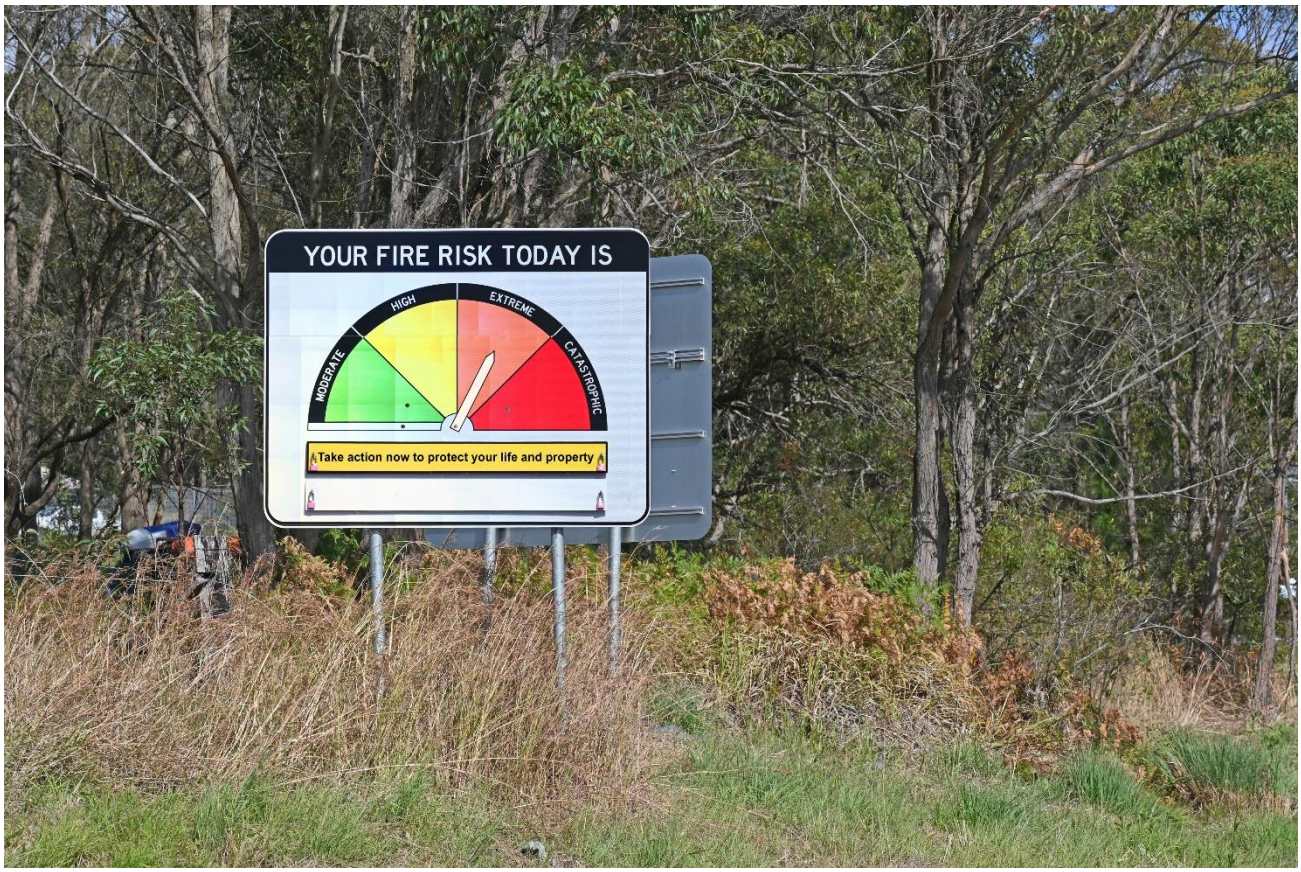
Australian Government
Bureau of Meteorology

Bureau of Meteorology Submission to the Legislative Council Environment and Planning Committee

Inquiry into the 2026 summer fires across Victoria

March 2026



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1. About the Bureau of Meteorology

The Bureau of Meteorology (the Bureau) is Australia's national agency for weather, climate, oceans and water. Its comprehensive suite of products and services supports informed decision-making by governments, emergency services, industry and the community. The Bureau offers a wide range of observations, forecasts, warnings, analyses and advice covering various aspects of Australia's atmosphere, water, ocean and space environments.

The *Meteorology Act 1955 (Cth)* outlines the Bureau's functions, including issuing warnings for gales, storms and other weather conditions that may endanger life or property, including conditions likely to lead to floods or bushfires.

The *Intergovernmental agreement on the provision of Bureau of Meteorology Hazard Services to the States and Territories* (IGA)[1] confirms the roles and responsibilities of the Bureau and state, territory and local governments in relation to hazard impact event management. Under the IGA, the Bureau has responsibility for the provision of forecasting and warning services for weather conditions likely to give rise to bushfires. The responsibility for bushfire preparation, response and warning of bushfires lies with state and territory governments and local governments. This includes the determination of fire danger ratings using a range of criteria incorporating forecast weather provided by the Bureau.

The Bureau collaborates closely with emergency services agencies and engages across all levels of government to enhance preparedness and facilitate informed decision-making. Additionally, the Bureau actively contributes technical advice to various disaster preparedness and resilience building programs at all levels of government, across the nation, throughout the year.

The Bureau of Meteorology hosts the Australian Climate Service (ACS). The ACS provides a comprehensive understanding of Australia's current and future climate risks. Australia's first National Climate Risk Assessment, delivered by ACS, assesses climate risks across our economy, communities, agriculture, health, infrastructure, and ecosystems. It identifies 10 priority hazards, including bushfires, grassfires and air pollution.

[1] Intergovernmental Agreement on the Provision of Bureau of Meteorology Hazard Services to the States and Territories | Federation

2. Response to terms of reference

The Bureau's submission responds to elements of the following terms of reference (TOR) of the inquiry into the 2026 summer fires across Victoria:

- TOR 1: the preparation and planning by government, emergency services agencies and the community ahead of the fire season, including management of public and private land and roadsides
- TOR 2: the causes and circumstances of the bushfires, including climate change and the adequacy of the Government's climate policies and actions, forecasts, warnings and public education on bushfire threats
- TOR 8: the impacts of climate change on the natural environment, which has resulted in more frequent and intense bushfires occurring in Victoria
- TOR 11: lessons from and progress on the implementation of recommendations from previous inquiries, reports and Royal Commissions

2.1. TOR 1: Preparation and planning

The Bureau supports pre-season planning by providing climatological and long-range forecasts of expected severe weather for the high risk weather season, building knowledge within the community, and providing training for emergency services agencies. The Bureau provides decision support services for all levels of government and the emergency management sector to ensure response agencies are informed about the latest weather hazards.

Preparedness and response activities are delivered through 3 primary methods:

1. delivery of timely, accurate and relevant weather outlook forecasts and warnings to the emergency management sector and the Australian community
2. provision of tailored briefings and advice to the emergency management sector to support decision making
3. communication of the Bureau's relevant weather outlooks, forecasts and warnings to the community via traditional and social media.

Ahead of the 2025–26 high risk weather season, the Bureau supported preparedness activities in Victoria as outlined below.

2.1.1. Long-range forecast products

Long-range forecasts are published routinely on the Bureau's website for a range of outlook periods: multi-week, monthly and seasonal (3-month). This product communicates the chance of above or below median rainfall and the chance of unusually high or unusually low rainfall for the outlook period. The product also communicates the chance of above or below median temperature and the chance of unusually high or unusually low temperature for the outlook period. These products support emergency management planning, however, long-range forecasts do not predict the occurrence or timing of heatwave events or dangerous fire weather conditions. They also cannot predict the amount of rainfall from individual weather systems, or the timing of extended dry periods.

The Bureau's long-range forecast for Australia for spring 2025, issued 28 August 2025, indicated that September to November was likely to be wetter than average in the eastern half of the country, and warmer than average in the far north and far south-east. The long-range forecast for Australia for

summer 2025–26, issued on 27 November 2025, indicated that December to February was likely to be warmer and drier than average for much of the country.

2.1.2. Briefings

The Bureau provides briefings to support fire agencies' planning and preparedness. This includes communication and interpretation of long-range forecast products.

In the period between July to December 2025 the Bureau:

- delivered 25 seasonal outlook briefings for the high risk weather season to Victorian emergency management partners including regional control teams, incident and State Control Centre teams and other partner agencies through the Bureau Emergency Management Quarterly Forums
- communicated long-range forecasts to Victorian community through media and social media channels
- embedded meteorologists in Emergency Management Victoria's State Control Centre, providing briefings and advice to agencies within the sector.

Briefings highlighted the increased fire weather risk for spring and summer driven by long term rainfall deficiencies and the higher chance of warmer than average conditions for both spring and summer.

2.1.3. AFAC Seasonal Bushfire Outlook

Information from the Bureau's long-range forecast is also routinely incorporated in the Australian and New Zealand Council for fire and emergency services (AFAC) Seasonal Bushfire Outlooks, via 2 collaborative briefings ahead of the release of each outlook. The briefings include discussion of current conditions; antecedent conditions; long-range forecasts for temperature, rainfall and soil moisture from the Bureau's model; and Australian Fire Danger Rating System long-range forecast for objective fire danger conditions.

2.1.4. Training the emergency management sector in Bureau products

The Bureau delivered fire weather training to Victorian emergency management partners on 6 separate occasions from May until end of November 2025. This included technical material on fire weather science along with Bureau products and services, including the Bureau's fire weather product suite. This supports emergency management sector preparedness, planning and response.

2.1.5. Engagement to support community preparedness

The Bureau's 2025–26 Community Preparedness Program in Victoria partnered with community organisations to strengthen understanding of severe weather risks and promote effective use of Bureau products and services among community-facing staff and community members.

The program delivered 6 engagements, involving 10 community organisations, reaching approximately 170 participants from priority agencies and communities at higher risk. While multi-hazard in scope, the program included a strong focus on fire risk, with engagements tailored to audience needs. Key fire-focused activities included:

- a workshop in Ballarat to enhance weather knowledge among Country Fire Authority community engagement practitioners
- collaboration with Victoria State Emergency Service, Country Fire Authority and Macedon Ranges Shire Council on a community fire preparedness video

- an online knowledge-building session for Country Fire Authority Municipal Fire Prevention Officers.

The Bureau also provided a toolkit enabling partners to integrate Bureau resources into their communications, including promotion of the BOM Weather app and map-based access to weather warnings. Partners further extended reach by cascading messages through volunteer networks, member organisations and community forums.

2.1.6. External exercises

Nationally, the Bureau contributes to the National Emergency Management Agency's (NEMA) annual pre-higher risk weather season national preparedness campaign, held between August and November. In September 2025, the Bureau developed a scenario for NEMA to exercise with states, territories, private and non-profit sectors at NEMA's annual National Preparedness Summit. The scenario was loosely based on the Bureau's spring seasonal outlook and included heatwave and extreme and catastrophic fire danger weather in Victoria and South Australia, resulting in fires in the Eyre Peninsula, Grampians and Otway Ranges.

Additionally, the Bureau provides pre-season briefings to members of Parliament, Australian Government agencies, the Commissioners and Chief Officers Strategic Committee, and the National Emergency Management Ministers' Meeting. A briefing to the National Emergency Management Ministers' Meeting in September 2025 included national-level information such as recent rainfall and maximum temperatures, recent weather extremes, and expected rainfall, bushfire risk, and day and night-time temperatures.

2.1.7. Forecast and warning products

In line with the roles and responsibilities outlined in the IGA, the Bureau:

- maintains up-to-date service level specifications for our services, in consultation with emergency management agencies
- collaborates closely with the emergency management sector
- engages across all levels of government to enhance preparedness and facilitate informed decision-making
- actively contributes technical advice to preparedness and resilience-building programs at all levels of government, across the nation, throughout the year.

The responsibilities of states, territories and/or local government are for bushfire preparation, response and warnings of bushfires. State and territory governments also have responsibility for determination of fire danger ratings using fuel state information determined by the jurisdictions and forecast weather provided by the Bureau. The Bureau provides an initial fire danger rating to agencies however the local hazard management agency responsible for fire weather has absolute discretion to vary the district fire danger ratings from the value determined by the Bureau.

The Bureau's Fire Weather Service Level Specification[2] and Heatwave Service Level Specification[3] document the fire weather and heatwave services provided by the Bureau. Services include:

- Fire weather forecasts provide detailed information for fire agencies about forecast weather parameters that are of greatest consequence to fire ignition, suppression and behaviour at a fire

[2] https://www.bom.gov.au/sites/default/files/2025-12/fire-weather-service-level-specification-2025-2026.docx
[3] https://www.bom.gov.au/sites/default/files/2025-11/heatwave-service-level-specification-2025-26.docx

weather district and sub-area level. These forecasts include fire behaviour indices for the next 4 days across the state of Victoria.

- Fire weather warnings alert the community that weather conditions are likely to make the suppression or control of fires difficult. Fire weather warnings for a fire weather district are issued when the fire danger rating is extreme or greater.
- Incident weather forecasts are site-specific forecasts issued to assist with tactical decision making in operations. Incident weather forecasts are only provided, on request, to designated fire agencies and are only for fire (uncontrolled fires/bushfires or prescribed/hazard reduction burns), structural fires, hazardous material operations or training purposes.
- Wind change charts advise of the forecast time of a significant wind change to assist operations. A Wind change chart is issued on days when a significant, trackable synoptic wind change is expected to impact at least one fire weather district that has a forecast fire behaviour index of 24 or above.
- Fire weather observations bulletins display real time weather observations, associated fire danger rating and fire behaviour index calculations, and maximum fire behaviour index observed since midnight, local time. It is provided to fire agencies to assist with situational awareness and monitoring of weather conditions.
- A fire danger rating for each fire weather district is provided as a 4-day summary to the public to increase awareness of the extent to which weather conditions will enhance fire related risks for this period, to allow for forward planning of activities sensitive to fire risk and to assist with agency tactical planning. A 7-day detailed fire danger rating product is made available to emergency service agencies. This contains ratings along with the fire behaviour index on a sub-area level for the next 7 days. Agency personnel use this product to assess the fire weather risk at a state, district and sub-area level which assists them in making operational planning and preparedness decisions in relation to the fire risk.
- Heatwave forecasts show heatwave severity areas (low-intensity, severe, extreme) on a map together with a text description of the heatwave areas.
- Heatwave warnings are issued when severe or extreme heatwaves are expected to affect at least 10% of a weather district (in Victoria, public weather and fire weather districts are the same).
- Heatwave decision support products are provided to health and emergency service agencies and includes aggregated information to public weather district and town levels based on gridded heatwave data. It covers 7 three-day periods, with the dates listed in the tables being the first and last days of the three-day period.

Additionally, by agreement with fire agencies, the embedded meteorologist provides the State Control Centre Fire Weather and Heat Intelligence Briefing twice daily during the fire season. It is a graphical and text product that shows forecast district fire danger ratings combined with the risk of other fire weather parameters such as lightning and the forecast confidence level for the next 7 days.

2.2. TOR 2: Causes and circumstances of the bushfires, including climate change and adequacy of forecasts and warnings

2.2.1. Antecedent conditions

2025 was Victoria's eighth-warmest year on record, 0.94 °C above the 1961–1990 average. Temperatures were above average (in the warmest 10% of all years since 1910) across the entire state.

Rainfall totals in 2025 were below average for much of Victoria, including for the Mallee, Wimmera, South West, Central, North Central, North East and Northern Country fire weather districts.

Over the 24-month period from January 2024 to December 2025, areas with severe or serious rainfall deficiencies (rainfall totals in the lowest 5% or 10% of periods since 1900, respectively) extended across much of the Mallee, Wimmera and South West fire weather districts, and into the Central and West and South Gippsland fire weather districts.

Root-zone soil moisture conditions on 1 January 2026 were generally close to average across Victoria; however, by 11 January, below average soil moisture emerged across the Mallee, Wimmera and North Central fire weather districts.

2.2.2. Briefings to emergency management sector and the community

From the morning of 3 January, Bureau briefings to the State Control Centre indicated a period of very hot conditions and elevated fire weather for the 8 and 9 January. The forecast fire danger rating issued on the afternoon of 3 January for the 9 January indicated extreme fire danger rating for the Mallee, North East, Northern Country and Wimmera districts.

Briefings to emergency management agency staff included this risk of very hot conditions and elevated fire weather, and the risk of dry lightning and a significant wind change. In relation to the January 2026 bush fires across Victoria, the Bureau:

- briefed emergency management agencies 74 times ahead of 9 January.
- supported Victorian emergency management agencies at 4 press conferences between 6 and 10 January
- attended a NEMA-facilitated press conference on 9 January
- Published 5 severe weather update videos across Bureau social media channels between 5 and 9 January.

2.2.3. Summary of Bureau forecasts and warnings

During summer 2025–26, in Victoria the Bureau:

- issued public fire weather warnings for 24 days (1 October 2025 – 19 February 2026): the average number of fire weather warning days for October to February was 5.8 days (based on October to February periods between 2015 and 2025)
- issued 402 bushfire related incident weather forecasts (1 October 2025 – 23 February 2026) for fire agencies
- issued 27 public heatwave warnings (including cancellations) (1 October 2025 – 19 February 2026)
- provided detailed fire weather forecasts, including fire behaviour indices for Victoria to emergency management customers at least twice daily
- provided fire weather gridded datasets that provide information for the next 7 days to emergency management customers at least twice daily.

Details of Bureau forecast and warnings for the 9 January event are detailed in timeline below.

2.2.4. Timeline of Bureau forecasts and warnings for January 2026 bush fires across Victoria

Early Jan: Bureau first became aware of potential for a serious fire weather day across Vic, parts of SA and NSW.

3 Jan: Fire danger ratings provided to fire agencies, including districts with an extreme fire danger rating for 9 Jan (Mallee, North East, Northern Country, Wimmera districts).

4 Jan: Fire weather warning for extreme fire danger rating for 5 Jan issued for the Northern Country fire weather district.

Public fire danger ratings include districts with an extreme fire danger rating for 8 Jan (Mallee, Northern Country).

Fire danger ratings provided to fire agencies incl districts with an extreme fire danger rating for 9 Jan (Mallee, North Central, North East, Northern Country, Wimmera districts).

5 Jan: Fire danger ratings provided to fire agencies including districts with an extreme fire danger rating for 9 Jan (Mallee, North Central, North East, Northern Country, Wimmera districts).

Extreme heatwave warnings for North East and East Gippsland districts.

Severe heatwave warnings for Mallee, Wimmera, Northern Country, West and South Gippsland, Central, North Central and South West districts.

6 Jan: Fire weather warning for extreme fire danger ratings for the Central, South West and Wimmera fire weather districts for 7 Jan.

Public fire danger ratings incl districts with an extreme fire danger rating for 9 Jan (Central, Mallee, North Central, North East, Northern Country, South West, West and South Gippsland, Wimmera districts).

Extreme heatwave warnings for Northern Country, North East, East Gippsland and West and South Gippsland districts.

7 Jan: Public fire danger ratings provided for all districts at extreme or higher for 9 Jan. Districts forecast to reach catastrophic included North Central, Northern Country and Wimmera districts.

Extreme heatwave warnings for Northern Country, North East, East Gippsland and West and South Gippsland districts.

Severe heatwave warnings for Mallee, Wimmera, Central, North Central and South West districts.

8 Jan: Fire Weather Warnings for Catastrophic Fire Danger for North Central, Northern Country, South West and Wimmera districts and Extreme Fire Danger for Central, East Gippsland, Mallee, North East and West and South Gippsland districts for 9 Jan.

Extreme Heatwave Warnings for Northern Country, North East, East Gippsland, West and South Gippsland and North Central Districts.

Severe Heatwave Warnings for Mallee, Wimmera, Central and South West Districts.

9 Jan: Fire weather warnings for catastrophic fire danger for North Central, Northern Country, South West and Wimmera districts and extreme fire danger for Central, East Gippsland, Mallee, North East and West and South Gippsland districts.

Extreme heatwave warnings for Northern Country, North East, East Gippsland, West and South Gippsland and North Central districts.

Severe Heatwave Warnings for Mallee, Wimmera, Central and South West Districts.

Wind change charts issued 11:23am EDT, updated approx. every 3 hours until 8:58am EDT 10 Jan

10 Jan: Severe Heatwave Warnings for Northern Country, North East, East Gippsland and West and South Gippsland Districts. Cancelled Heatwave Warnings for South West, Mallee, North Central, Central and Wimmera

11 Jan: Cancelled heatwave warnings for Northern Country, North East, East Gippsland and West and South Gippsland districts.

1 January – 11 January 2026

2.3. TOR 8: Impacts of climate change on the natural environment which has resulted in more frequent and intense bushfires occurring in Victoria

2.3.1. Impacts of climate change on the natural environment

Under the *Climate Action Act 2017 (Vic)*, the relevant Victorian Minister must prepare a climate science report on the science and data relevant to climate change in Victoria every 5 years. The Victorian Minister for Climate Action released the most recent report in November 2025, including updates to the Victoria's Future Climate Tool. The Bureau is an official reviewer of the climate science report.

The Bureau's findings on the impact of climate change are detailed in publications such as the *State of the Climate 2024*[4] report and *Annual Climate Statement 2025*[5]. Australia's climate has warmed by an average of 1.59 ± 0.23 °C between 1910 and 2025, with most of the warming having occurred since 1950. The observed warming in Australia is consistent with the overall average warming across the Earth's land areas. This warming has led to an increase in the frequency of extreme heat events over land.

There has been an increase in extreme fire weather, and a longer fire season, across large parts of the country since the 1950s. These changes are particularly evident during spring and summer and are associated with an earlier start to the southern fire weather season, including in Victoria.

There is also a notable trend in some regions of southern Australia towards more days with weather that is conducive to generating thunderstorms within smoke plumes (pyroconvection). These fire-generated thunderstorms can lead to extremely dangerous fire behaviour, such as during the Black Summer fires (2019–2020), the Victorian Black Saturday fires (2009), and the Canberra fires (2003). New fires can be ignited from lightning strikes produced by these thunderstorms.

Findings from the National Climate Risk Assessment , produced by the Australian Climate Service, show that at all future global warming scenarios (+1.5°C, +2.0°C and +3.0°C), susceptibility to fire across southern and eastern Australia is projected to increase due to increases in heat and the frequency of heatwave conditions, along with more time spent in drought. The degree to which vegetation changes over the 21st century will alter overall fire risk in some locations.

In southern regions, extreme fire weather is correlated with fire extent. In areas with existing and expansive vegetation, warmer and drier conditions (including increased drought and heatwaves) are projected to continue to lead to larger and more intense fires. Southern and eastern Australia may also experience an increase in the number of dangerous fire weather days and a longer fire season, with the potential for more megafires.

[4] State of The Climate 2024
[5] Annual Statement 2025

2.4. TOR 11: Lessons from and progress on implementation of recommendations from previous inquiries, reports and Royal Commissions

2.4.1. The Royal Commission into National Natural Disaster Arrangements

The Royal Commission into National Natural Disaster Arrangements was established on 20 February 2020 in response to the extreme bushfire season of 2019–20 which resulted in loss of life, property and wildlife and environmental destruction.

The Royal Commission examined coordination, preparedness for, response to and recovery from disasters as well as improving resilience and adapting to changing climatic conditions and mitigating the impact of natural disasters. The inquiry also considered the legal framework for Commonwealth involvement in responding to national emergencies. A summary of the status of the Royal Commission's recommendations of relevance to the Bureau is provided below.

NNRDC Recommendation	Current Status
8.1 - A sovereign aerial firefighting Capability Australian, state and territory governments should develop an Australian-based and registered national aerial firefighting capability, to be tasked according to greatest national need.	The Bureau supports forecasting for firefighting aviation activities through its Aviation Operations team and Decision Support Services. Ongoing engagement occurs with emergency services partners in the jurisdictions and at the national level through the National Aerial Firefighting Centre, the AFAC Aviation Safety Group (and the Hazards Services Forum. Customer discovery was undertaken during 2025 to clarify the decisions agencies make with respect to aerial firefighting, the intelligence currently used, and any areas for potential improvement in provision of services and products. The Bureau will report back to the Hazard Services Forum on these findings in May 2026.
13.1 - Development and implementation of the Australian Fire Danger Rating System State and territory governments should expedite the development and implementation of the Australian Fire Danger Rating System. It should ensure that there is national consistency in the visual display of the AFDRS and action to be taken in response to each rating.	Forecast and observed fire weather conditions are determined by the Bureau using the Australian Fire Danger Rating System (AFDRS). The AFDRS calculates, forecasts and reports fire danger using fuel state data, spatial and satellite data, and weather data. It takes advantage of many decades of research about how fire behaves and interacts with weather conditions, incorporating a wide range of fire behaviour models to better represent the variety of Australian vegetation and fuel types. The AFDRS is regularly improved upon using the latest science and technology in fire weather. The Bureau is a member of the AFAC AFDRS Board and Steering Committee. The Steering Committee provides national leadership, advocacy and oversight on the ongoing management and improvement of the AFDRS System.

	The Bureau manages the calculation of the Fire Behaviour Index and Fire Danger Ratings outputs of the AFDRS. Other elements of AFDRS systems are managed by the NSW Rural Fire Service. This includes a Fire Danger Viewer and a Fuel Editor. The Bureau, along with the fire emergency community, launched AFDRS in September 2022. In September 2023, the Bureau released a major update to its component of AFDRS, which provided increased functionality to Bureau fire weather forecasters and improved service resilience. Through 2024 and 2025, the Bureau worked with fire agencies on a "Fire Weather Priority Improvements" project, which aimed to deliver enhancements that had been prioritised by fire agency customers. This project provided model updates, improved forecast and observation products and new gridded products as examples.
13.2 - Education on the Australian Fire Danger Rating System State and territory governments should deliver education to ensure that the public understands the new Australian Fire Danger Rating System ratings, the potential danger attached to each rating, and the action that should be taken in relation to each rating.	An AFDRS Technical User Guide[6] was released in June, 2025. The Bureau contributed to the authorship of this resource. The Bureau has developed courses for its staff which are required as part of its pre-season training suite. These include: AFDRS theory, AFDRS practical, AFDRS Operations and Support, and fire behaviour for meteorologists. The Bureau has also contributed to training packages to support fire agencies' use of the AFDRS.
14.1 – Nationally consistent air quality information, health advice and interventions Australian, state and territory governments should develop close to real-time, nationally consistent air quality information, including consistent categorisation and public health advice.	Air quality monitoring and reporting is the responsibility of the jurisdictions. However, the Bureau includes information about smoke haze on forecasts when this is expected to be significant.

[6] AFDRS-A-Technical-User-Guide

14.2 National Air Quality Forecasting Capability Australian, state and territory governments should develop national air quality forecasting capabilities, which include broad coverage of population centres and apply to smoke and other airborne pollutants, such as dust and pollen, to predict plume behaviour.	Victoria has had access to the Australian Smoke Dispersion System (ASDS) since 2018 (alongside NSW). ASDS was launched for registered emergency services users nationally in October 2025. ASDS combines bushfire, fuel reduction burns and atmospheric data with weather and chemical transport models to estimate the likely concentration and distribution of smoke at ground level from a range of sources, including planned burns. Funding for the ASDS included the delivery and operational costs for the first year (FY2025—2026).