

COUPLED SYSTEMS: FROM PHYSICAL SCIENCE TO COMMUNITY SAFETY

Michael Rumsewicz Joe Buffone, Liam Fogarty, Simon Heemstra, John Bally



Business Cooperative Research Centres Programme



Department of Environment, Land, Water & Planning





Bureau of Meteorology

About Fire Danger Ratings

The Fire Danger Rating tells you how dangerous a fire would be if one started.

It helps you to know when conditions are dangerous enough to put your bushfire survival plan in to action.

Ratings are forecast using Bureau of Meteorology data for up to four days in advance, based on weather and other environmental conditions such as fuel load.

The rating is your prompt to take action to stay safe.



From http://www.cfa.vic.gov.au/warnings-restrictions/about-fire-danger-ratings/



CURRENT FIRE DANGER RATING SYSTEM



TOWARDS A NEW NATIONAL FIRE DANGER RATING SYSTEM

In 2013, work commenced to develop a nationally agreed position on a new National Fire Danger Ratings System.

In July 2014, all Australian governments agreed that a new NFDRS is a national priority.

Work has begun on

- a national statement of functional requirements,
- the identification of scientific readiness and gaps,
- a map to manage the system,
- and indicative costs for a new Australian system.

WHO WOULD BENEFITS FROM A NFDRS?



DESIGN PRINCIPLES

- Enables and supports National consistency, interoperability, jurisdictional applicability and those with Statutory responsibilities
- Instils confidence and trust
- Enhances and delivers robust and timely information to support decision making
- Affordable and allows for incremental investment
- Supports a wide range of user needs for managing risk and response

- Underpinned by fit for purpose science, data, technology and systems
- Based on physical parameters of fire
- Accurately identifies vulnerability and potential impacts
- Outputs are clear, simple, relevant and understandable
- Open, adaptive, upgradeable and expandable for continuous improvement

WHAT MIGHT IT LOOK LIKE?



APPLICATIONS GO DEEPER AND WIDER

1) Policy Decisions: Central to climate change assessment

- 2) Regulatory Decisions: local and state planning schemes (inc thresholds and hazard maps), standards for building and construction
- **3) Strategy Decisions**: Priorities for planned burning in native bush, resource investments, risk assessment around critical infrastructure

CONCEPTUAL DESIGN





RESEARCH OVERVIEW

Existing research – Identified about 180 projects funded through CRCs, NEMP, Australian Research Council, and agencies

- Relevance to the FDRS

- Assess scientific and operational readiness

Broad brush gap analysis for research required on a particular topic to bring it to operational readiness.



Factor	Projects	Scientific Maturity		
	Total	Low	Medium	High
Fire Weather	12	4	2	6
Fuel Condition	30	8	9	8
Fire Behaviour	27	5	5	12
lgnition Likelihood	5	1	1	3
Fire Suppression	4	1	1	1
Fire Impact	10	2	3	5

- Some projects were not rated for scientific maturity due to lack of available information



NEXT STEPS - RESEARCH

Detailed System Requirements

Detailed Gap Analysis

Prioritisation

Communication



RFS FDRS Pilot Testing Parameters Project

- Examine fire behaviour indices
- Separate from operations
- Lessons learned
- Feeding into the national process



NSW RURAL FIRE SERVICE

Trial during fire season

- ➤ Daily examination of bulletin and grids by fire behaviour analysts → Starts September
- Other states and agencies to provide FBANs to assist → EOI for participation
- Compare with actual fires
- > Intelligence gathering





REALISING BENEFITS – IT'S ABOUT COMMUNITIES

WHAT IS THE FIRE DANGER RATING SYSTEM?

The Fire Danger Rating System is used by Australian fire and emergency service organisations to calculate the risk of a bushfire occurring and the potential for impac or damage.

The system supports a range of critical decisions that are made in response to the threat of a bushfire. This may include readiness activities, such as pre-positioning firefighting resources, issuing public safety warnings and information, or limiting the potential for ignitions through the use of total fire bans or the closure of national parks and schools.

WHY THE NEED FOR CHANGE?

The science behind the current system remains largely unchanged since its development in the 1960s. It is limited in the number of factors it can consider to determine fire danger.

The system does not, for example, consider new weather inputs developed by the Bureau of Meteorology or potential impacts of a fire. This inhibits the preparedness and response capabilities of emergency services, especially in complex and time-critical operations.

WHAT IS THE CURRENT NATIONAL FIRE DANGER RATING SYSTEM PROJECT?

since 2010, a National Fire Danger Ratings Working Group has coordinated an extensive program of work to support the development of a new National Fire Danger Rating System.

The current project is being funded through the National Emergency Management Projects NEWE grants program to deliver a set of agreed functional requirements, implementation options and a road-map to reveloping a new National Fire Danger Rating System.

- The project will deliver:
- proposed design principles for the new fire danger rating system
- an analysis of the way states and territories use the existing fire danger rating system
- a proposed statement of nationally agreed functional requirements to be built into the new system
- an evaluation of current research that could support improved functionality (such as for improved weather indices) in a new system
- the identification of gaps in scientific knowledge against those functional requirements
- the identification of the best approach for implementing the system and the associated costs, and
- an analysis of the benefits that the next-generation system will provide.

WHAT HAPPENS NEXT?

The development of a new National Fire Danger Rating System represents a significant investment over a number of years.

Based on the outcomes of the current project, all jurisdictions will need to consider the next steps and scope for further work. Early indications show future research would be beneficial on:

improving fire weather predictions

 analysing how a fire ignites and how it progresses under different types of weather and varied landscapes, and
understanding the impacts on the assets and ilvelihoods of fire affected communities, and on the natural environment.

Photo: NSW RFS

Discussion

WHO IS INVOLVED

NFDRS Working Group

Project Board

Joe Buffone (Working Group Chair) – Victoria, EMV Andrew Lawson – South Australia, CFS Andrew Stark – Australian Capital Territory, RFS Chris Arnol – Western Australia, DFES Damien Killalea – Tasmania, TFS Gary McCormack – Queensland, QFES Liam Fogarty -Victoria, DELWP Rob Rogers – New South Wales, RFS Wendy Kelly – Attorney-General's Department Steve Rothwell – Northern Territory, PFES **Observers** Stuart Ellis – AFAC Michael Rumsewicz – BNHCRC Ray Canterford – Bureau of Meteorology Simon Dunstall – CSIRO

Science and Technical Reference Group

Simon Heemstra (Co-chair) – New South Wales, RFS Liam Fogarty (Co-chair) – Victoria, DELWP Fergus Adrian – Queensland, QFES Mark Chladil – TFA Mike Wouters – South Australia, DEWNR John Bally – Bureau of Meteorology Andrew Sullivan – CSIRO Lachie McCaw - Western Australia, DPAW Andrew Stark – Australian Capital Territory, RFS Andrew Turner – Northern Territory, Bushfires NT Stuart Matthews – New South Wales, RFS Gary Featherston – AFAC Michael Rumsewicz - BNHCRC