Evidence-based Fire Management – not just politics and spin !

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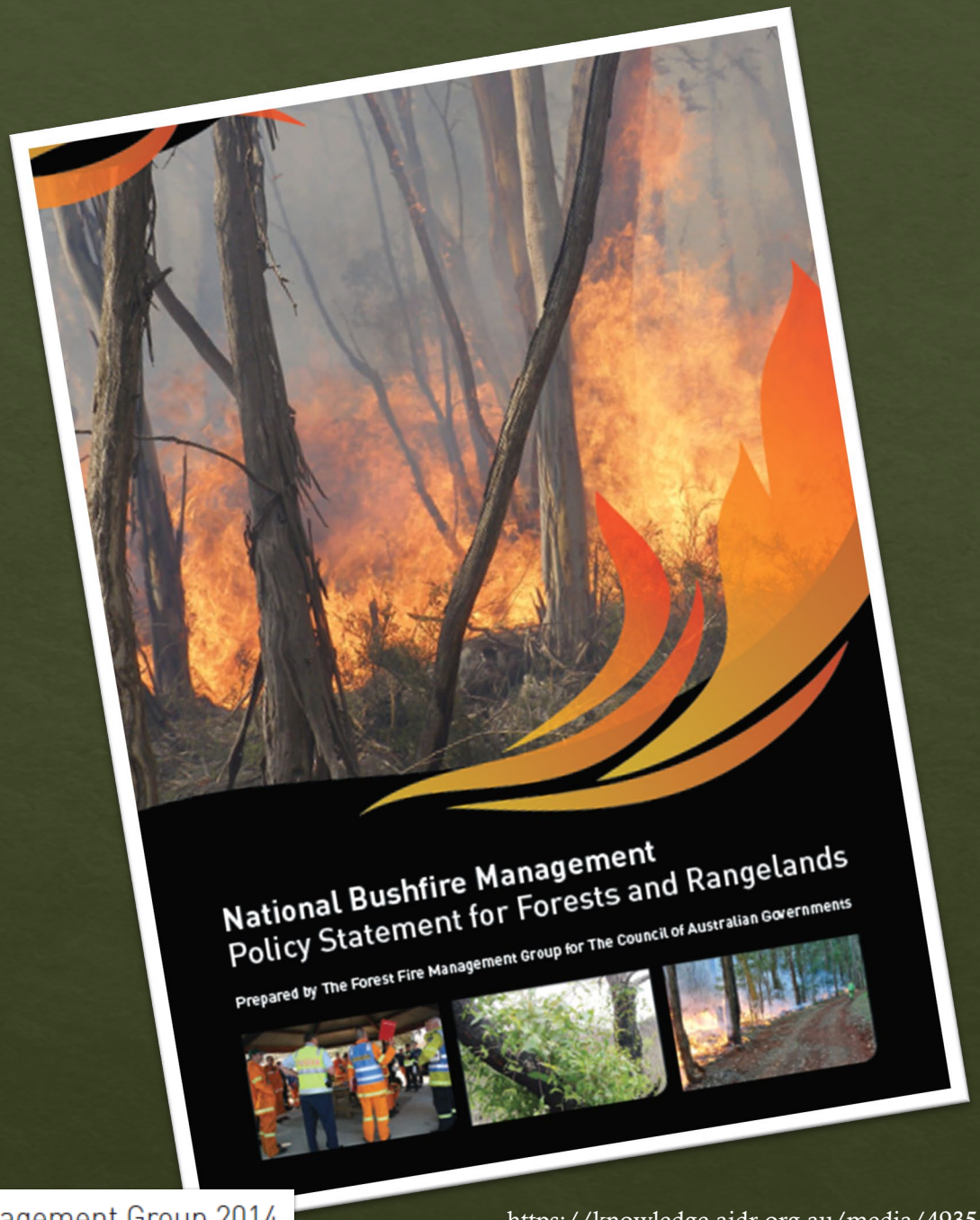
Forestry Australia 2022 Symposium

Forestry Australia - Symposium
20-22 October 2022, Albury NSW

THE UNIVERSITY OF MELBOURNE

"Living In Harmony With Fire"
Tolhurst Bushfire Services



A Statement of:

- Vision
- Principles
- 4 Strategic Objectives
- 14 National Goals

for Bushfire Management, nationally

by the Council of Australian Governments (COAG) 2014

- Comprehensive
- Nationally Applicable

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https://knowledge.aidr.org.au/media/4935/nationalbushfiremanagementpolicy_2014.pdf

Fire Management – alternate paths

Political

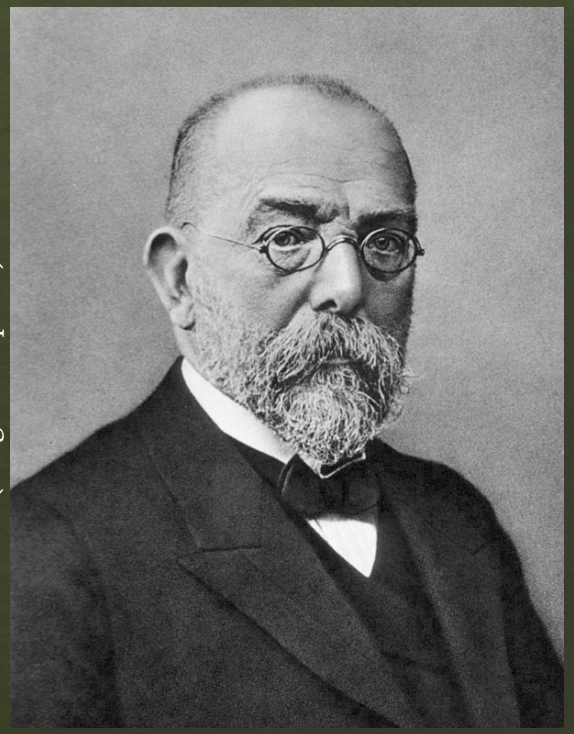
Perception / Beliefs / Opinion
Popularity
Social License

Science

Evidence-based
Known Assumptions
Debate / Discussion
Repeatable
Objective-driven

Inquiries / Royal Commissions / Reviews / Media

Fire Management – alternate paths



(image: Wikipedia)

Koch's postulate

Proof of cause and effect

(not just data and conjecture !)

Science

Evidence-based
Known Assumptions
Repeatable
Objective-driven

Political

Perception / Beliefs
Popularity
Social License

Hypothesis formation
Research Questions
Experimentation
Analysis
Conclusions / Theories
Theory testing
Adaptive Management

Why the need for science-based management?

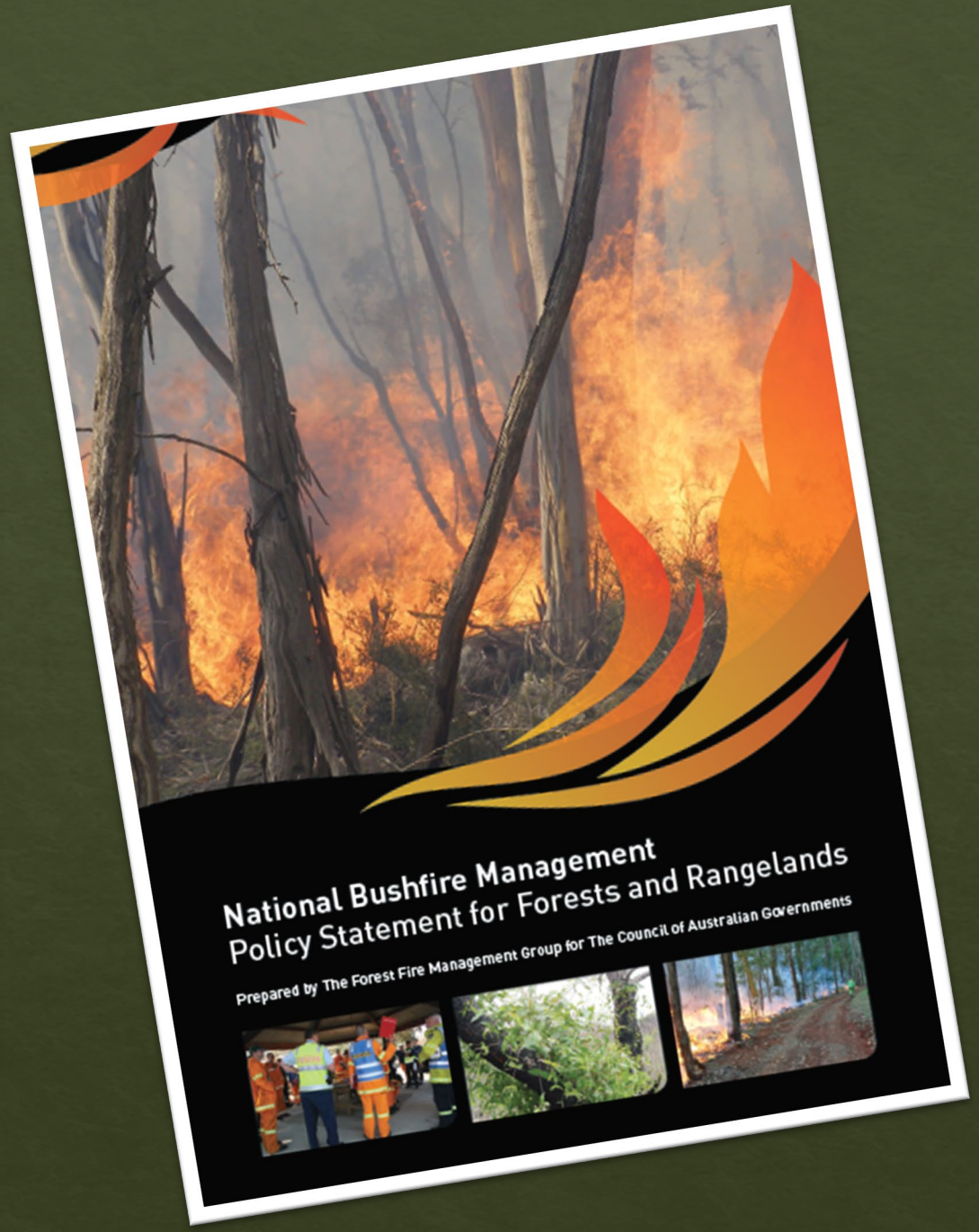
- Change perceptions (public and scientists)
- Basis for engagement, common understanding, collective efforts
- Social license
- Garner support for appropriate resources / management structures
- Increase skills, knowledge, successful outcomes

- Alternative:
  - Media-based “angle / bias” (24hr – week cycle)
  - Political popularity (1-4 yr cycle)
  - *(Fire cycle 10-150 yrs)*
  - *(Ecosystem cycle 10-500 yrs)*

Vision

The vision inspiring this policy is that:

> *Fire regimes are effectively managed to maintain and enhance the protection of human life and property, and the health, biodiversity, tourism, recreation and production benefits derived from Australia's forests and rangelands.*



National Goals

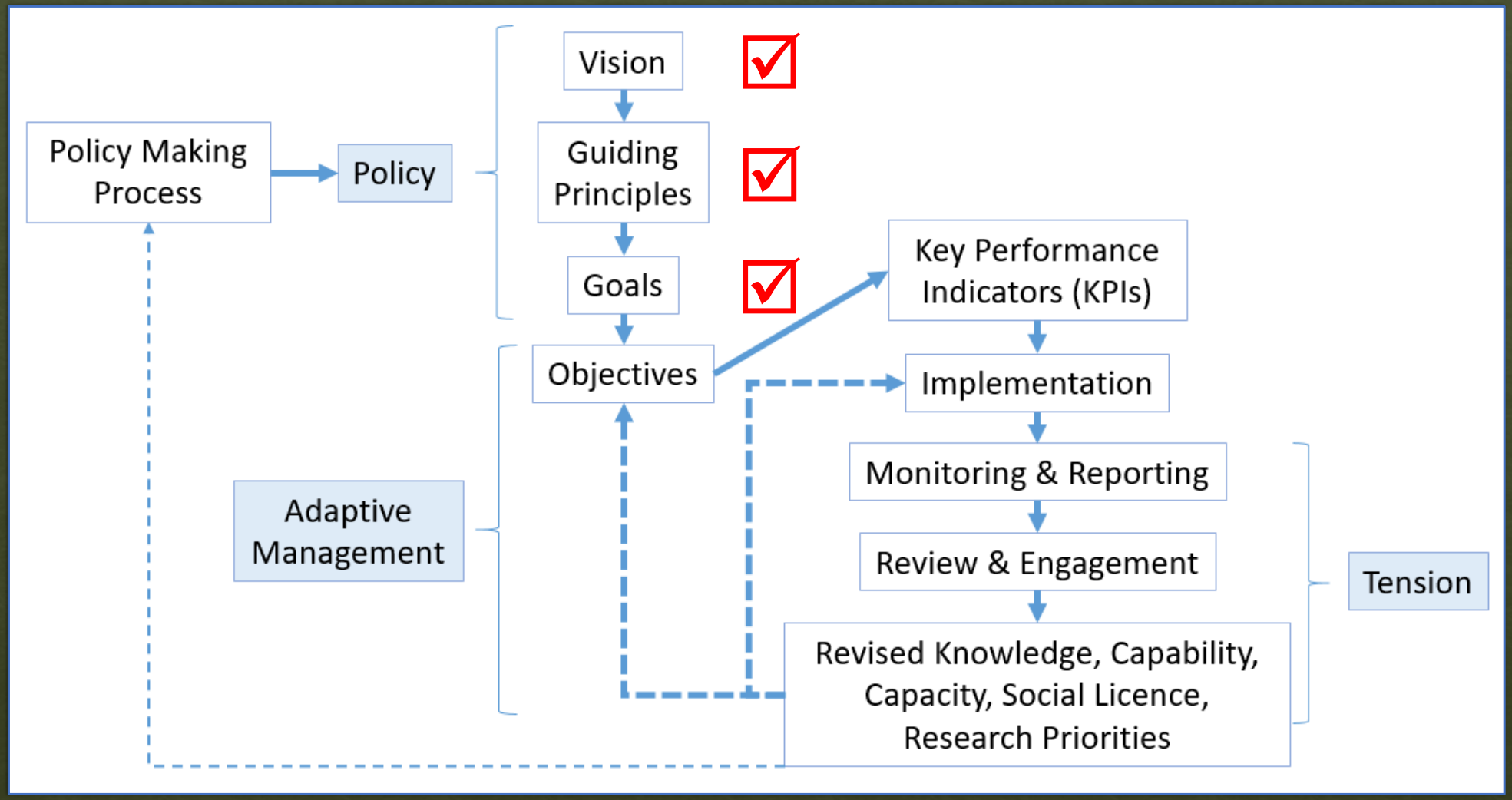
The governments agree that to achieve their vision for better managing fire in the Australian landscape, fourteen national goals should be pursued. Each of these goals is described below and broad strategies for progressing these goals are introduced.

14 National Goals

4 Strategic Objectives [Themes]:

1. Effectively Managing the Land with Fire
2. Involved and Capable Communities
3. Strong Land, Fire and Emergency Partnerships and Capability
4. Actively and Adaptively Managing Risk

Policy Implementation Process



"Adaptive Management": the systematic process of increasing the likelihood of achieving the desired outcomes

"Tension": the residual difference between the outcomes actually being achieved and those desired

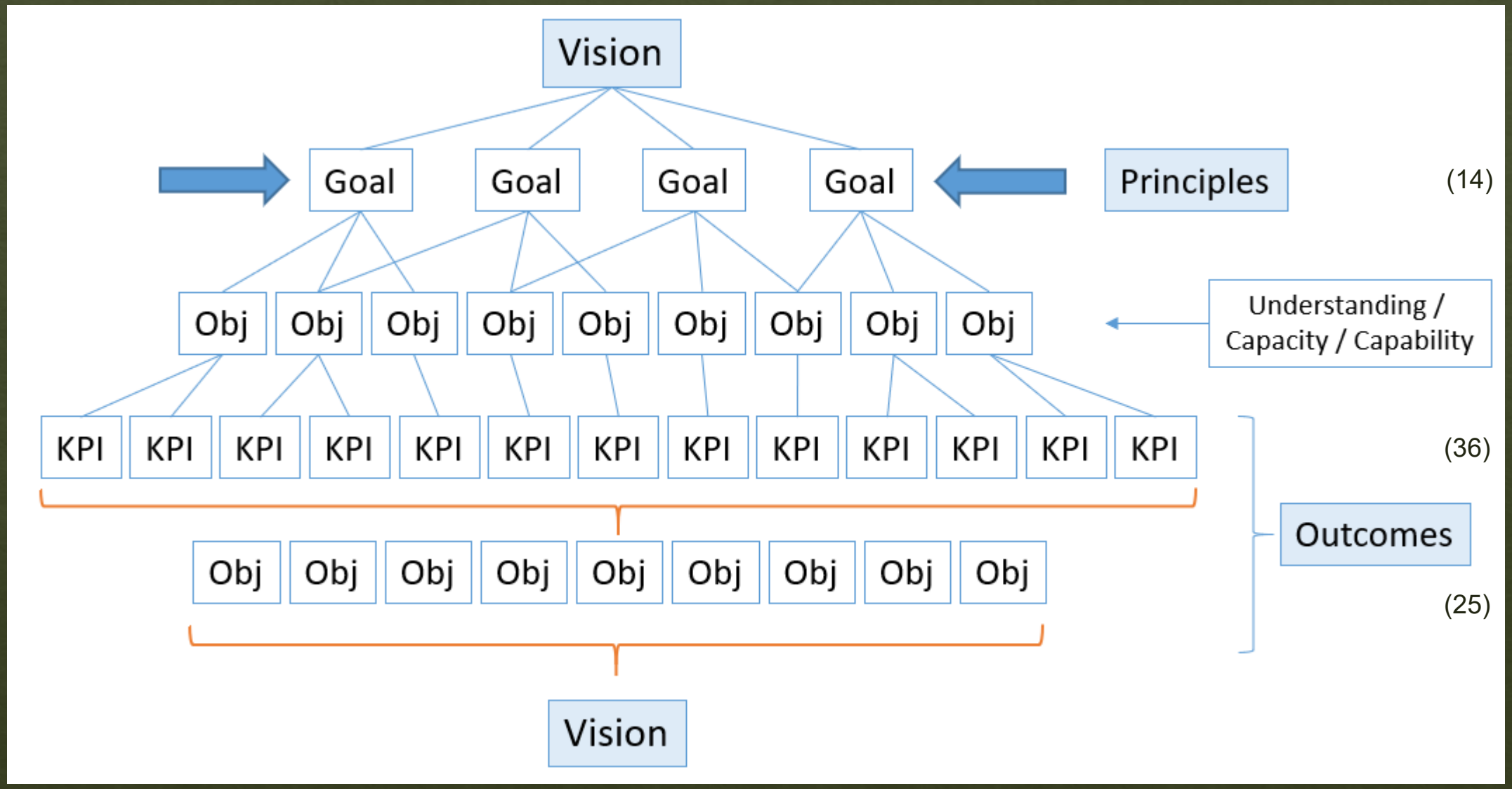
Policy Implementation Structure

20+ yrs

10-20 yrs

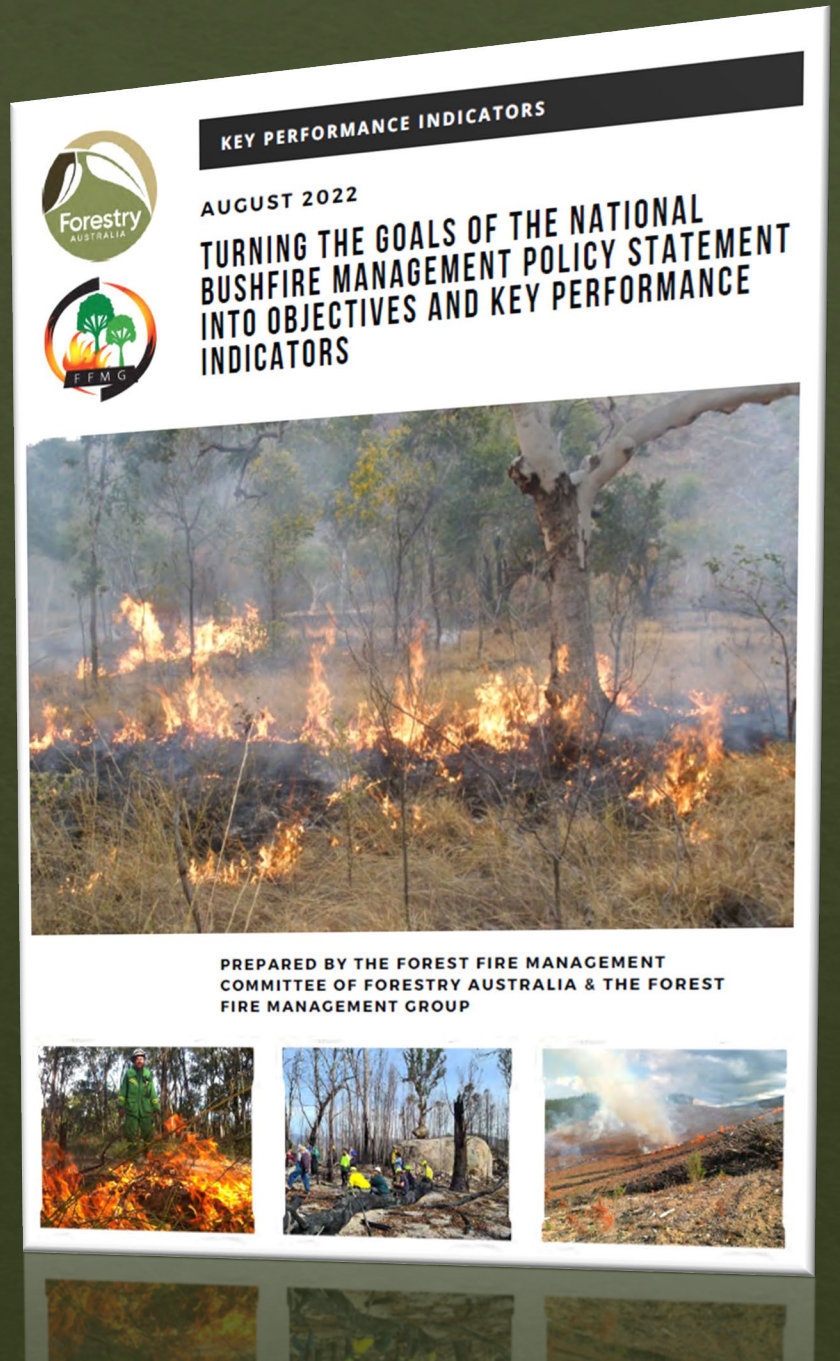
1-5 yrs

1 year

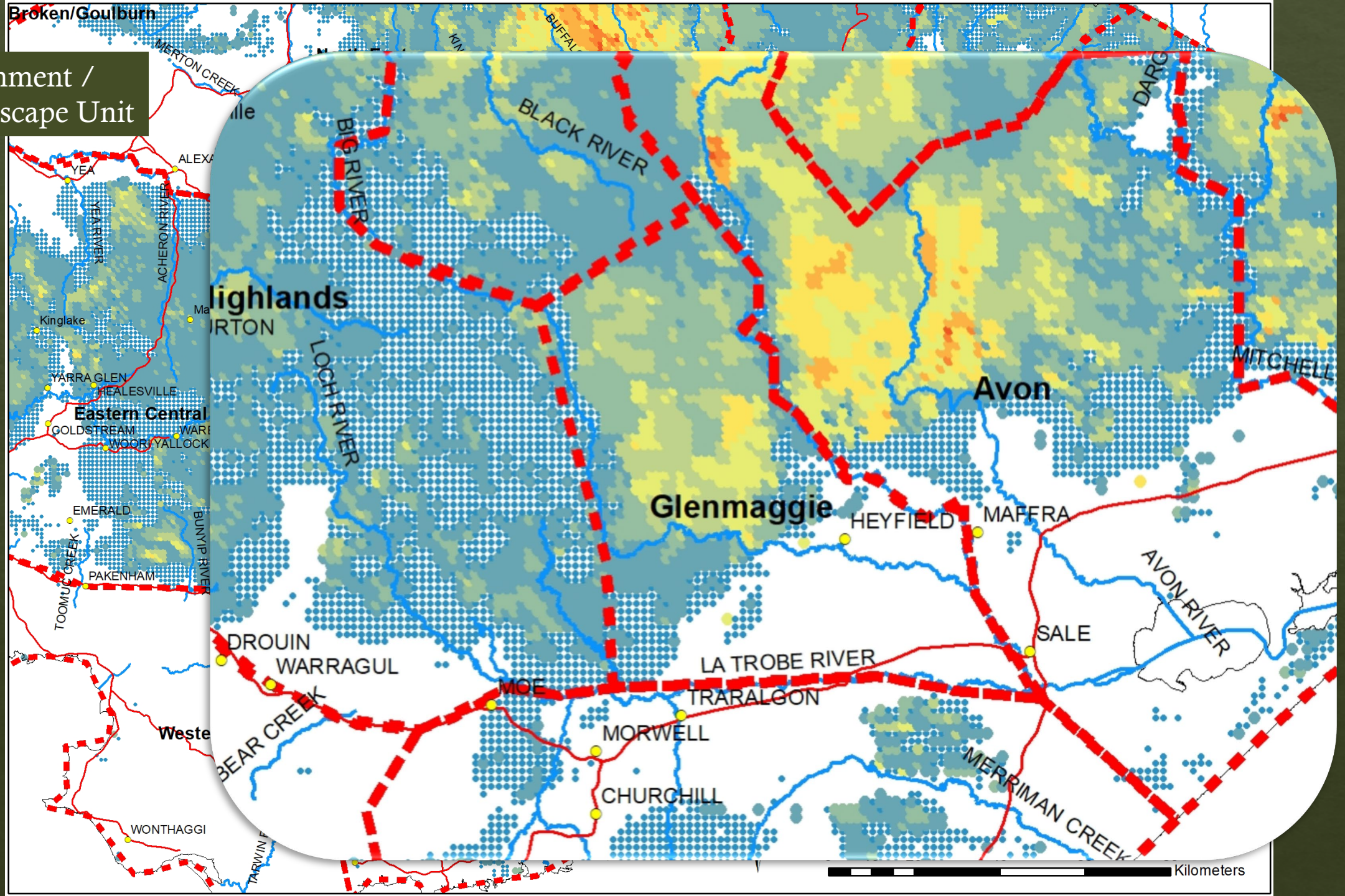


Next Steps

- Formulate specific objectives
- Derive KPIs from objectives
- Capture Science
- Fire Catchment (Fire Landscape Units)
  - Natural units for planning, management, reporting
- Adaptive Management
  - Continual improvement
  - Continual learning (experience & research)



Fire Catchment / Fire Landscape Unit



a) Reduce wildfire severity and extent

This objective theme can be divided into the following SMART objectives:

A.a.1 - Objective: To limit the extent of any one wildfire in a forested fire catchment to less than 30% of its area through the combined use of planned burning and wildfire suppression.

A.a.2 - Objective: To limit the cumulative extent of areas burnt, at an intensity sufficient to cause full crown scorch or crown fire, to less than 50% of a forested fire catchment over a complete fire cycle. (A fire cycle being the period of time taken to burn a cumulative area equivalent to the total area of the catchment.) (FFMG 2014, p.12)

A.a.3 - Objective: To maintain sufficient fire, both planned and unplanned, in a forested fire catchment to achieve a sustainable fire cycle.

- **A.a.** KPI: Outcome: Percentage of forested fire catchments where the area burnt by a wildfire in a single season exceeds 30% of each catchment area.

- **A.a.** KPI: Outcome: Cumulative proportion of forested fire catchment burnt by crown fire or full canopy scorch fire within the period of a fire cycle.

- **A.a.** KPI: Outcome: Current effective fire cycle compared with the sustainable fire cycle based on the range of ecological processes in the forested fire catchment.

A.a.1 - Objective: To limit the extent of any one wildfire in a forested fire catchment to less than 30% of its area through the combined use of planned burning and wildfire suppression.[1]

- *A.a.* KPI: Outcome: Percentage of a forested fire catchment burnt by a single wildfire never exceeds 30% of the catchment area.

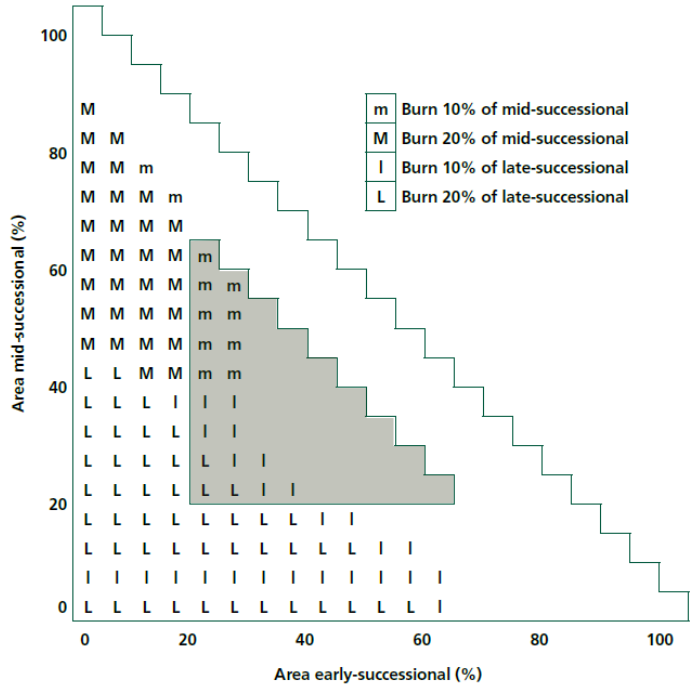


Fig. 5. The optimal fire management policy for the Foothills Forest of the Otways, assuming the distribution of unplanned fires given in Fig. 4, and with the aim of achieving at least 20% of the landscape in early-, mid- and late-successional stages, which are defined as <10, 10–25, >25 years since the last fires. The triangular area in the middle defines the desired distribution of age classes. The management time horizon was assumed to be 50 years.

b) Reduce impact of fire on human life and property, social and commercial values, and critical infrastructure

This objective theme can be divided into the following SMART objectives:

A.b.1 - Objective: To keep bushfire fatalities to below 1:10,000 people in areas directly affected by fire smoke, heat and embers through public warnings, public education, hazard reduction, evacuation and community response.

A.b.2 - Objective: To keep bushfire house loss to below 10:1000 houses when the AFDR <Extreme, and 100:1000 houses when AFDR >Extreme, in areas affected by fire heat and embers through building design, land-use planning, hazard reduction and fire suppression.

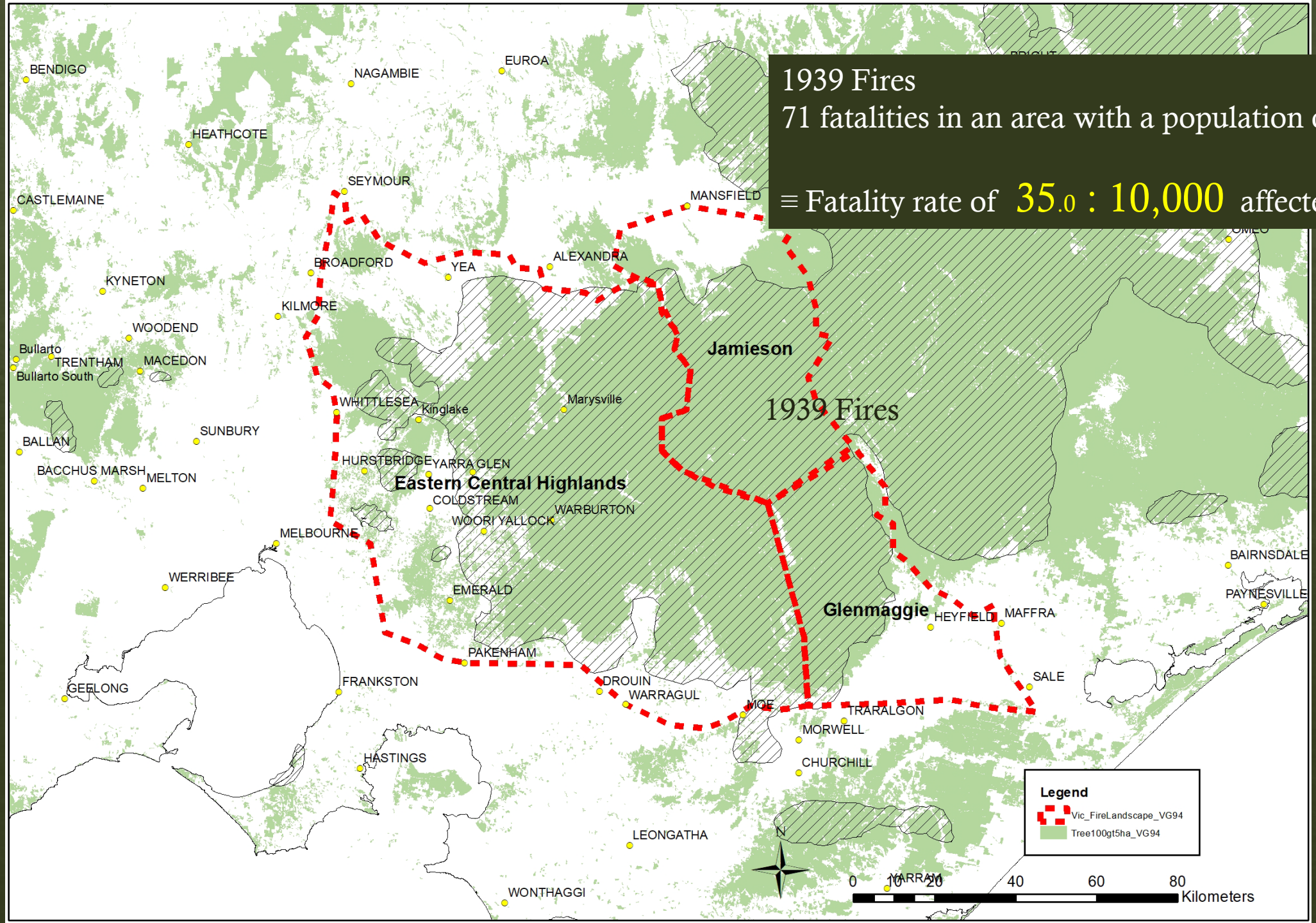
- **A.b.** KPI: Outcome: Bushfire fatality rate is less than 1 in 10,000 people in fire-affected areas.

- **A.b.** KPI: Outcome: Bushfire house loss is less than 10 in 1,000 houses in fire-affected areas.

A.b.1 - Objective: To keep bushfire fatalities to below 1:10,000 people in areas directly affected by fire smoke, heat and embers through public warnings, public education, hazard reduction, evacuation and community response.

1939 Black Friday fires --> 71 fatalities

2009 Black Saturday fires --> 173 fatalities


1939 Fires
71 fatalities in an area with a population of 20,100
≡ Fatality rate of 35.0 : 10,000 affected
BENDIGO
NAGAMBIE
EUROA
HEATHCOTE
SEYMOUR
CASTLEMAINE
MANSFIELD
BROADFORD
YEA
ALEXANDRA
KYNETON
KILMORE
WOODEND
Bullarto
TRENTHAM
MACEDON
Bullarto South
Jamieson
1939 Fires
WHITTLESEA
Kinglake
Marysville
SUNBURY
BALLAN
HURSTBRIDGE
YARRA GLEN
Eastern Central Highlands
BACCHUS MARSH
MELTON
COLDSTREAM
WARBURTON
WOORI YALLOCK
MELBOURNE
BAIRNSDALE
PAYNESVILLE
WERRIBEE
EMERALD
Glenmaggie
HEYFIELD
MAFFRA
PAKENHAM
SALE
FRANKSTON
DROUIN
WARRAGUL
GEELONG
MOE
TRARALGON
MORWELL
HASTINGS
CHURCHILL
LEONGATHA
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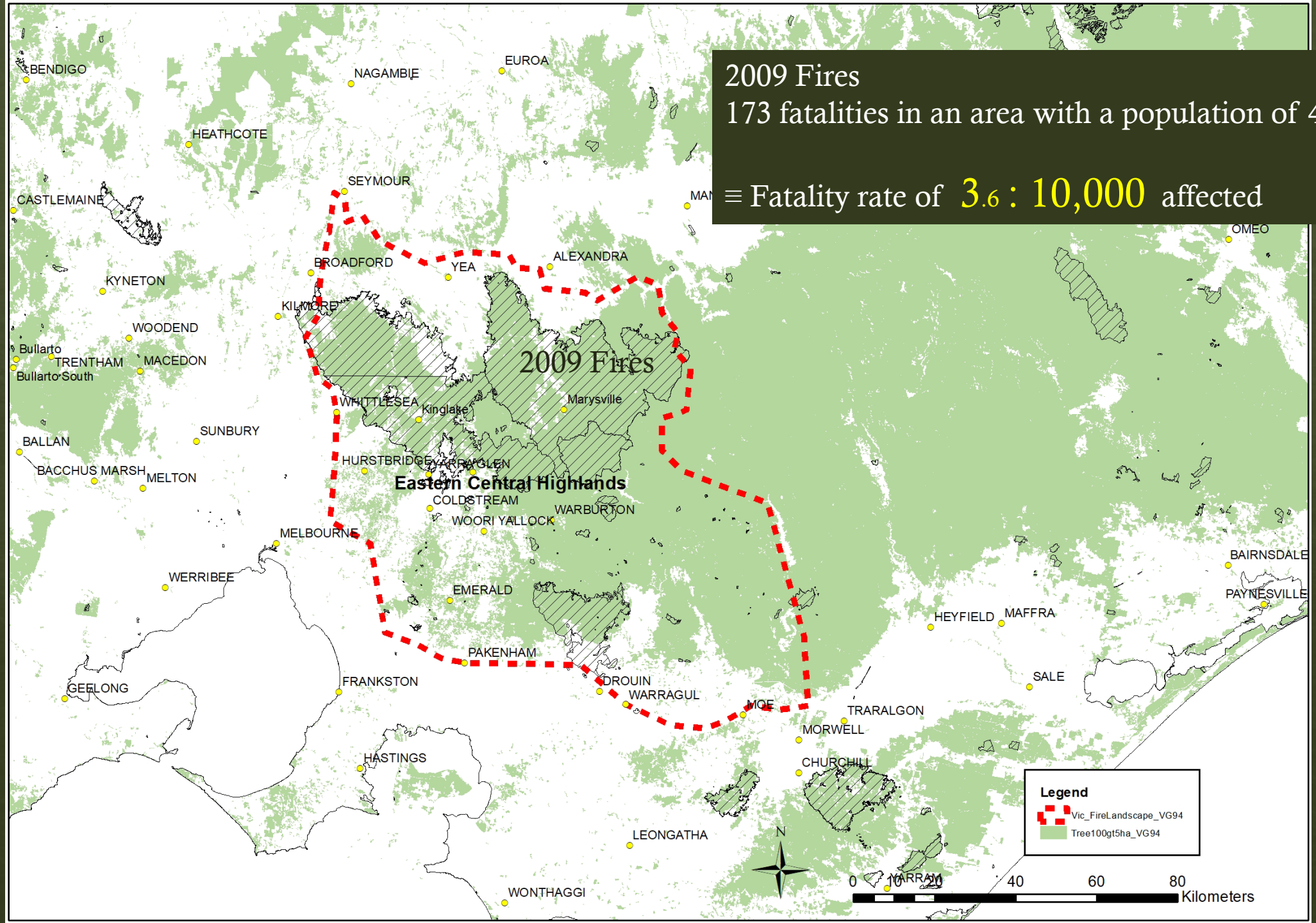
Legend
Vic_FireLandscape_VG94
Tree100gt5ha_VG94
0
20
40
60
80
Kilometers
WONTHAGGI


2009 Fires
173 fatalities in an area with a population of 478,770
≡ Fatality rate of 3.6 : 10,000 affected
2009 Fires
Eastern Central Highlands
BENDIGO
NAGAMBIE
EUROA
HEATHCOTE
SEYMOUR
CASTLEMAINE
OMEO
BROADFORD
YEA
ALEXANDRA
KYNETON
KILMORE
WOODEND
Bullarto
TRENTHAM
MACEDON
Bullarto South
WHITTLESEA
Kinglake
Marysville
SUNBURY
BALLAN
HURSTBRIDGE
YARRAGLEN
BACCHUS MARSH
MELTON
COLDSTREAM
WARBURTON
WOORI YALLOCK
MELBOURNE
BAIRNSDALE
PAYNESVILLE
WERRIBEE
EMERALD
HEYFIELD
MAFFRA
PAKENHAM
SALE
FRANKSTON
DROUIN
WARRAGUL
GEELONG
MOE
TRARALGON
MORWELL
HASTINGS
CHURCHILL
LEONGATHA
WONTHAGGI
N
0
20
40
60
80
Kilometers
Legend
Vic_FireLandscape_VG94
Tree100gt5ha_VG94

A.b.1 - Objective: To keep bushfire fatalities to below 1:10,000 people in areas directly affected by fire smoke, heat and embers through public warnings, public education, hazard reduction, evacuation and community response.

1939 Fires
71 fatalities in an area with a population of 20,100

≡ Fatality rate of 35.0 : 10,000 affected

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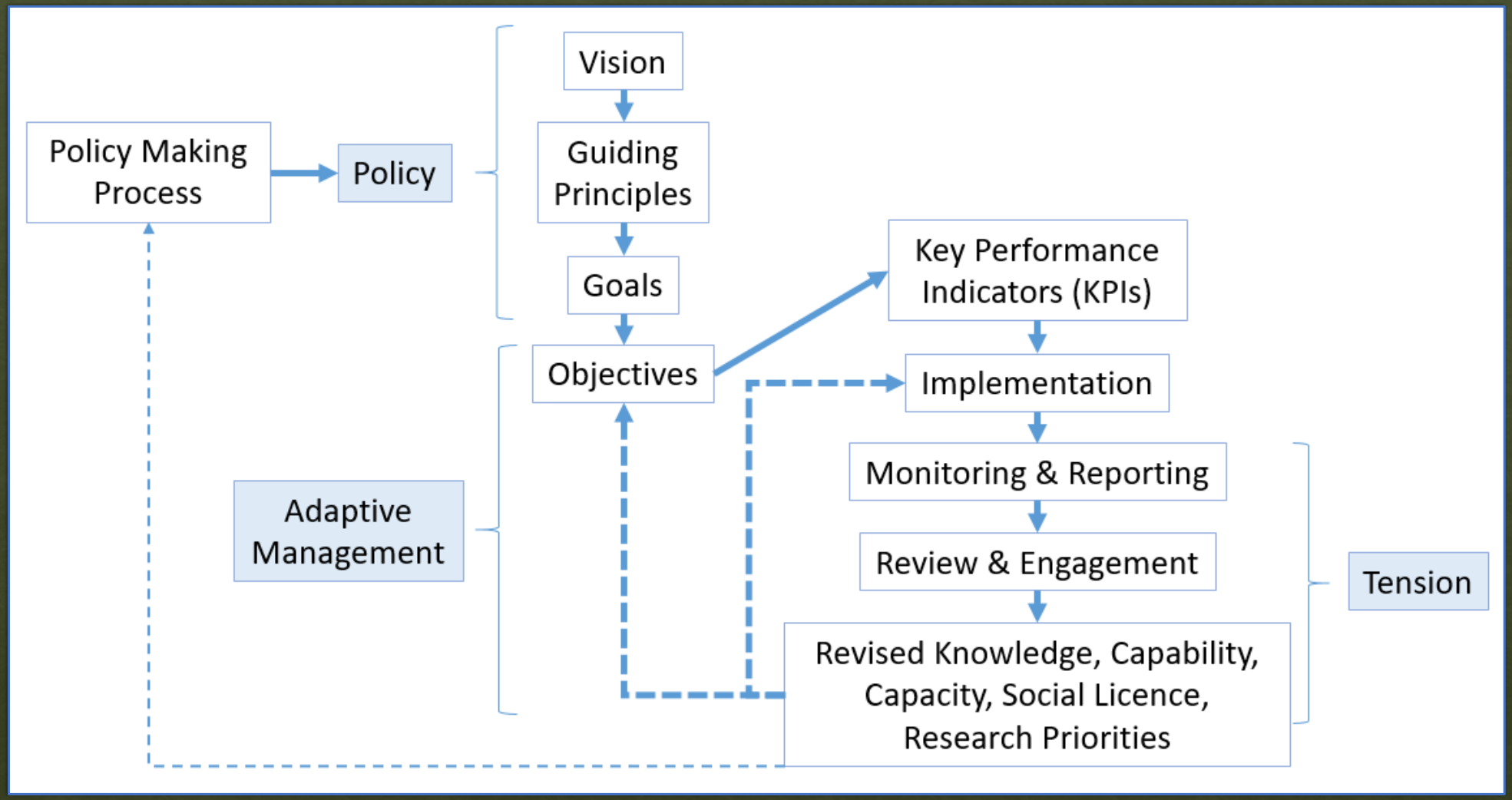
Policy Implementation Process



"Adaptive Management": the systematic process of increasing the likelihood of achieving the desired outcomes

"Tension": the residual difference between the outcomes actually being achieved and those desired

Impediments to implementation

- Inadequate capability and capacity
  - Knowledge and skills (education, training and research)
  - Recruitment process (technical and practical expertise)
  - Promotion process (regular job changes rewarded more than competence and engagement)
  - Funding

- Social and political focus on Response and Recovery (not Prevention, Preparedness, and Fire Regime Management)
  - (like trying to improve public health by buying more ambulances!)

- Individuals, communities and agencies all have a specific role to play in fire management, but professional groups (such as IAWF and FA) role is to set the professional standards and communicate them to governments and the public.

My view

- *“Our scientific knowledge always exceeds our level of practice so it is not more research that is needed, but greater efforts to use the knowledge we have.”*

- *“Research will never provide all the knowledge we need, but it can deliver valuable insights, knowledge and provide guides to future directions in what we should do.”*

- *“Adaptive Management, properly used, uses a scientific approach (evidence-based) to management in a way that we ‘learn by doing’ to continually improve management outcomes.* ***BUT*** *! Adaptive management is based on well defined objectives and a formal understanding of the system we are working with.”*

- *“Ecosystems are Complex and so cannot be understood by simple ‘action and reaction’ understanding, but by understanding processes, relationships, interactions and responses.”*

agriculture.gov.au/abares/forestsaustralia/framework

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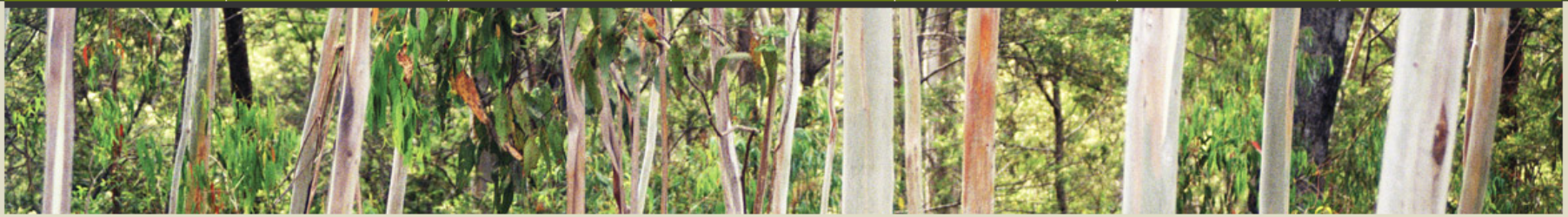


Department of Agriculture » ABARES » Forests Australia » Criteria and Indicators for reporting

7 Criteria

44 Indicators

14 Goals
25 Objectives
36 Outcome KPIs
74 KPIs

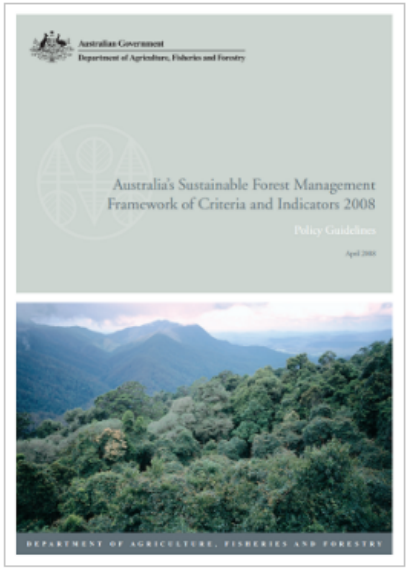
- Forests Australia
- Australia's forests
- Fast forest facts
- Forests at a glance
- Australia's State of the Forests Report series
- Criteria and Indicators for reporting
  - Review
- National Forest Inventory
- Forest profiles

Australia's Framework of Criteria and Indicators

Australia's Sustainable Forest Management Framework of Criteria and Indicators 2008 – Policy Guidelines [1.6MB] details the seven criteria and 44 indicators in the framework used for reporting on the state of Australia's forests. It includes the rationale for the inclusion of each indicator in the framework, within the relevant criterion. All such frameworks are developed on the premise that sustainable forest management is a process of continuous improvement.

This is Australia's second framework of criteria and indicators of sustainable forest management. The original framework was developed in 1998 and used in production of SOFR 2003. A major review of Australia's Sustainable Forest Management Framework of Criteria and Indicators was conducted during 2006, and led to the set of indicators currently used for reporting.

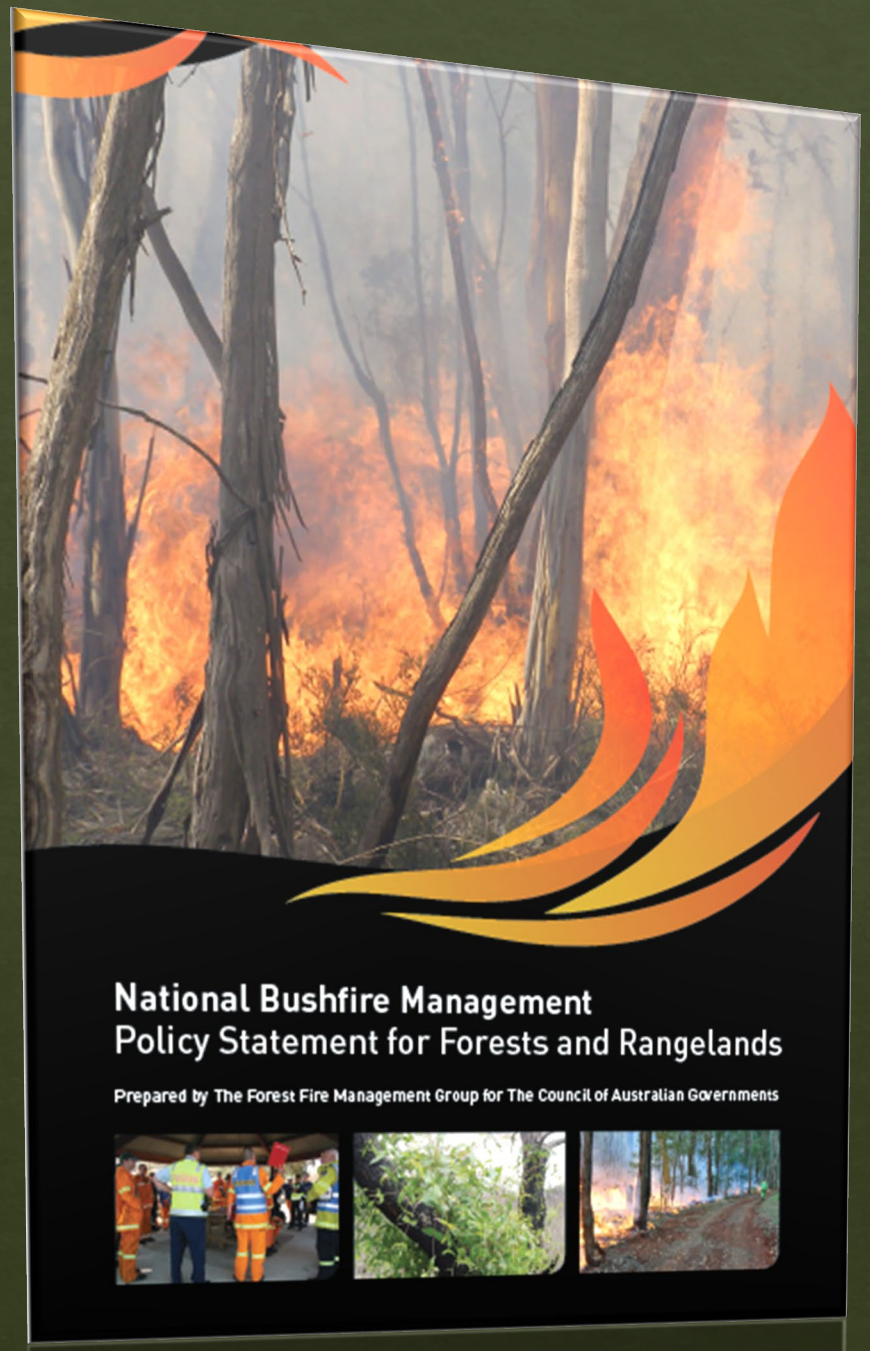
Forests are complex ecosystems that provide a wide and dynamic array of environmental and socioeconomic benefits and services. The essential aim of sustainable forest management is to maintain the broad range of forest values in perpetuity. However, assessing progress towards this aim is difficult. Criteria and indicators are used to simplify the task by characterising the essential components of sustainable forest management. They are intended to provide a common understanding of what is meant by sustainable forest management and a common framework for describing, assessing and evaluating a country's progress towards sustainability at the national level.

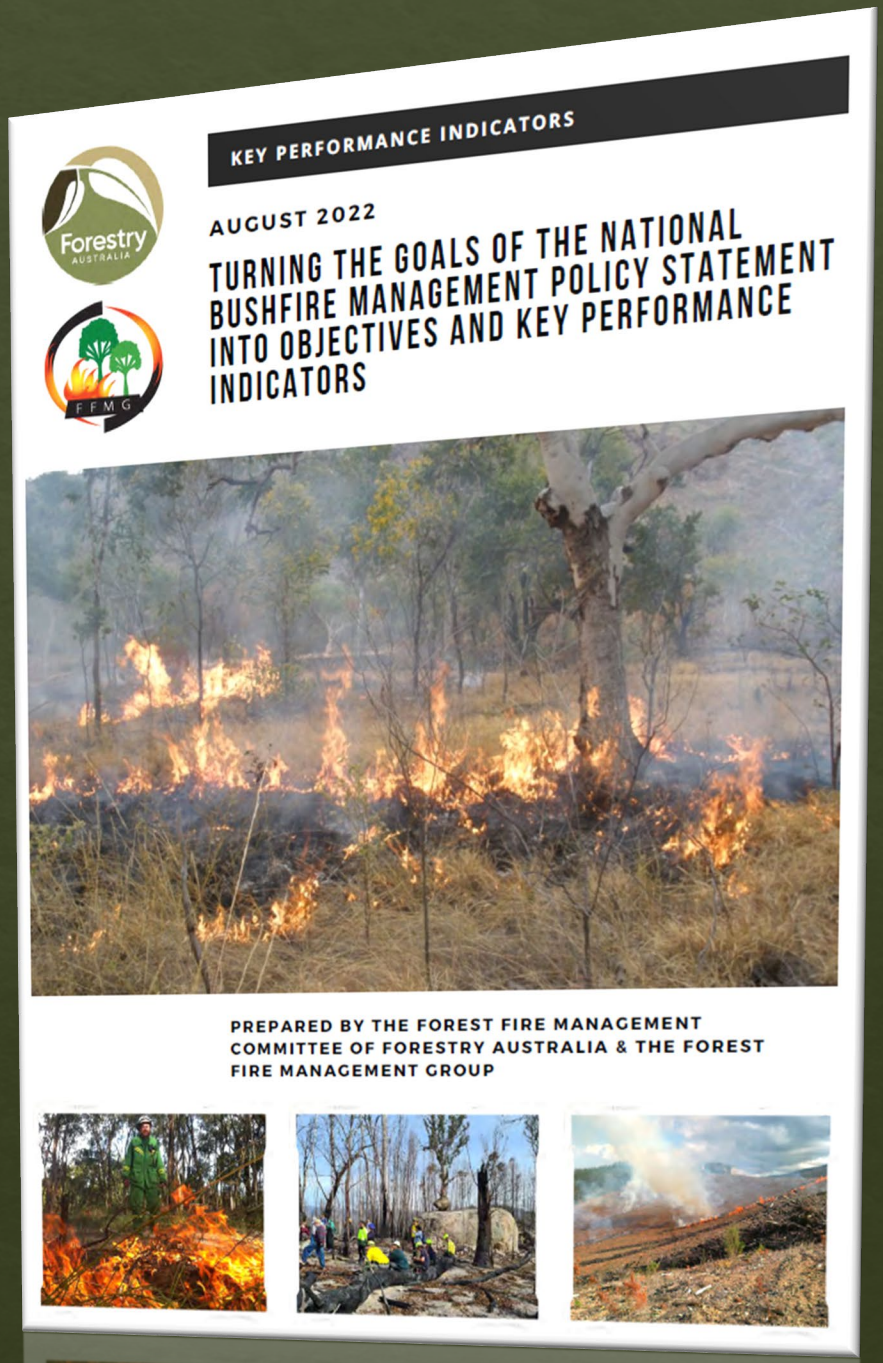


National reports based on this

Conclusions

- Implementing the National Bushfire Management Policy will need to be done incrementally, but needs to be done comprehensively.
- Achieving the NBMP Vision will require the cooperation of the National Government and each of the States and Territories.
- The development of objectives and the process of adaptive management provides a basis for community engagement, a common understanding, collective efforts and effective communication
- Fire management is a major undertaking and has to be done with adequate skill, knowledge and support.
- Every long journey starts with (a vision, planning &) a single step.


National Bushfire Management
Policy Statement for Forests and Rangelands
Prepared by The Forest Fire Management Group for The Council of Australian Governments


KEY PERFORMANCE INDICATORS
AUGUST 2022
TURNING THE GOALS OF THE NATIONAL BUSHFIRE MANAGEMENT POLICY STATEMENT INTO OBJECTIVES AND KEY PERFORMANCE INDICATORS
PREPARED BY THE FOREST FIRE MANAGEMENT COMMITTEE OF FORESTRY AUSTRALIA & THE FOREST FIRE MANAGEMENT GROUP