

Impacts of land use changes (2001-2021) on wildfire risk in San Diego County, California

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Wildfires are increasing:

- climate change
- mismanaged land
- wildland urban interface



Aim and objectives:

- map WUI expansion
- map high-risk wildfire zones
- (where) is there an overlap?

San Diego County:

- 3+ million inhabitants
- diverse terrain and ecology
- hot dry summers,
wet winters



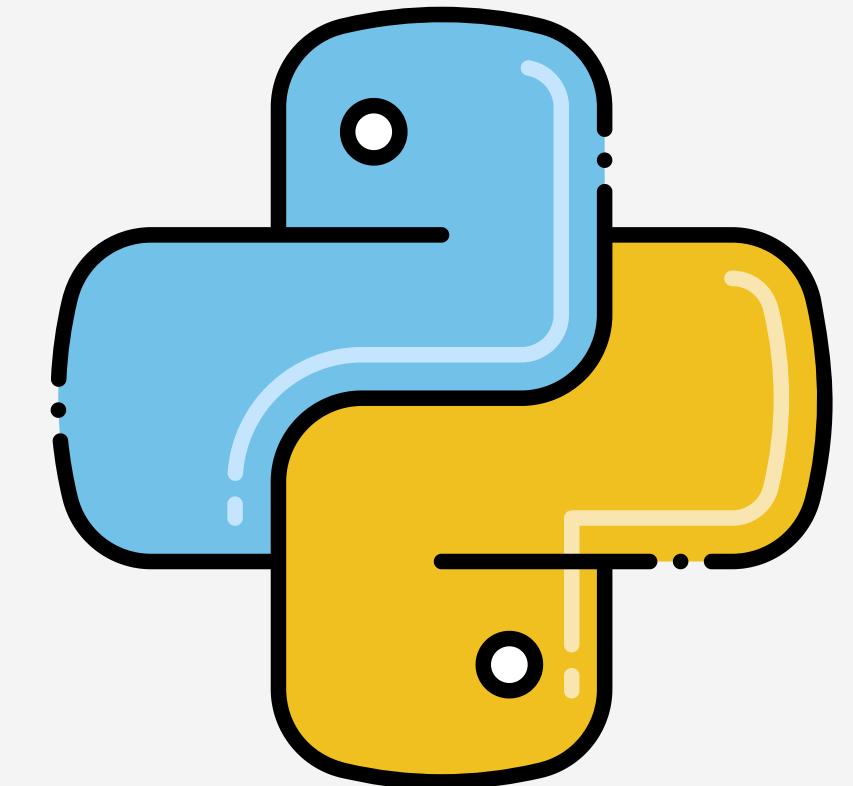


Datasets:

- land use data (2001, 2021)
- historical wildfire perimeters (2000-2023)
- county boundaries
- DEM

Software & Hardware:

- ArcGIS Pro
- Python
- Lenovo Thinkpad P14s



Method Overview:

- WUI extraction
- wildfire risk mapping
- (where) is there an overlap?

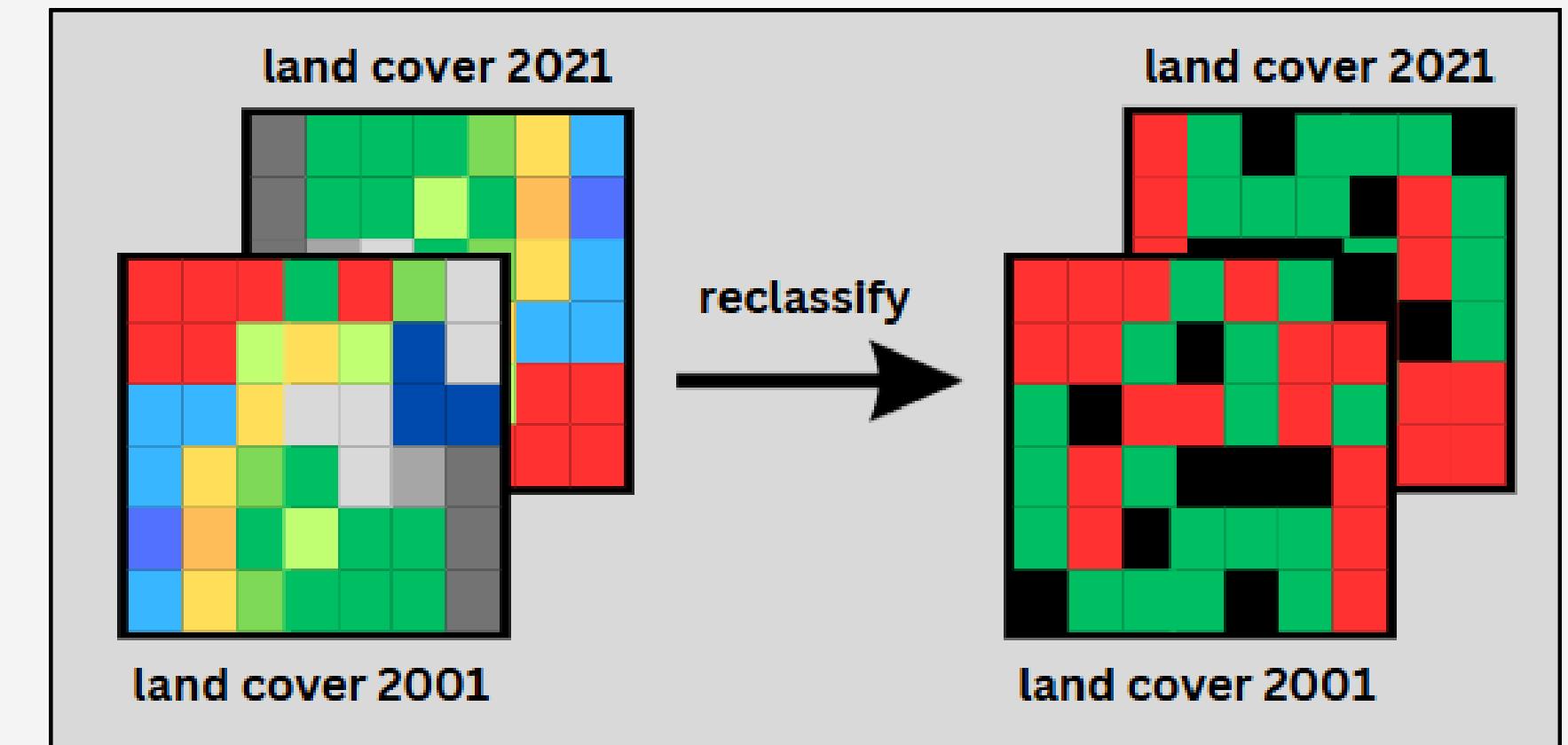
WUI definition:

- where built areas meet natural land
- very prone to wildfire damage



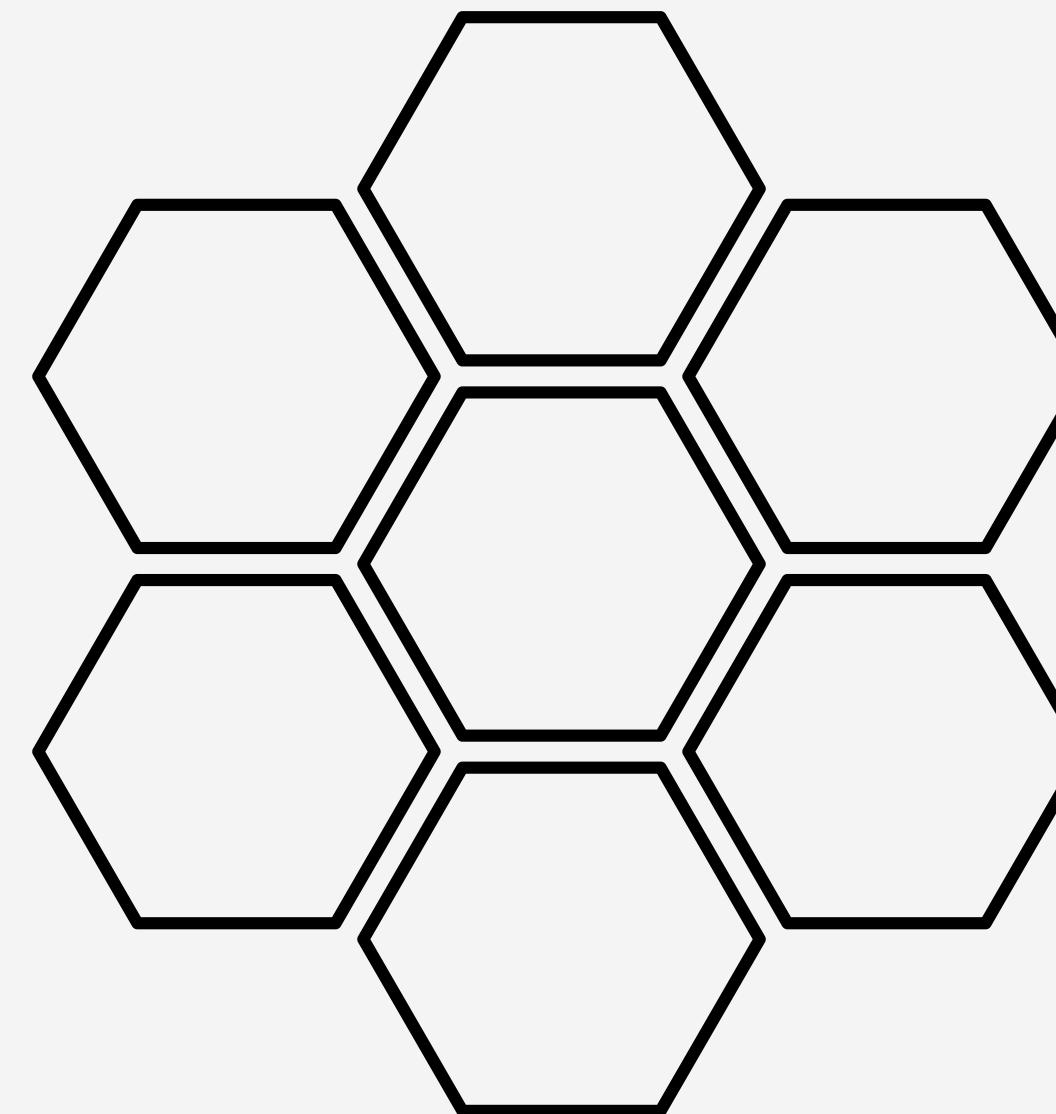
WUI extraction step 1:

→ reclassify land use
classes to 1 = urban
and 0 = natural land



WUI extraction step 2:

- hexagon overlay
- sum up urban cells within each hexagon
- 150 - 1800 urban cells
= WUI



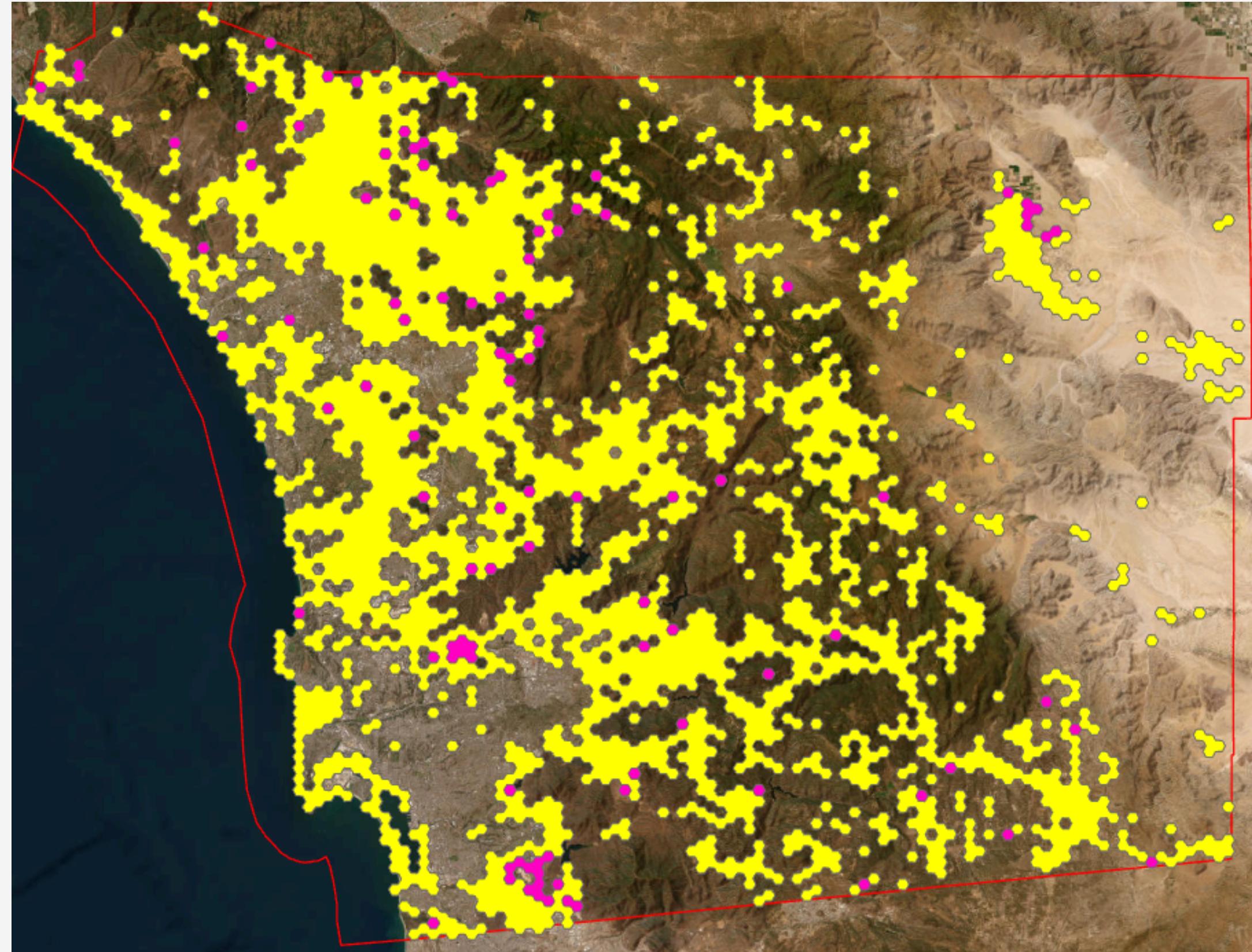
Validation:

→ visual assessment
via satellite imagery



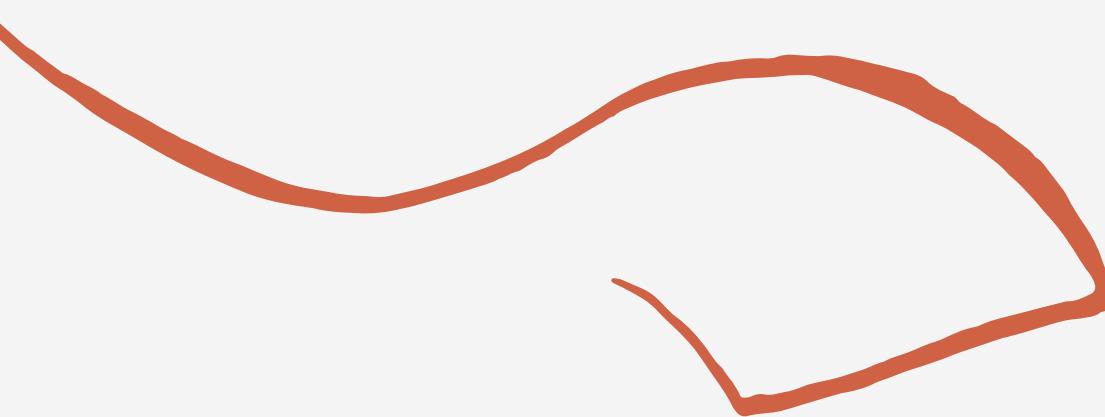
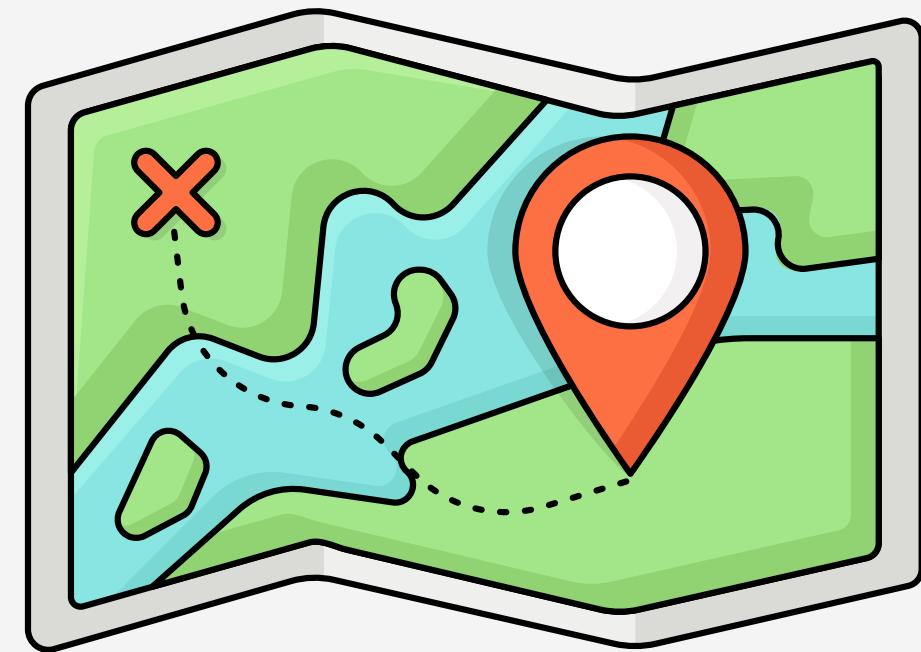
WUI Results:

→ WUI increase (pink)
of approx. 100km^2
from 2001-2021



Wildfire Risk Mapping:

- methodology based on Portugal's wildfire commission
- combination of the metrics hazard and potential damage



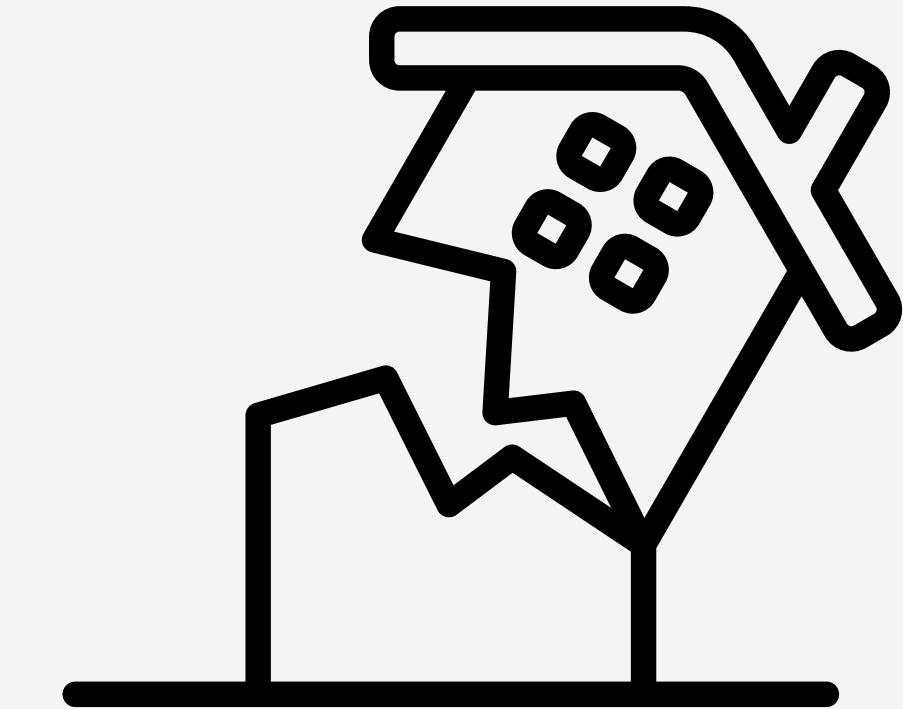
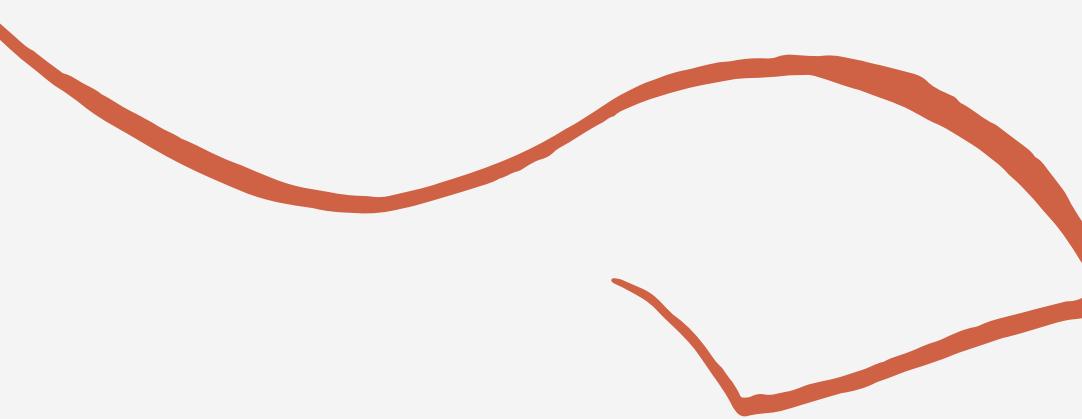
Hazard:

- probability X susceptibility
- probability (based on previous wildfires)
- susceptibility based on topography



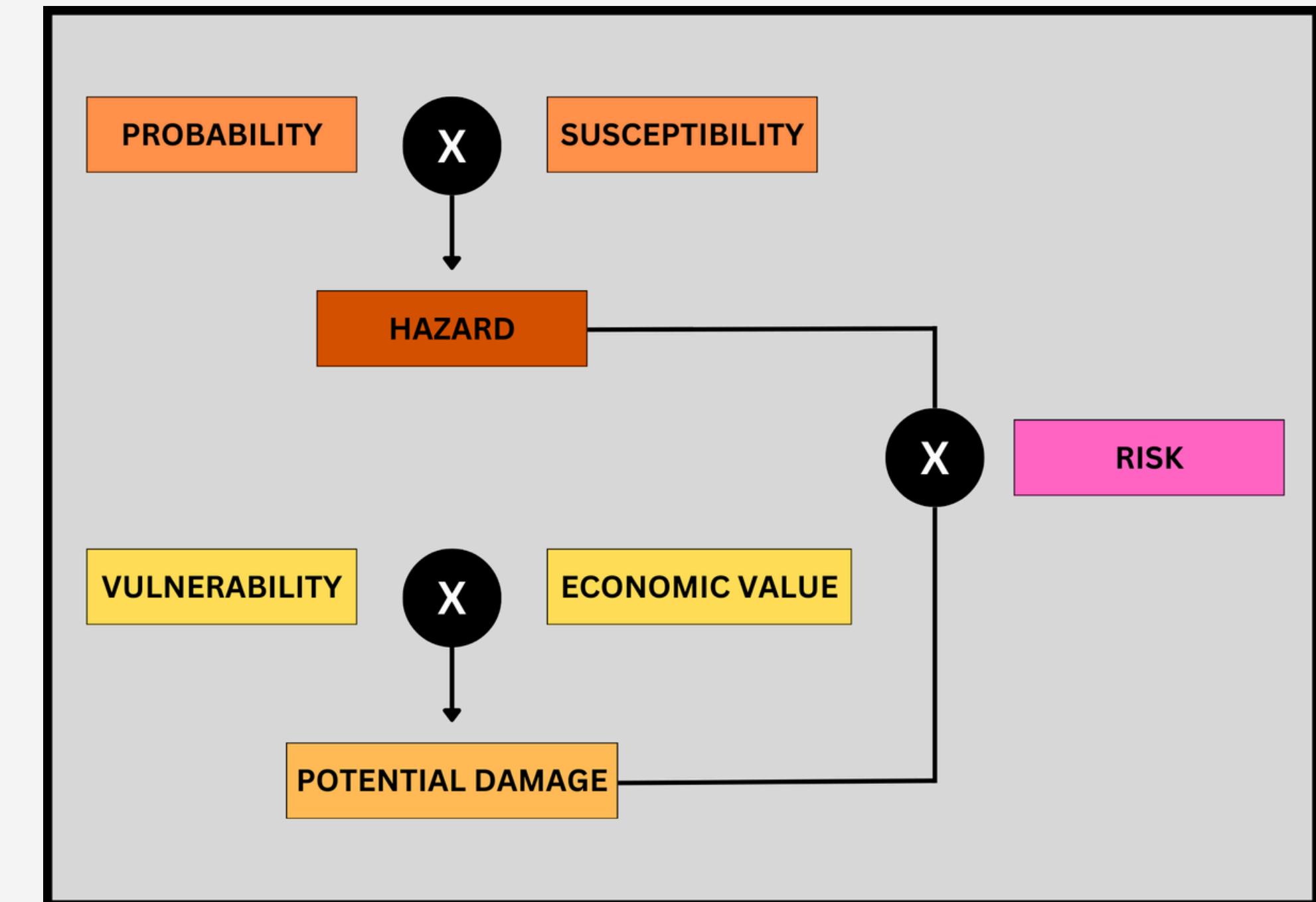
Potential Damage:

- vulnerability X economic value
- vulnerability according to land use
- economic value (€ per hectares of land)



Final Risk Map:

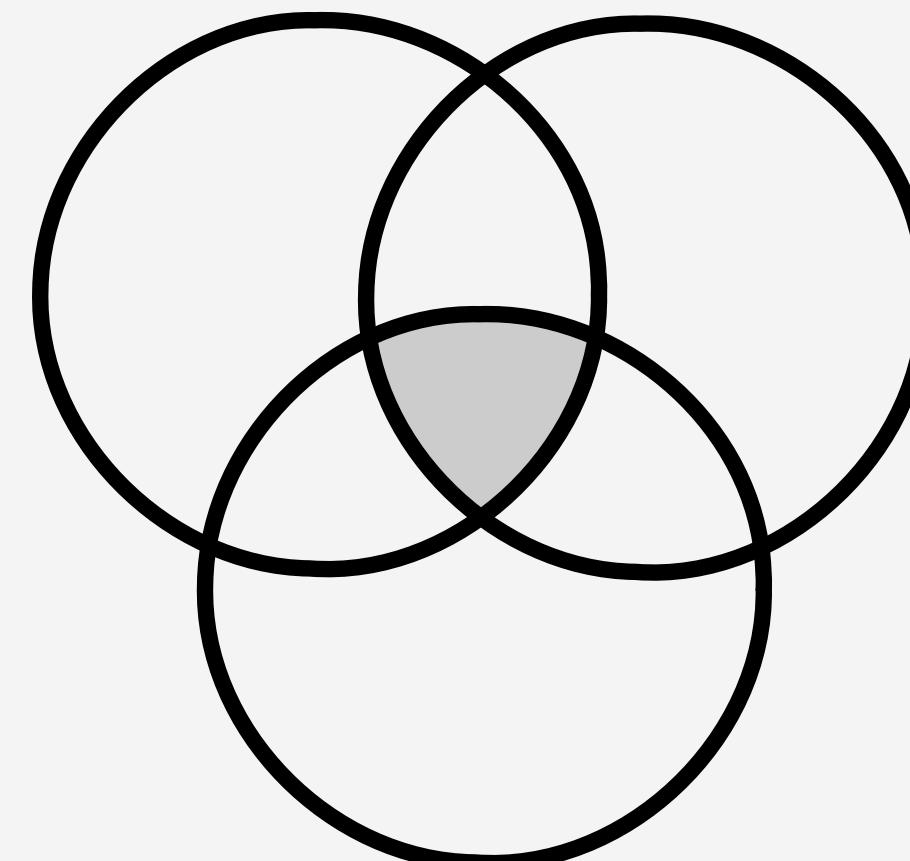
- multiplying hazard and damage map
- 5 risk classes



Intersection of WUIs with wildfire

high-risk zones:

→ identify most troublesome
WUI areas



Stakeholders:

- San Diego County Fire Protection District
- California Office of Emergency Services



Next Steps:

- perform wildfire risk mapping
- fine-tune WUI results
- quantify WUI high-risk zone overlap metrics
- evaluate & present final outcomes