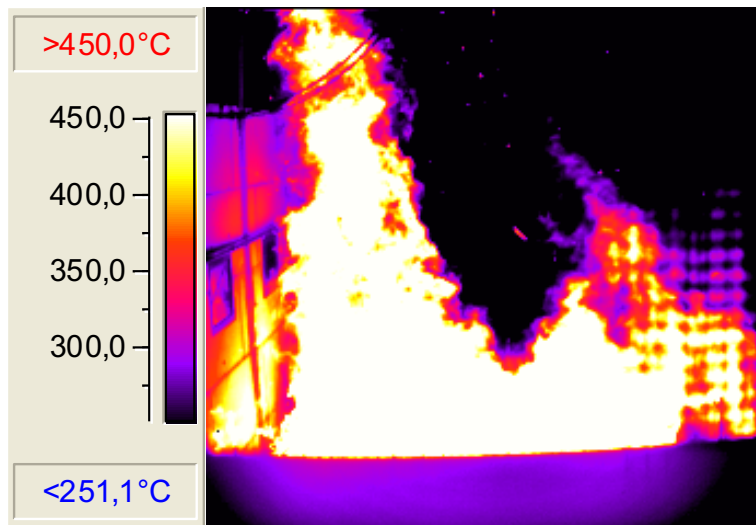
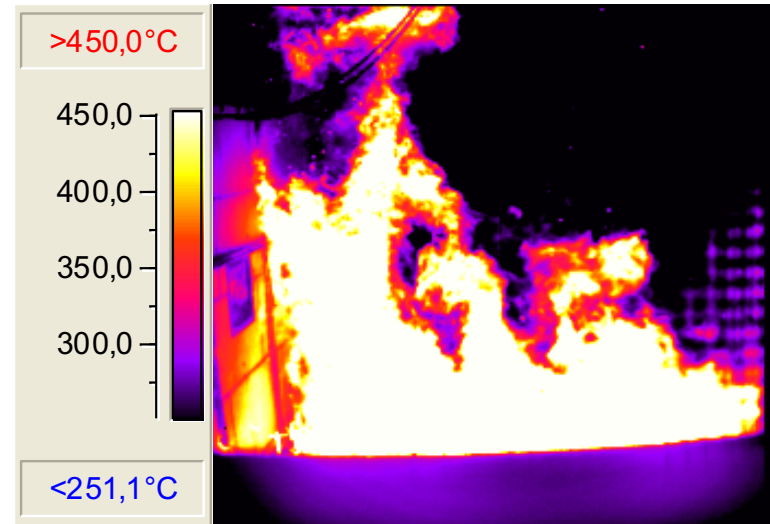
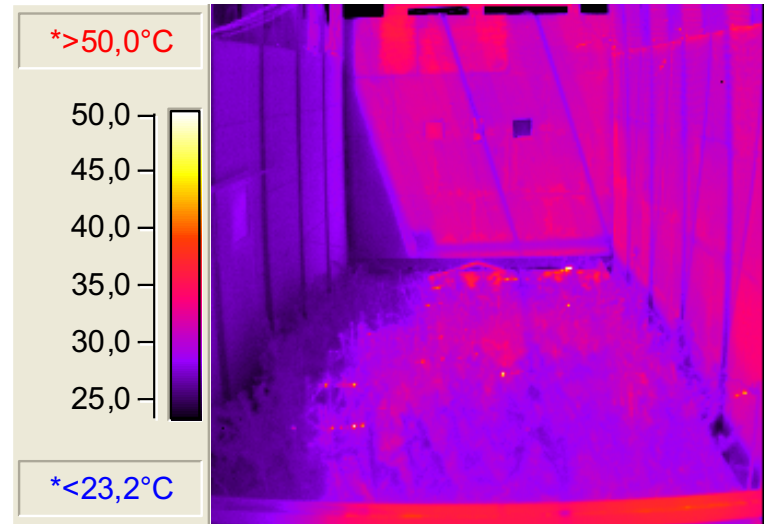


Foto D. Caballero

Research – Façade elements



Research – Façade elements



Research – Shutters and blinds



Research – Shutters and blinds



Research – Shutters and blinds



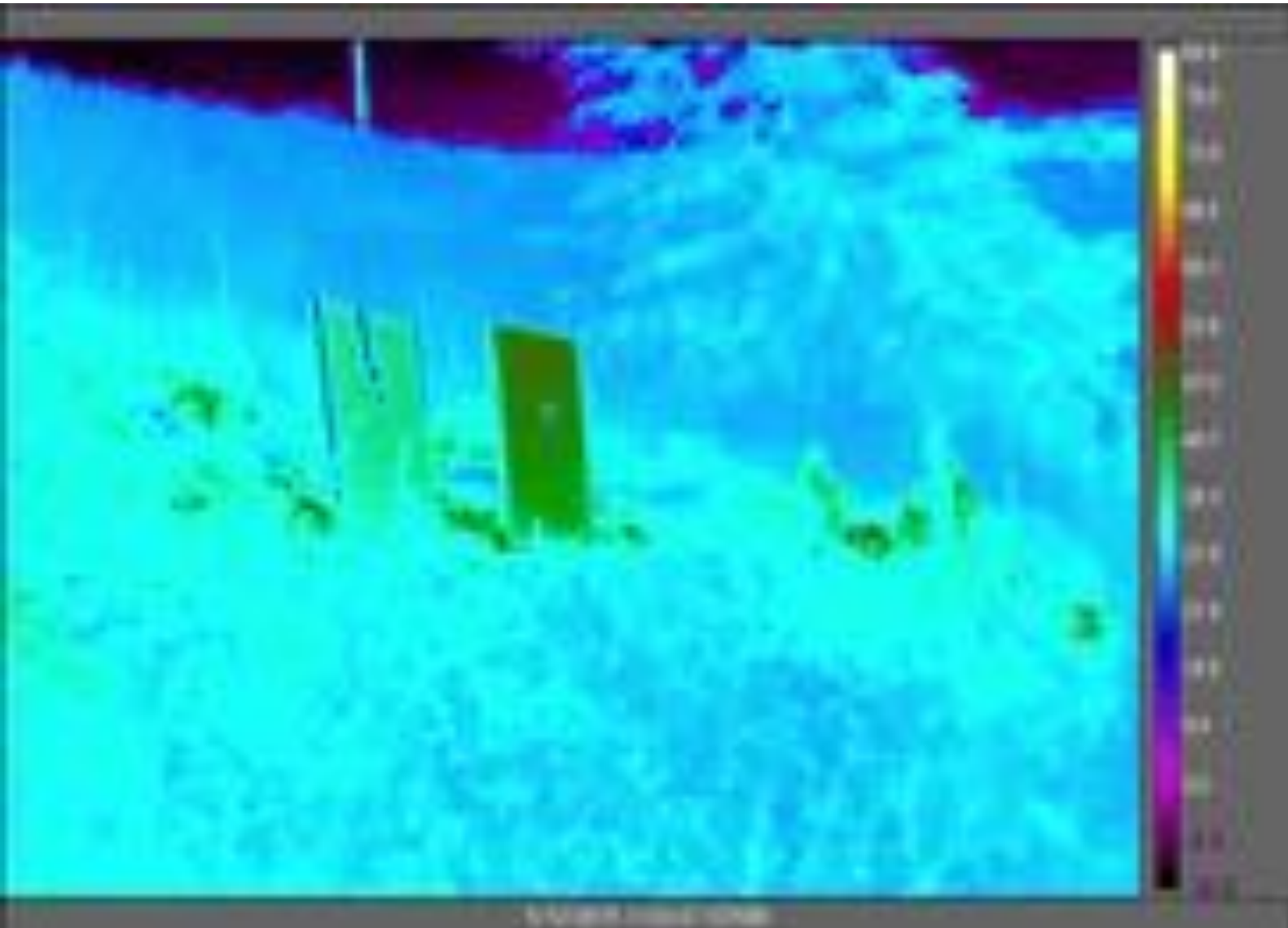
Research – Shutters and blinds



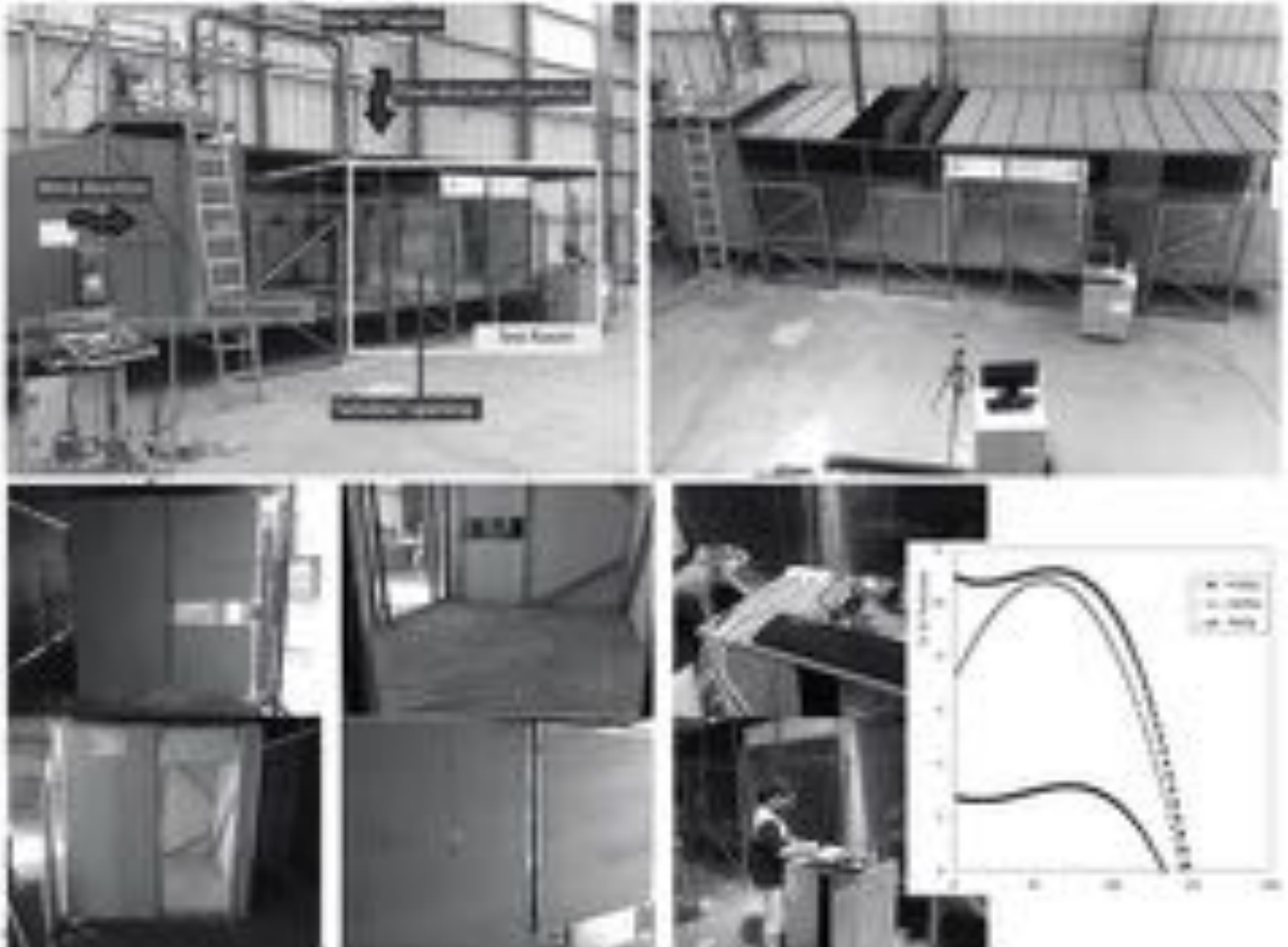
Research – Shutters and blinds



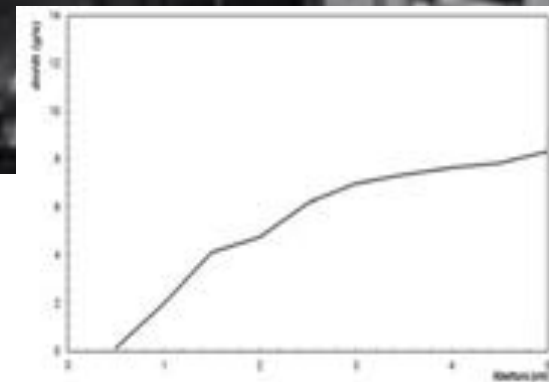
Research – Shutters and blinds



Research – Internal doors and windows



Research – Garage doors



Some remarks on **SAFETY**

Entrapments



Entrapments



Entrapments



Domino effect



Domino effect



LPG Tanks



LPG Tanks



LPG Tanks



LPG Tanks



LPG Tanks



LPG Tanks



LPG Tanks



LPG Tanks



LPG Tanks



LPG Tanks



Towards a common WUI Strategy in Europe

Our ten-points strategy

1. WUI as a new land use, new regulations
2. Inhabitability map (safe, defensible, undefensible)
3. Land servitude of protection and safety (owners)
4. WUI Code, at the three scales
5. Provisioning, training, reinforcing municipalities
6. Guide of equipment and operations in the WUI
7. Implementation of risk assessment tools
8. Research program, experience capitalisation
9. Awareness raising, education, population involvement.
A metric to measure prevention impact & benefit
10. Program for the integral landscape management

Thank you!

Any questions?

More information:

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