

Australian Fire Danger Rating System

What is the Australian Fire Danger Rating System?

The Australian Fire Danger Rating System (AFDRS) Program is redesigning the forecasting of fire danger in Australia. The AFDRS is a project of national significance being developed collaboratively by each state and territory, and the Commonwealth government. It aims to improve public safety, reduce the impacts of bushfires and better support the community with nationally consistent ratings and messaging. The AFDRS will be implemented on 1 September 2022 across Australia.

What are Fire Danger Ratings?

Fire Danger Ratings describe the potential level of danger should a bushfire start. They provide people with information so that they can take action to protect themselves and others from the potentially dangerous impacts of bushfires. Ratings are calculated using a combination of weather forecasting and vegetation information. They do not indicate the chance of a fire occurring.

How is the AFDRS different from our current system?

The current Fire Danger Rating System is largely based on 60-year-old science applied on a large scale. New technology and research have greatly improved our ability to more accurately predict fire behaviour and the potential threat to the community.

The AFDRS will have four levels with action-oriented messages to encourage people to take action. The ratings and high-level messages are:

1. **Moderate:** Plan and prepare.
2. **High:** Be ready to act.
3. **Extreme:** Take action now to protect life and property.
4. **Catastrophic:** For your survival, leave bushfire risk areas.



Supporting messages, including localised information, will clearly explain what community response is required at each level. The AFDRS also introduces an 'off' or 'no rating' level (white strip under Moderate) for days where no proactive action is required. This does not mean that fires cannot happen, but that they are not likely to move or act in a threatening way.

What are the benefits of the AFDRS?

Currently, there are inconsistencies in how jurisdictions determine and communicate Fire Danger Ratings. By implementing a national system, wherever people are in Australia they will see and be able to access consistent fire danger advice, maximising their ability to understand and appropriately respond to conditions. The AFDRS will also apply eight of the most contemporary fire behaviour models. This will see us move to a Fire Behaviour Index (FBI) that provides a much more accurate scale of potential fire behaviour based on weather conditions and the applicable model. The following table lists the agreed FBI thresholds for each rating:



| Name/Colour | Fire Behaviour Index Range | Suppression difficulty |
|---------------------------|----------------------------|---|
| MODERATE (Green) | 12-23 | Most bushfires in this category. Fires typically suppressed with direct, parallel or indirect attack. |
| HIGH (Yellow) | 24-49 | Initial attack success critical to prevent large fire development. Defensive suppression strategies. |
| EXTREME (Orange) | 50-99 | Defensive suppression strategies. High levels of threat to life/property. Safety of firefighters and community paramount. |
| CATASTROPHIC (Red) | 100+ | Unsafe for firefighters and community. Without initial attack success, likelihood of very large fire development is very high. High probability of loss of life and property. |

What do Local Governments need to know?

The move from six to four ratings, new names and thresholds, will change how Fire Danger Ratings are referenced within the *Bush Fires Act 1954*, *Bush Fires Regulations 1954* and *Bush Fires (Infringements) Regulations 1978*. DFES has been consulting with representatives across state and local government, agriculture and industry to identify and progress the required changes ahead of the nationally agreed 1 September 2022 implementation date.

Total Fire Ban

The primary justification for recommending the declaration of a Total Fire Ban (TFB) is based on the forecast Fire Danger Index (FDI) and resultant Fire Danger Rating (FDR). The State of WA is currently divided into the three TFB FDI indicator zones (Zone 1: FDI 50+, Zone 2: FDI 60+ and Zone 3: FDI 75+).

As the AFDRS will provide a Fire Behaviour Index (FBI) as a scale of fire danger that produces fine-scale information across a range of fuel types (compared to the existing two fuel types), there will not be a requirement for TFBs to be declared across separate zones. As the transition between the High and Extreme rating (50 FBI) is associated with erratic fire behaviour and an increased likelihood of community loss and significant consequences, it has been nationally recognised as the most appropriate threshold for a TFB declaration.

Harvest Vehicle Movement Ban

Currently during a TFB a Bushfire Control Officer MUST impose a ban, commonly referred to as a Harvest Vehicle Movement Ban (HVMB), on off-road activity for business, industry and agriculture if the FDI exceeds 35. However, as the AFDRS is based on the FBI rather than Grassland FDI (GFDI) and a new grassland model, an appropriate FBI/FDR threshold must be determined. Analysis was conducted to determine the range of weather combinations (temperature, relative humidity and wind speed) and fuel inputs (4.5 t/ha fuel load and 100% curing) that equate to a GFDI of 32. These same weather conditions when applied to the FBI algorithm, resulted in producing an average FBI of 40 which will become the new trigger under the AFDRS.

WA is currently leading the way in producing a tool that will allow for calculating an FBI to inform the requirement for a HVMB based on the new grassland model. The tool will be available on smart devices when either on or offline and will allow for the input of observed weather and grass curing conditions.



Burning under a Permit

Under the current system, burning during the restricted burning period is not permitted under a burn permit when the fire danger forecast reaches 'Very High' or above. Following detailed analysis work and understanding of the new science behind the AFDRS, the new 'High' rating has been identified as the most appropriate upper-level threshold for authorisation of burn permits under s.18 of the *Bush Fires Act 1954*, notwithstanding the requirements on a permit holder as set out in:

1. Section 38(17) of the *Bush Fires Act 1954*; and / or
2. Regulation.15B(7) of the *Bush Fires Regulations 1954*.

This is based on national recognition that planned burning is generally not recommended at the High rating (FBI 24 – 49) due to the potential that fire line intensity, spotting activity and rapidly spreading fires will pose a serious risk of burn escapes. A Fire Weather Officer will still be able to authorise the use of a permit at a rating of 'High' and above (i.e. an FBI of 24 or more) during the restricted burning period s.38(17).

Fire break and rates notices

Changes to legislation and new thresholds for restricted activities will not be finalised in time for information to be released with 2022 fire break and rates notices. Local governments are advised that thresholds are being finalised and the outcomes will be communicated as soon as practical.

DFES suggests the above information be included in your rates notice and fire break notice to inform your communities that changes are coming, with a note that the electronic version will be updated when the information becomes available.

Signage

A replacement program in direct consultation with local governments is proposed to replace the current network of analogue and digital roadside fire danger rating signage ahead of 1 September 2022. Local governments will need to submit their signage requirements and priorities to DFES, who will coordinate the procurement of new signage. Local governments will be required to oversee the removal of existing, and installation of the new, Fire Danger Rating signs. **See Attachment A in the email for information and guidance.**

Tools

The AFDRS will provide tools including the Fire Danger Viewer, and BOM registered user products, that display forecast and current FDRs. This will allow stakeholders that have part of their activity regulated by fire danger (e.g. harvesting operations, permit to burn cancellations, school closures) to obtain customised weather, fuel and fire history data that is precise to the location and the time of day of the activity. This will significantly reduce over-regulation and over-warning, avoiding the need to unnecessarily restrict activities. There will also be an upgrade to the Aurora Fire Behaviour Calculator that will enable users to input local weather conditions to determine the FBI, supporting sound decision making.

Education products

Updates are being worked on for public information sources (e.g. Emergency WA) and a suite of education and training products will be made available to local governments, volunteers and other key stakeholders. A national awareness campaign is also under development, which will launch with the new system to help embed understanding of the new levels and actions.



Training

Training has been developed in a digital modular format and includes eLearning, videos, PowerPoints and guides. Each module will be targeted to the different stakeholders' training requirements, split into three levels:

1. **Introductory:** Introduction to AFDRS concepts and changes. The target audience includes career and volunteer firefighters, government staff and private industries.
2. **Intermediate:** Designed for fire and land management agency staff, and bushfire practitioners for a practical and applied level of training.
3. **Advanced:** Technical training by BoM for Fire Behaviour Analysts (FBANs), planners and researchers.

Once user testing is complete, training packages will be released. In the meantime, we encourage you to [subscribe to our AFDRS Newsletter](#) and review resources at the [AFAC website](#).

Fire Weather Districts

The AFDRS project presented an opportunity for WA to review the [current Fire Weather Districts](#) to improve how FDRs are communicated. The review commenced in January 2021 facilitated by DFES and BoM, involving agency staff and key stakeholders. Following consultation across each region and detailed analysis work, the revised Fire Weather Districts have now been finalised and will be introduced with the release of the AFDRS. The new Fire Weather Districts can be accessed from the [interactive map viewer](#).

Effective from 1 September 2022, BoM will cease using the old model and only forecast using the AFDRS. Given the volume of data associated with forecasting, there will not be an overlap period.

Want to know more or stay in touch?

To learn more about AFDRS Program, visit afac.com.au/initiative/afdrs. For information about the AFDRS WA implementation project, email AFDRS@dfes.wa.gov.au or [subscribe to our AFDRS Newsletter](#).

