



NBIC – National Datasets for Current Hazard and Future Climate

Justin Leonard



I would like to begin by acknowledging the Traditional Owners of the land that we're meeting on today, and pay my respect to their Elders past and present



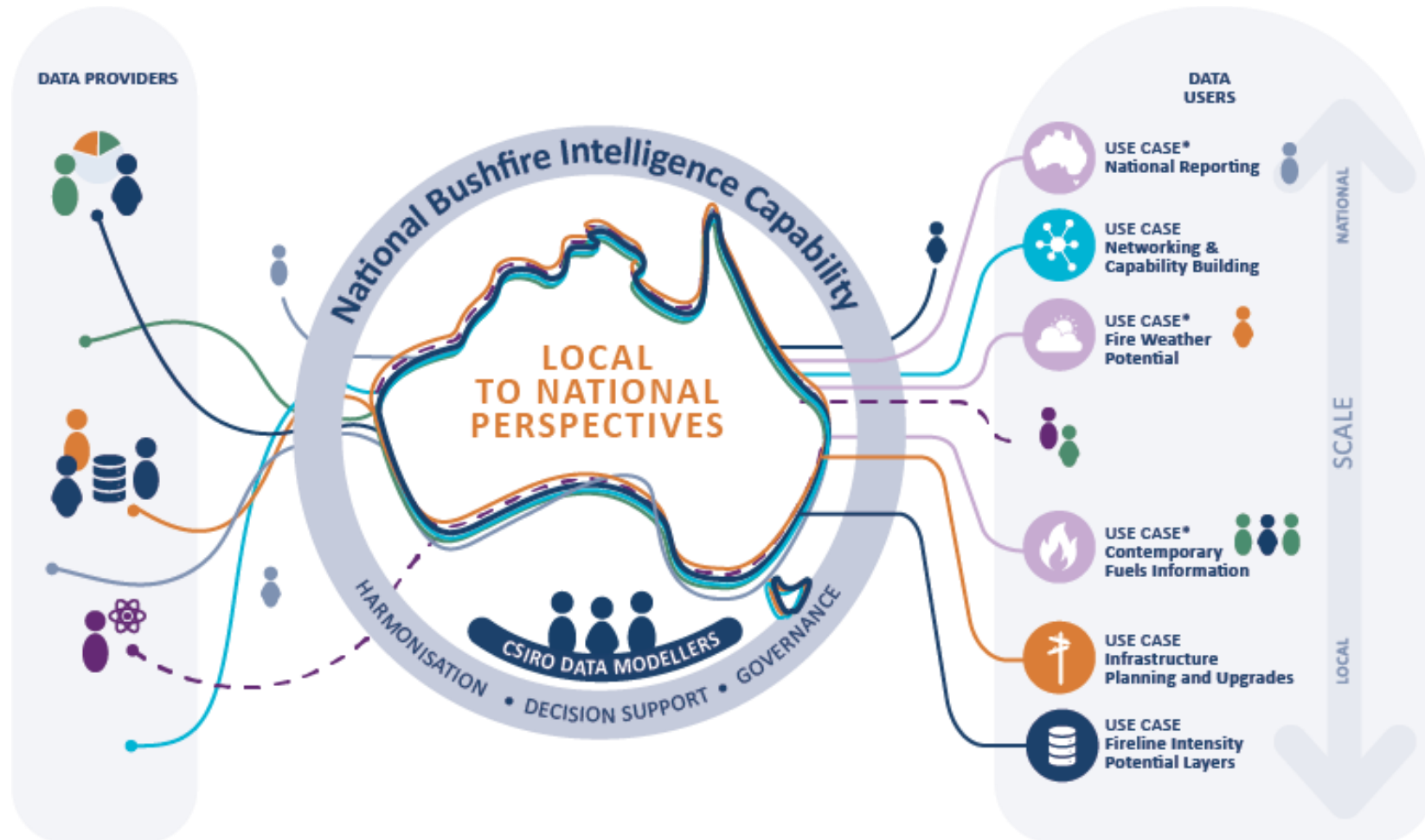
NBIC Vision

Preparing Australia for a **changing climate** by connecting **local, state** and **national** understandings of bushfire hazard.



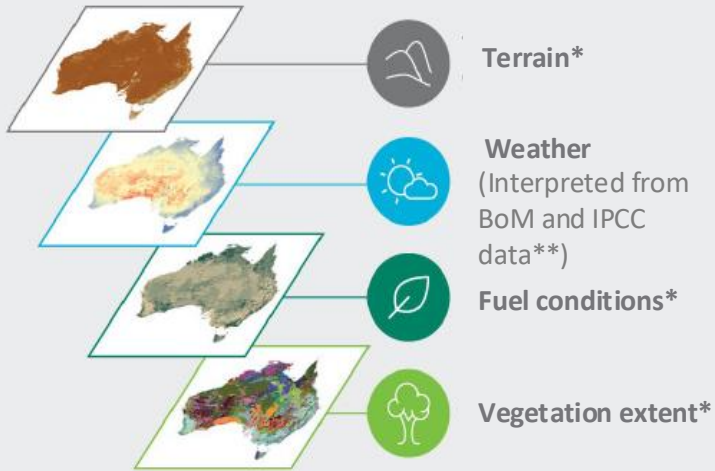
Imagine if you had

Ready access to information that **describes the reasonable worst-case bushfire severity and bushfire weather**, both for the coming season and the future seasons including **climate change projections**.



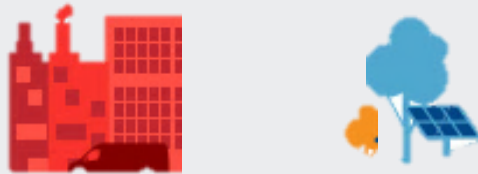
Our capability – simple workflow

1 Use NBIC created data or provide your own vegetation or terrain data.



*Ability to use your own jurisdictional data for these inputs
**BoM – Bureau of Meteorology, IPCC - Intergovernmental Panel on Climate Change

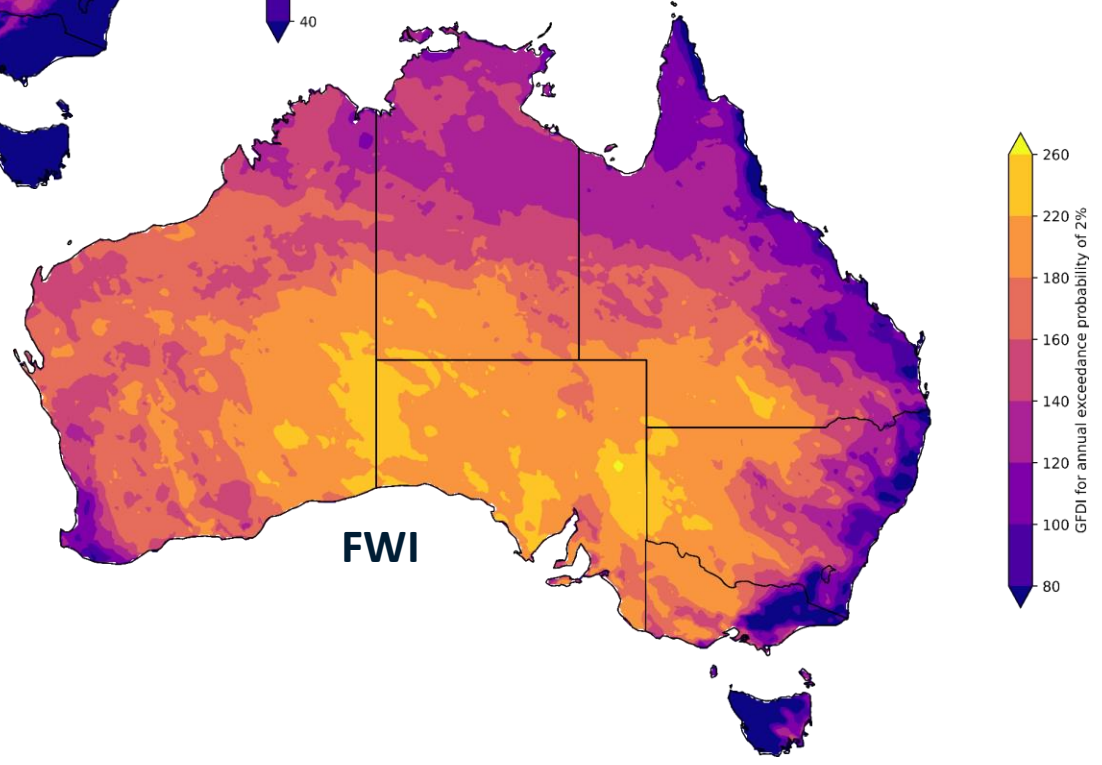
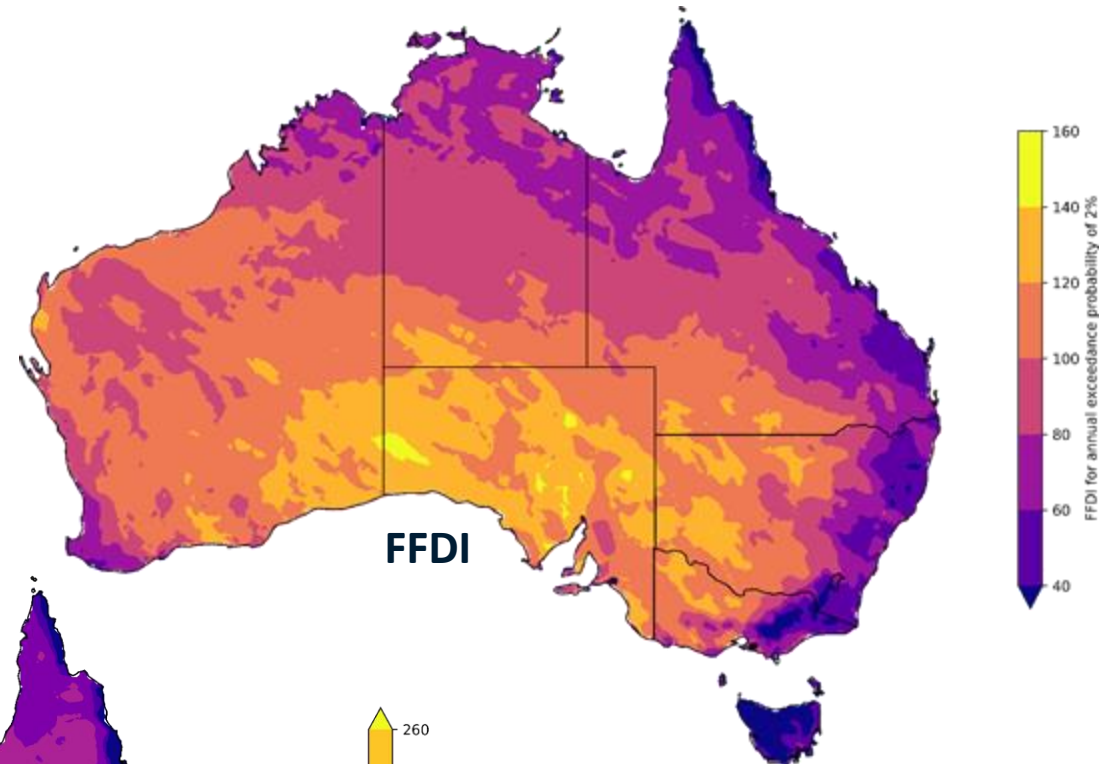
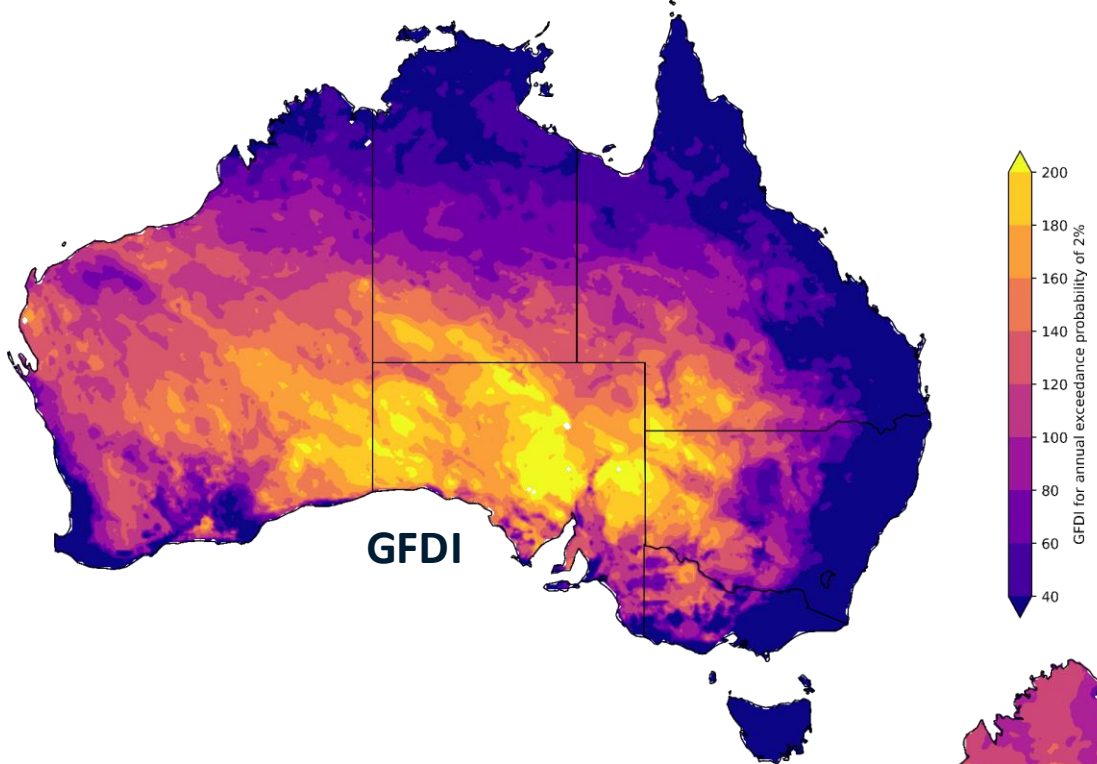
2 Choose from an agreed set of climate change scenarios and assumptions that suit your purpose.



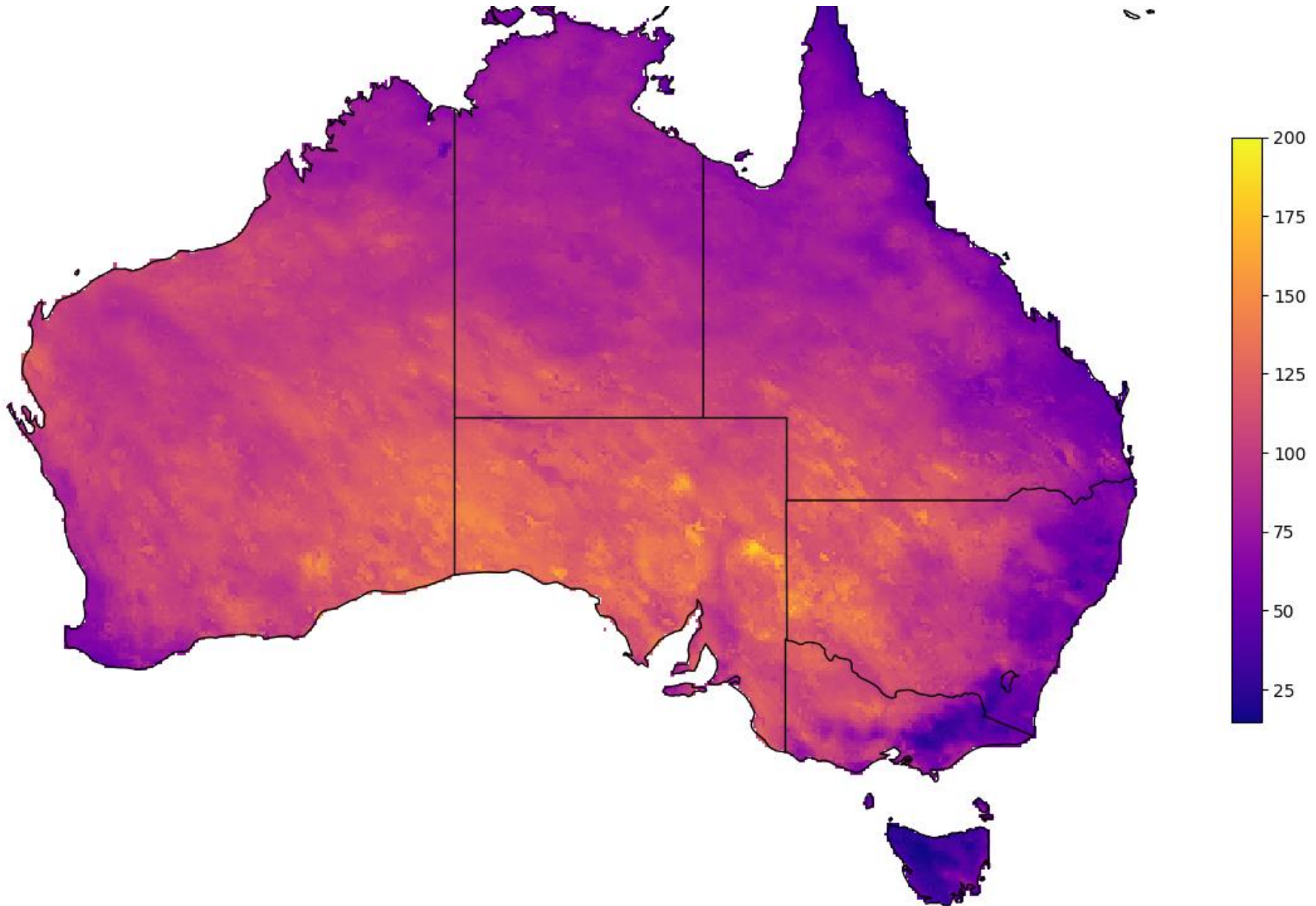
3 NBIC provides your requested customised bushfire data.



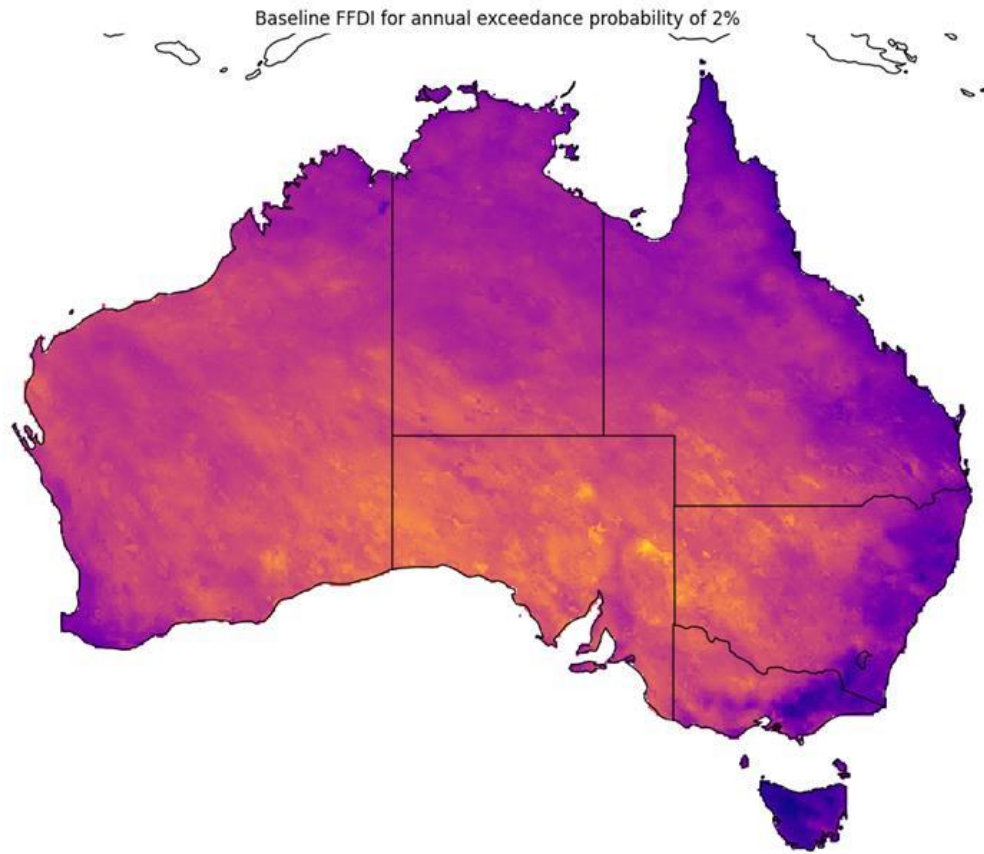
*Fireline intensity (FLI) potential relates to the rate of energy released from an advancing fire front, indicating the intensity of a bushfire's behaviour



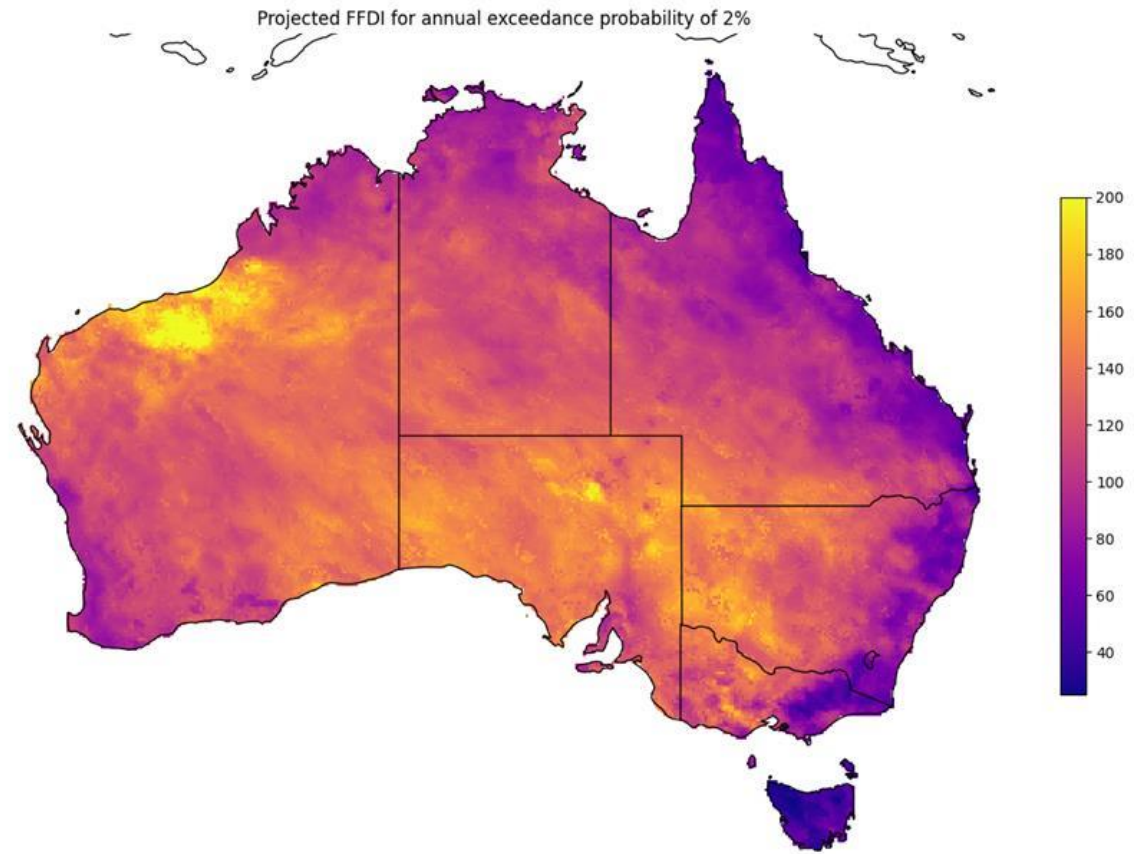
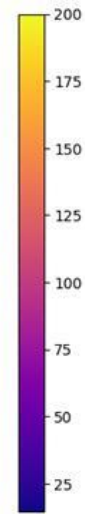
Forest Fire Danger Index - FFDI (2% AEP Current Climate)



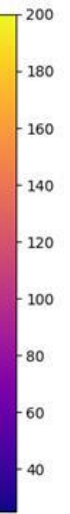
Forest Fire Danger Index – FFDI (2% AEP) with climate



Baseline 2% AEP



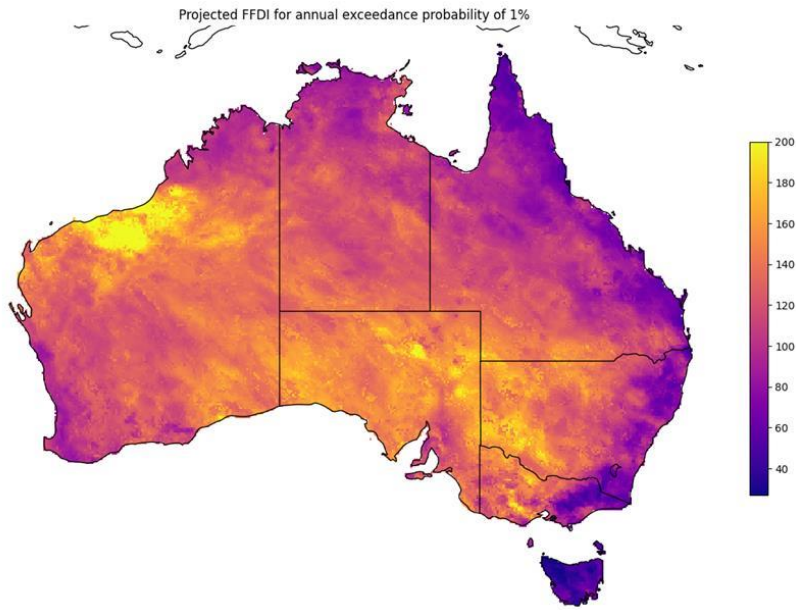
2090 Climate adjusted 2% AEP



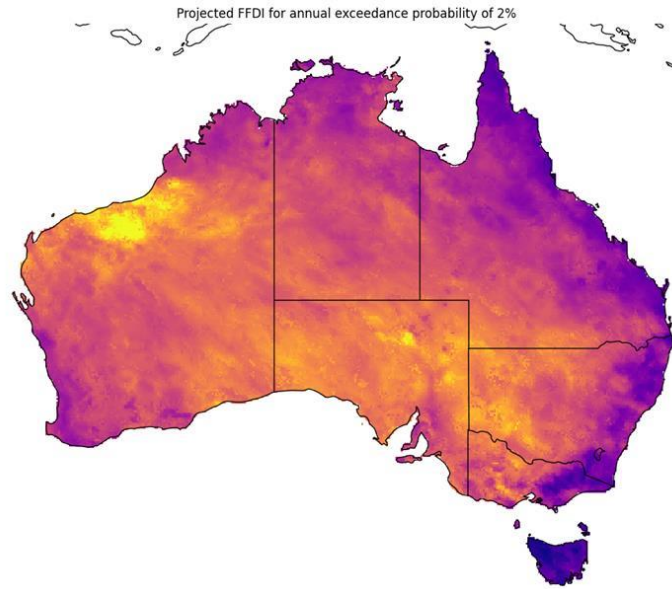
Fire Weather Potential – FFDI at different exceedance levels for 2090 Climate

From hourly BARRA R2 (15km) & CMIP 6

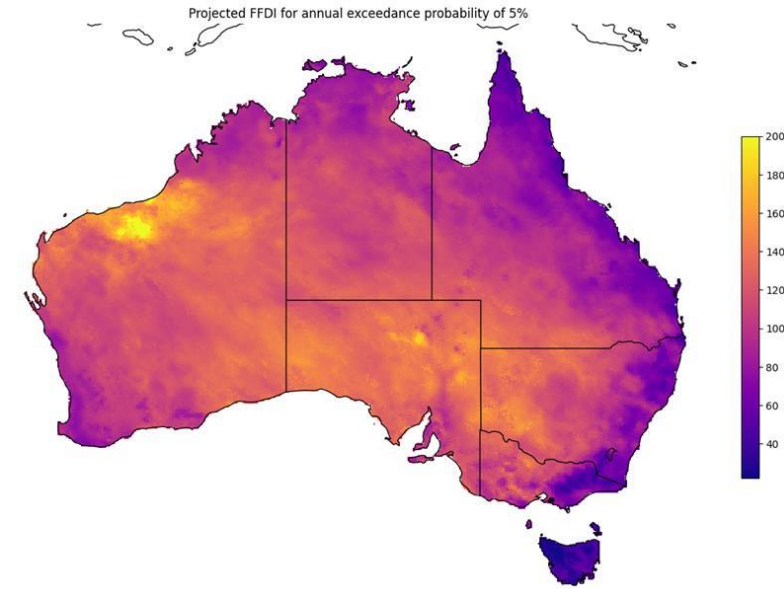
**1%
AEP**



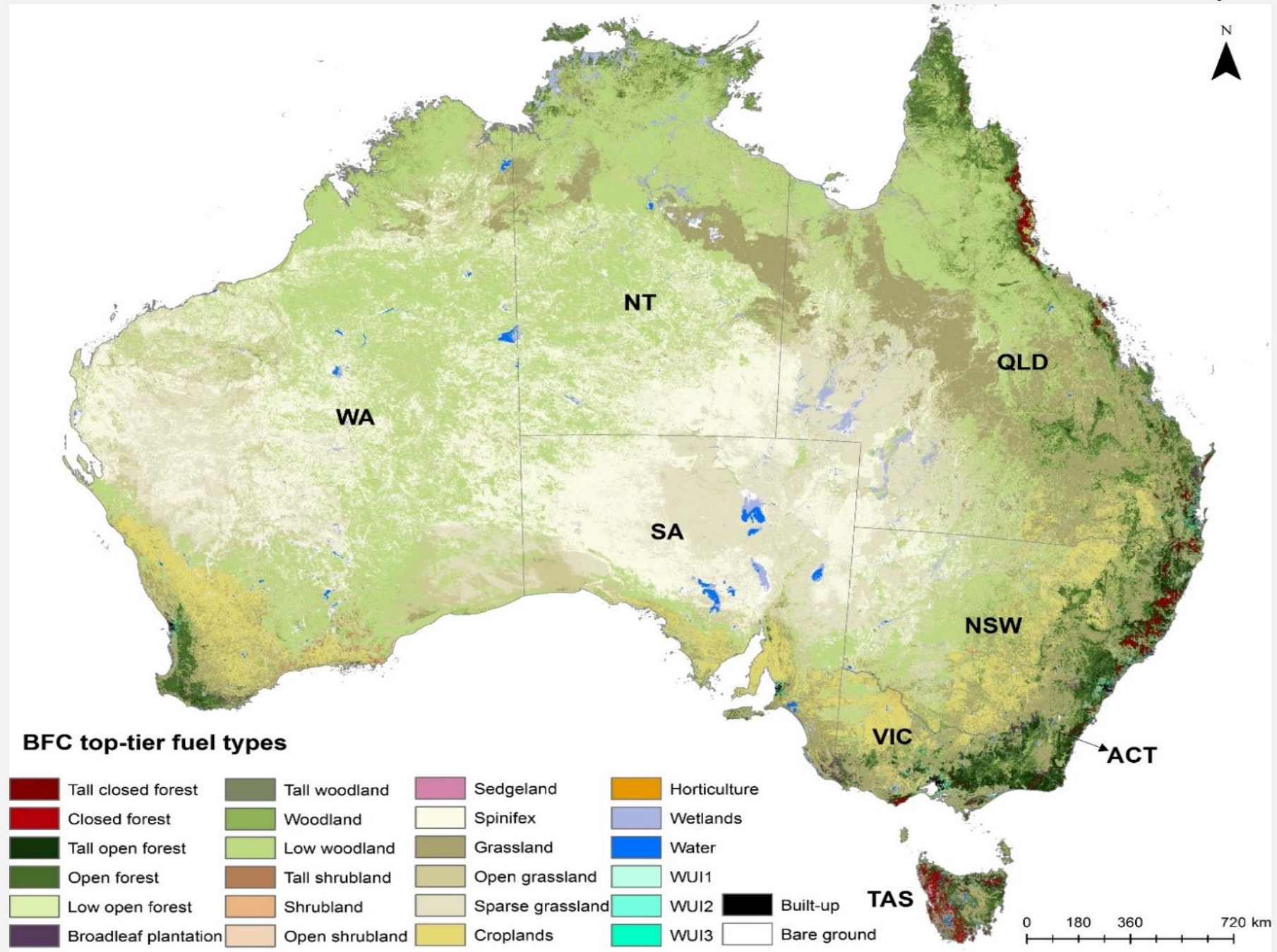
**2%
AEP**



**5%
AEP**



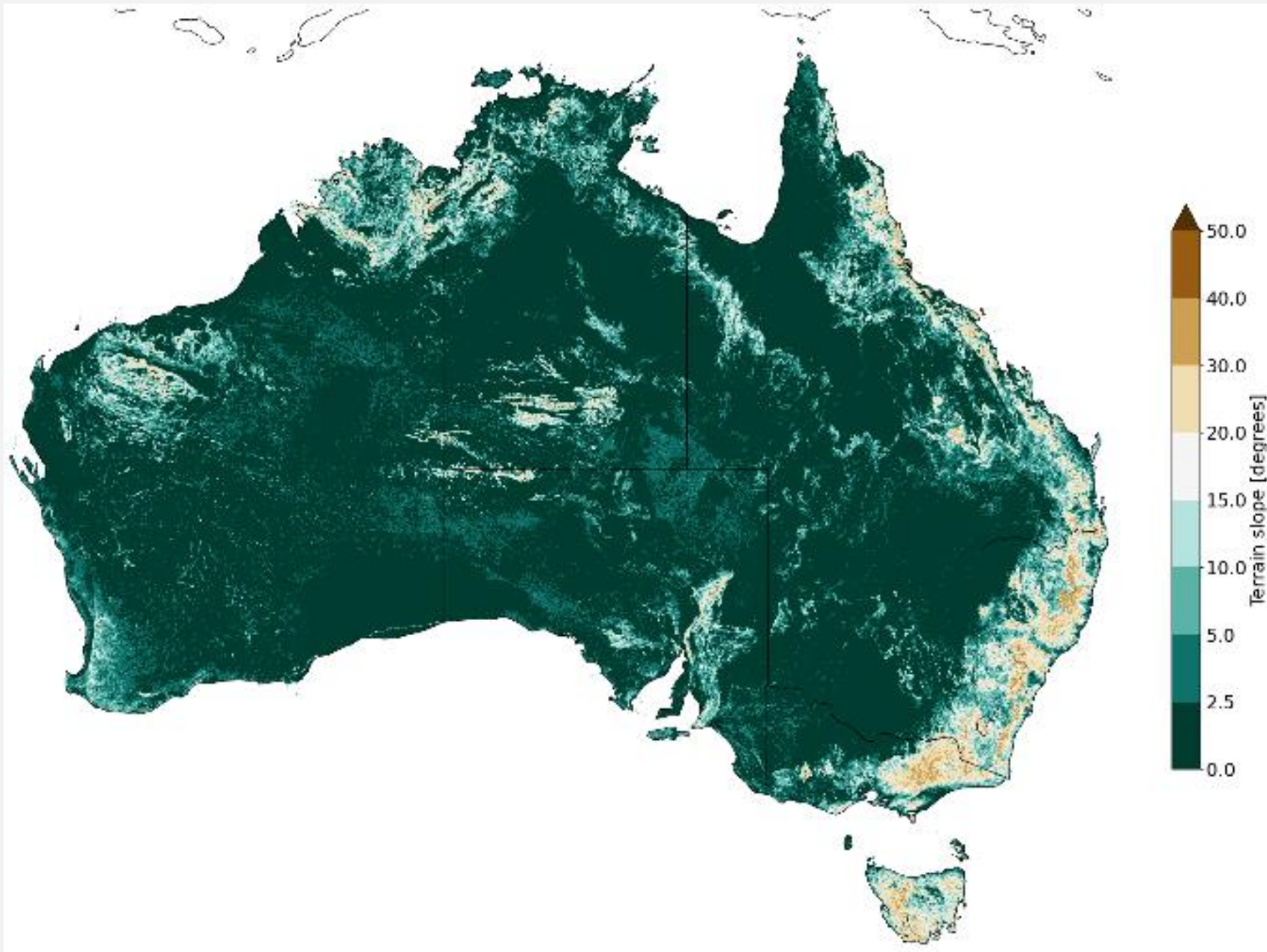
Bushfire Fuel Classification, fuel loads and other attributes (90m)



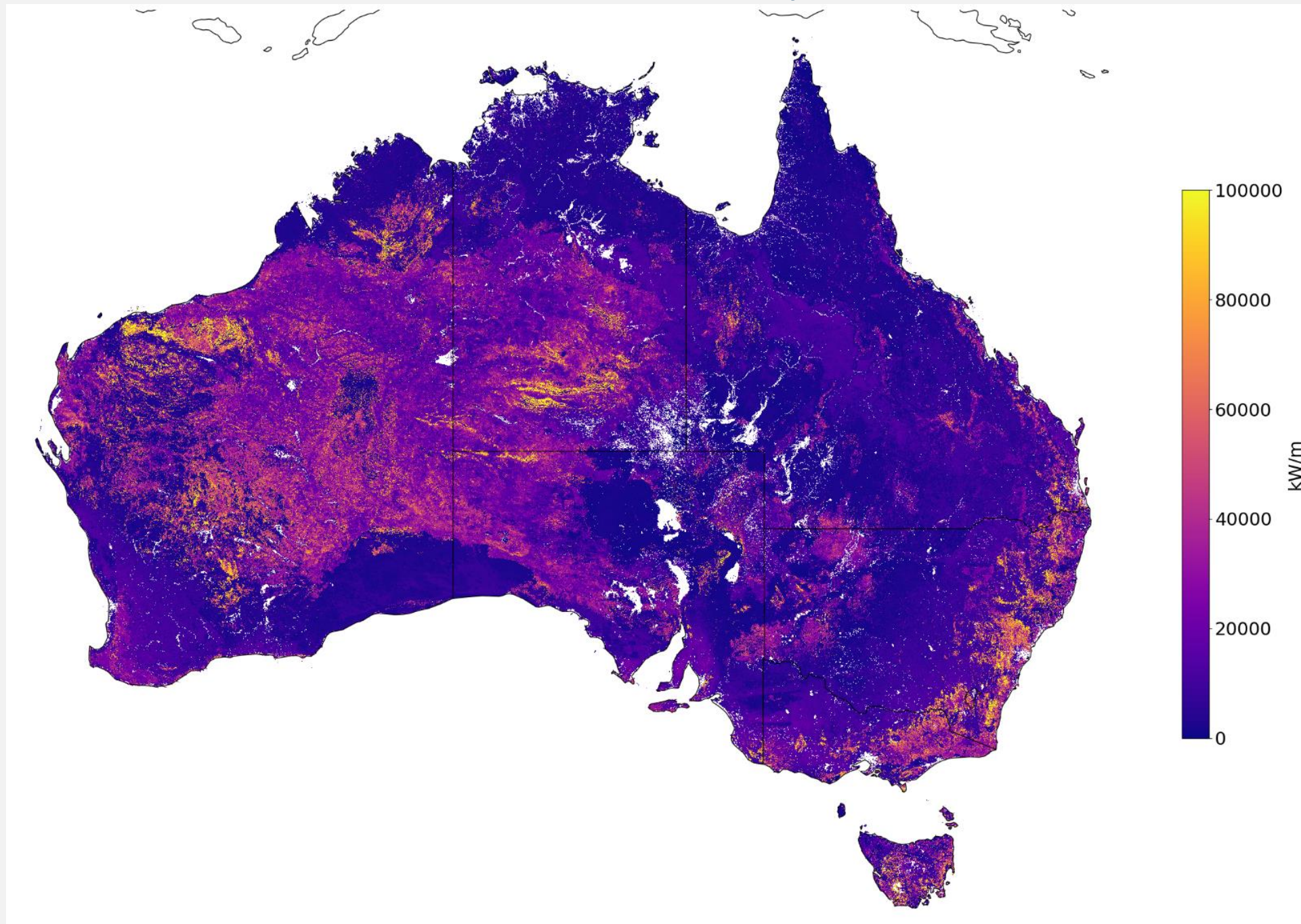
Why does BFC and fuel parameters matter?

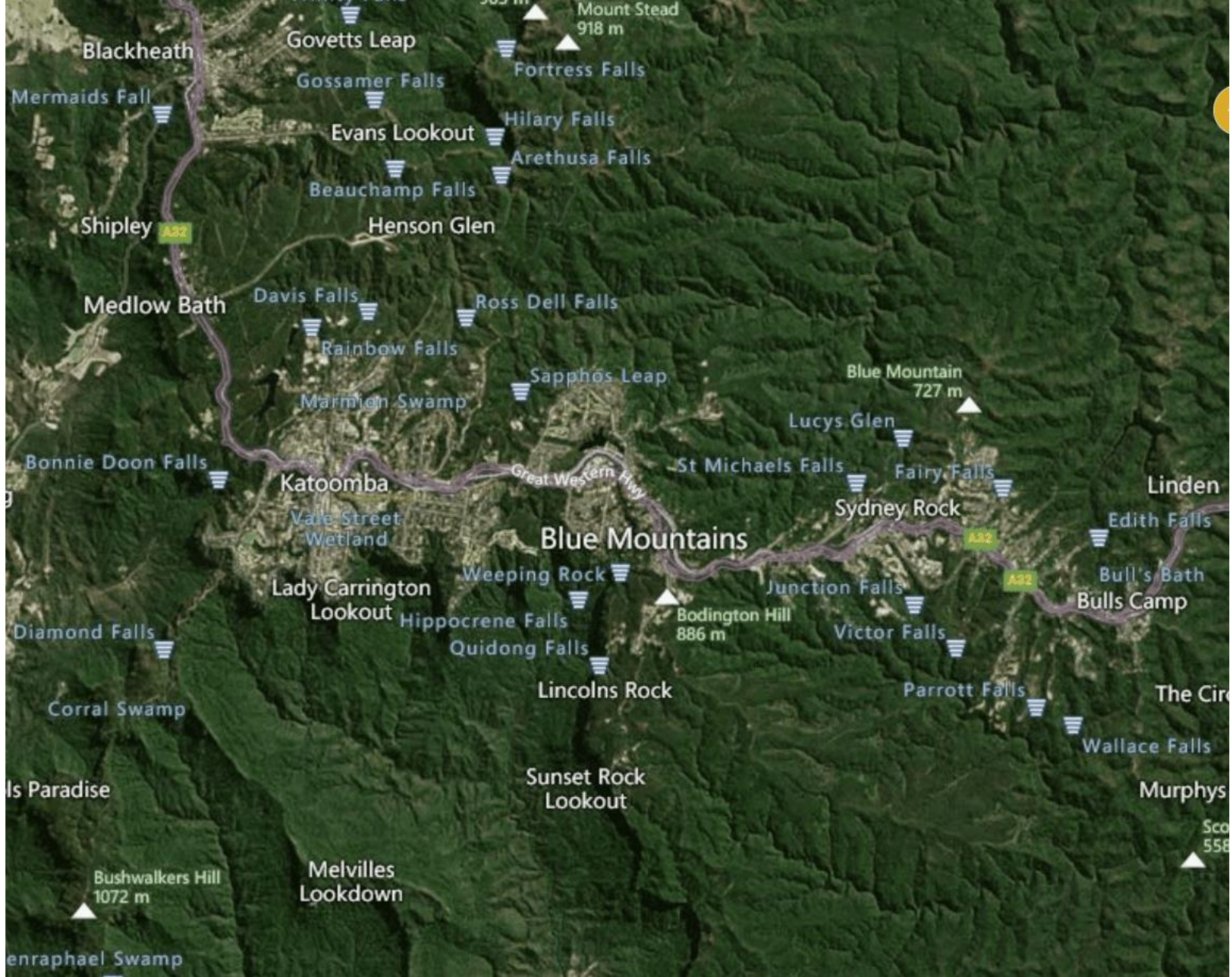
- **Updatable:**
 - We can capture the latest modification to our environment
 - We can quantify the impact of risk reduction measures and unplanned fire events
 - Can be combined with State Layers and local intel as needed.
- **Consistent:**
 - Provides a common base for everyone to collaborate and augment
 - Minimal dependence from other data products
- **Unencumbered:**
 - Everyone can potentially benefit from it
 - Researchers and agencies can better collaborate, augment and improve their data and hazard quantification approaches.

Terrain (30m)



Fireline intensity 90m





Blackheath

Govetts Leap

Mount Stead
918 m

Mermaids Fall

Gossamer Falls

Fortress Falls

Evans Lookout

Hilary Falls

Arethusa Falls

Beauchamp Falls

Henson Glen

Shipley

Medlow Bath

Davis Falls

Ross Dell Falls

Rainbow Falls

Sappho's Leap

Murrumbidgee Swamp

Blue Mountain
727 m

Bonnie Doon Falls

Katoomba

Vale Street
Wetland

Great Western Hwy

St Michaels Falls

Fairy Falls

Linden

Lady Carrington
Lookout

Weeping Rock

Sydney Rock

Edith Falls

Blue Mountains

Diamond Falls

Hippocrene Falls

Bodington Hill
886 m

Junction Falls

Victor Falls

Bull's Bath
Bulls Camp

Corral Swamp

Lincolns Rock

Parrott Falls

The Circle

Is Paradise

Sunset Rock
Lookout

Wallace Falls

Murphys

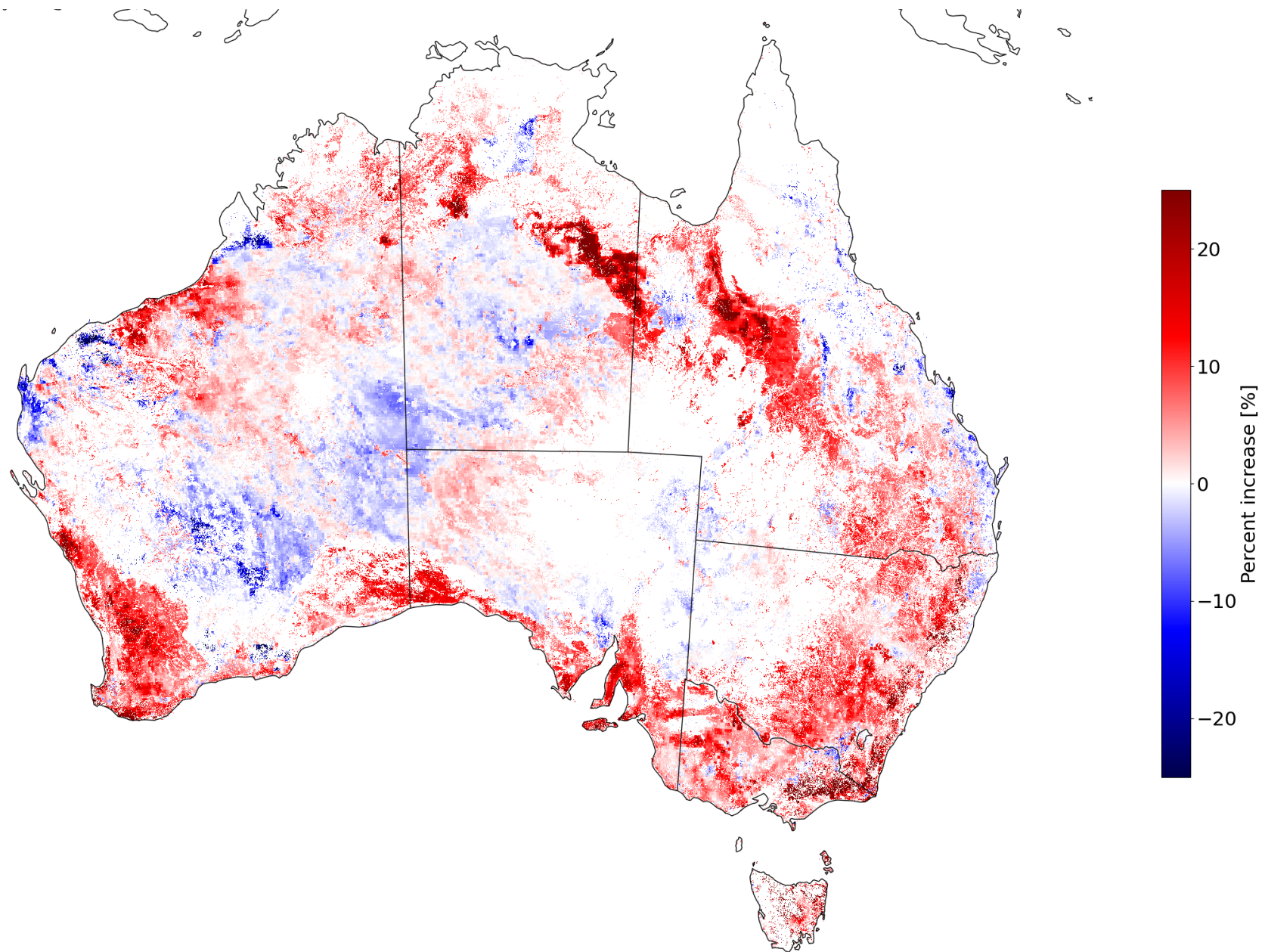
Bushwalkers Hill
1072 m

Melvilles
Lookdown

Scotts Hill
558 m

enraphael Swamp

Fireline Intensity with a changing Climate (expected difference between now and 2090)



Use cases





NBIC Mapping product

Fireline intensity (FLI) to inform planning and zoning decisions

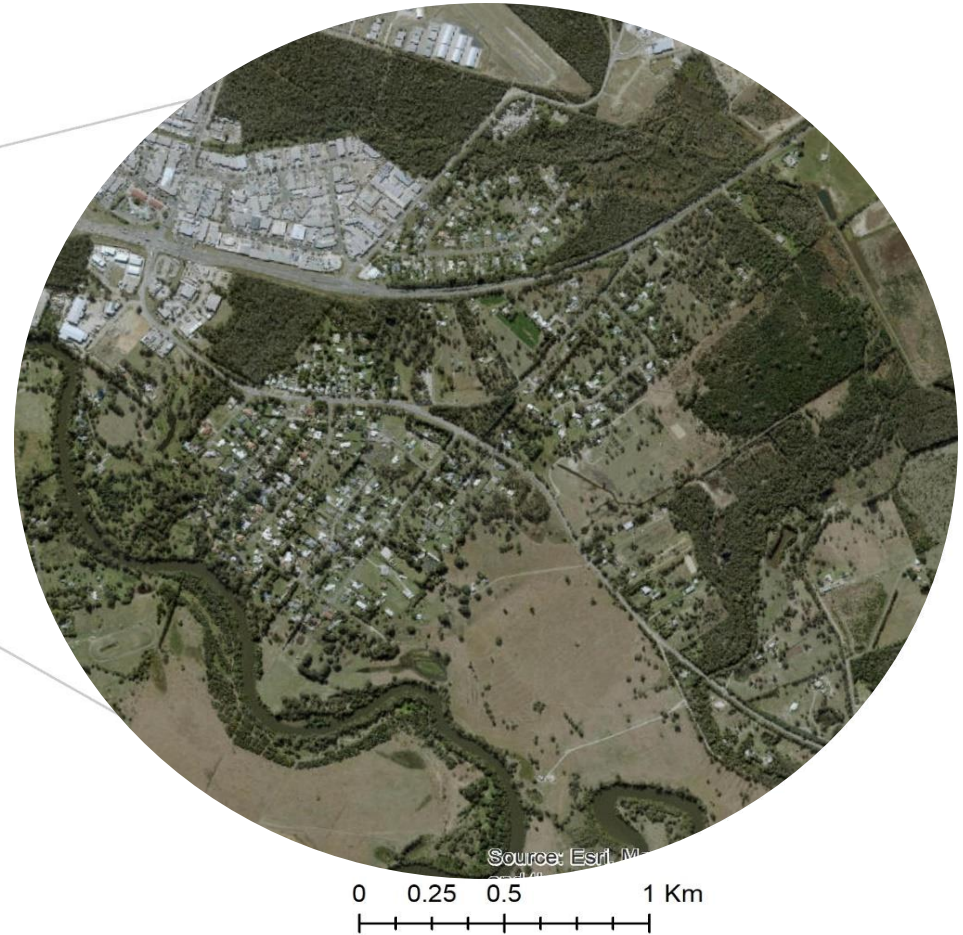
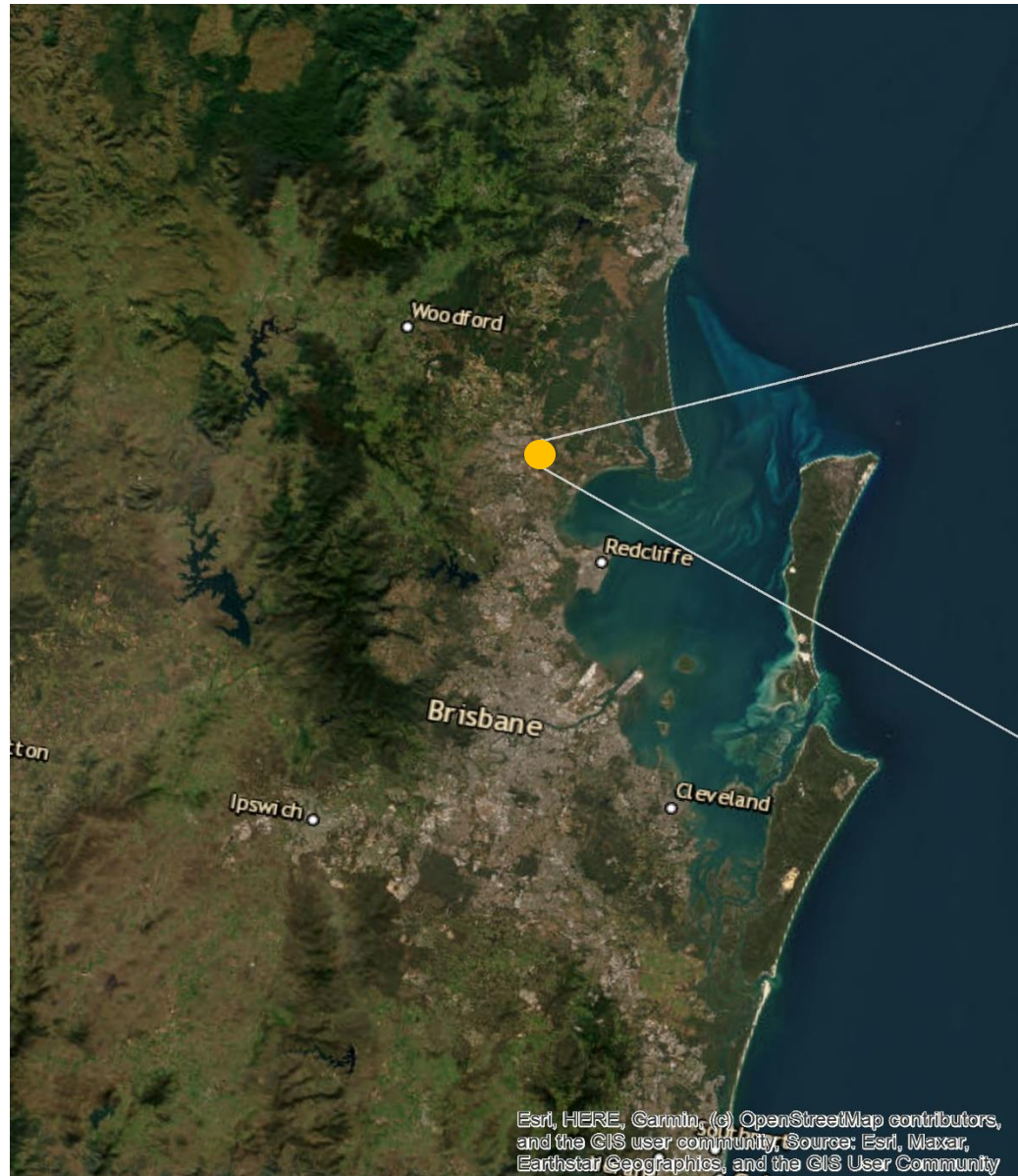
Impact

Best available data for land use planners to work with both land managers and emergency managers

Use case

Translating Queensland vegetation classes to AFDRS classes and incorporating this into QLD's next generation of Land Use Planning Maps.

Location in South East Queensland

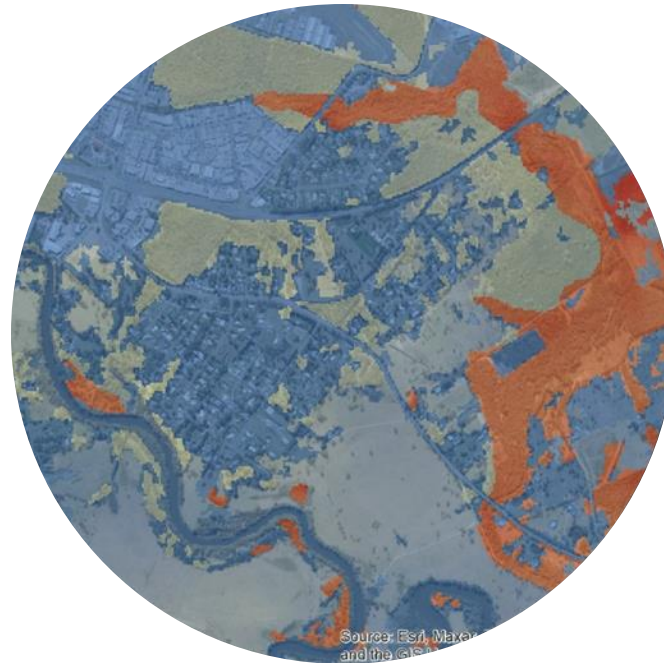


Qld Pilot project: Hazard mapping 2023

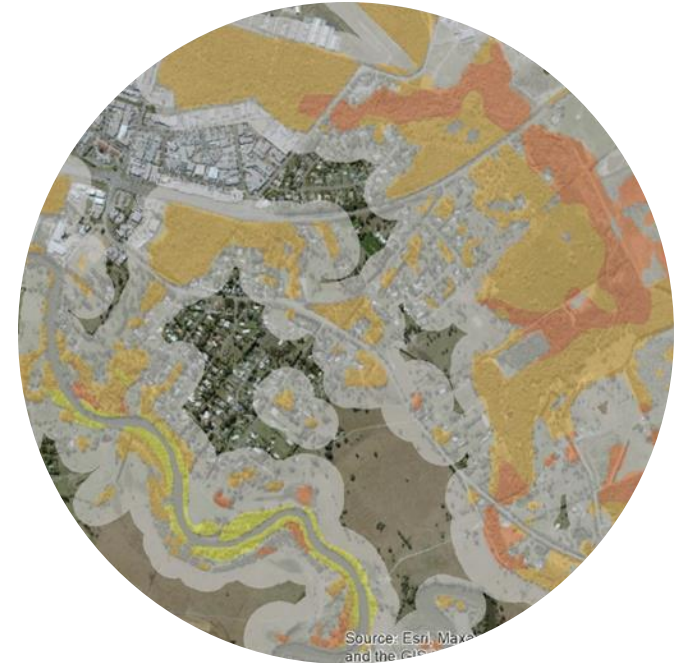
Vegetation map 2022



Fireline intensity 2022



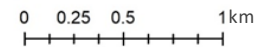
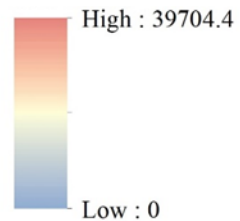
Hazard classes 2022



South East Queensland vegetation classes converted to Australian Fire Danger Rating System fuel classes

- | | |
|-------------------|-------------------|
| ■ Acacia woodland | ■ Non combustible |
| ■ Built up | ■ Pine |
| ■ Crop | ■ Wet forest |
| ■ Forest | ■ Woodland |
| ■ Heath | |

Fireline intensity (FLI)



Hazard classes

- | |
|----------------------------|
| ■ Potential Impact Buffer |
| ■ Very low [0-4,000] |
| ■ Low [4,000 - 10,000] |
| ■ Medium [10,000 - 30,000] |
| ■ High [30,000 - 50,000] |
| ■ Very high [50,000+] |



CRITICAL INFRASTRUCTURE MANAGEMENT

NBIC Mapping product

Fireline intensity to inform infrastructure management

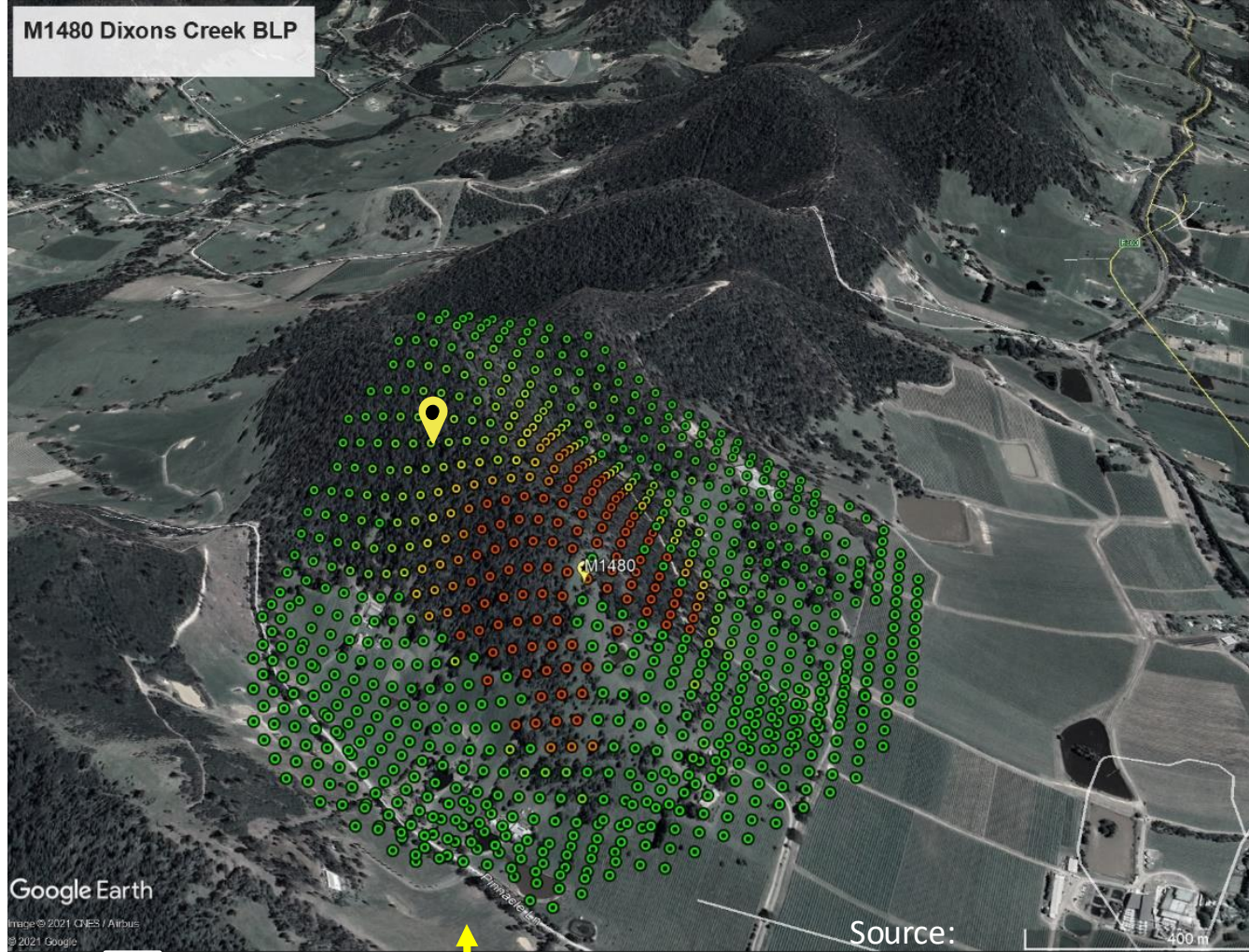
Impact

Access to reasonable worst-case Fireline intensity potential that is adjusted for climate change allowing short- and long-term upgrade planning to achieve resilient infrastructure assets.

Use case

Allocate resources for upgrades across exposed infrastructure in the most effective way.

- High threat to asset due to vegetation burn severity potential and proximity
- Medium threat to asset due to vegetation burn severity potential and proximity
- Lower threat to asset due to vegetation burn severity potential and proximity



An aerial photograph of a residential neighborhood. The left side of the image shows a dense forest of trees with brown and orange autumn foliage. The right side shows several houses with white roofs and green lawns. A road with a red curb runs through the center. A semi-transparent white rounded rectangle is overlaid on the center of the image, containing text.

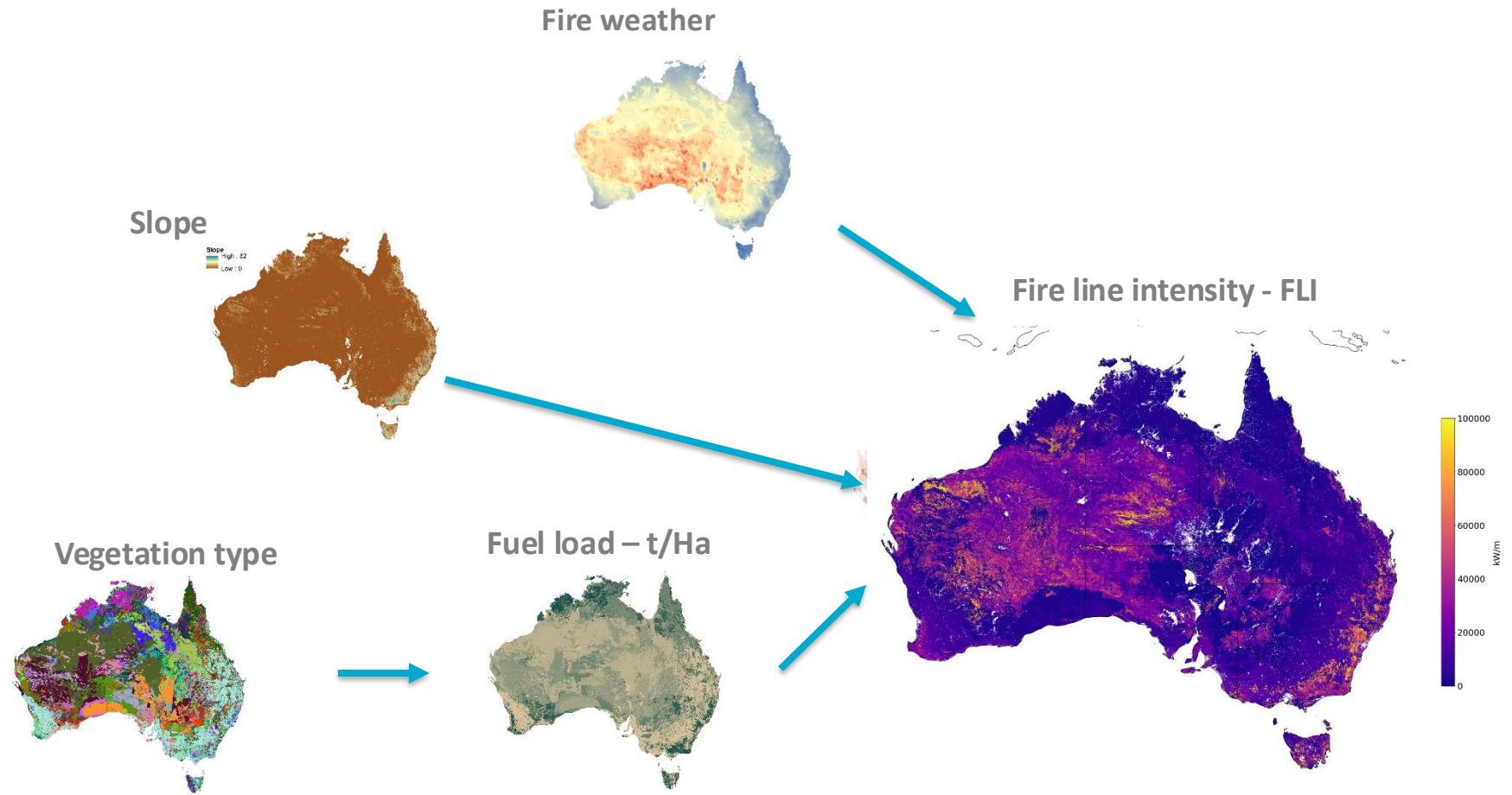
INVESTMENT IN PREPAREDNESS

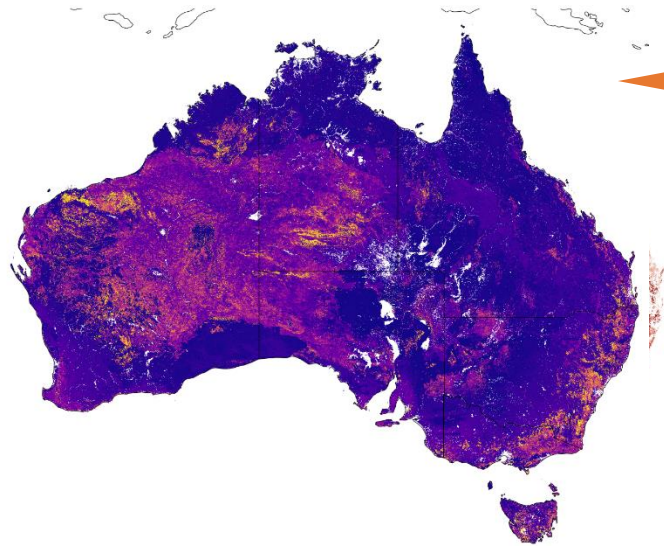
Use case

Identifying loss potential within Local Government Areas

Impact

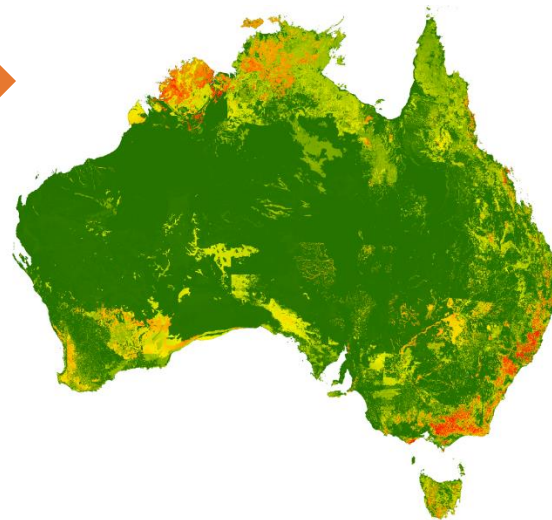
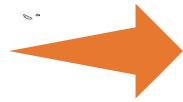
Effective ranking and prioritisation of Local Government Areas for allocation of funding and risk treatments





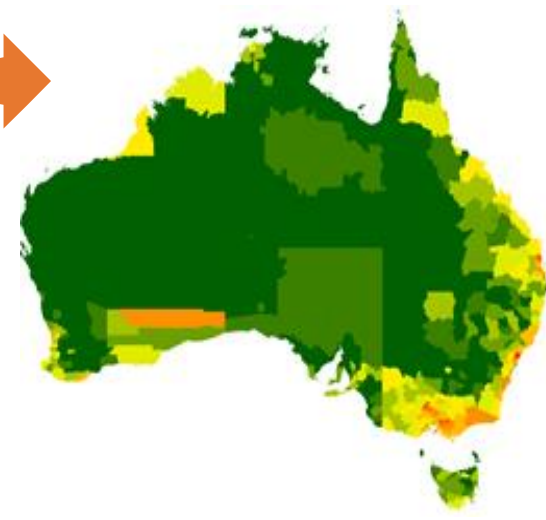
Fireline intensity potential

(Reasonable worst case –
Fireline intensity using nationally
consistent vegetation and fuel
parameters)



Hazard level for houses

(Building Loss Potential (BLP) if a house
existed at any given location, calculated
using nationally consistent datasets and
methods)



Ranked Local Government Areas

(Categorised by their aggregated residential
bushfire building loss potential for a worst-
case bushfire at that location)

Our capability - people

Climate and data science

- **Alessio Arena**, Nathan Drayson, David Robertson, Chandrama Sarker, Durga Shrestha, Yong Song

Fuels modelling, remote sensing and bushfire behaviour

- Miguel Gomes Da Cruz, **Randall Donohue**, Rakesh Joshi, Glenn Newnham, Andrew Prata, Chandrama Sarker, Catherine Ticehurst including collaboration with Geoscience Australia and the Emergency Management Spatial Information Network Australia: Kane Orr and team

Topography, workflow, spatial analyses

- **Kimberley Opie**, Chandrama Sarker, Nathan Drayson,

Risk reduction

- **Raphaëlle Blanchi**, Ranisa Gupta, Garth Warren, Elana Berton

Technical architecture, data engineering and cloud development

- Peter Baker, Ranisa Gupta, Ben Leighton, Hao Tang, **Jonathan Yu**

User centred design, knowledge translation, stakeholder engagement, social architecture and communication

- Neil Cooper, Elana Berton, Tamsin Wagner, Clare Brandon, Paul Box



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<https://research.csiro.au/nbic/>



NBIC: Preparing Australia for a changing climate by connecting local, state and national understandings of bushfire risk

The [National Bushfire Intelligence Capability](#) is funded by the [Australian Climate Service](#), led by [CSIRO](#) and supported by the [National Emergency Management Agency](#). We take a collaborative approach to work with national, state and territory agencies. © CSIRO 2023

