



Fire & Emergency Services  
Authority of Western Australia

Submission No: .....29.....

Our Ref: 11275

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Mr Russell Chafer  
Committee Secretary  
Parliament of Australia  
House of Representatives  
PO Box 6021  
Parliament House  
CANBERRA ACT 2600

Dear Mr Chafer

Thank you for your letter dated 24 March 2009 inviting the Fire and Emergency Services Authority of Western Australia to provide a submission regarding the Standing Committee on Industry, Science and Innovation Inquiry into Long Term Meteorological Forecasting in Australia.

Please find attached our submission for your consideration. FESA is happy to provide the committee with any further information as required. We look forward to the Committee's final report.

Thank you for the opportunity to have input into this valuable subject.

Yours sincerely

JO HARRISON-WARD  
CHIEF EXECUTIVE OFFICER

28 April 2009

## Fire and Emergency Services Authority of Western Australia

### Submission to the Standing Committee on Industry, Science and Innovation **Inquiry into Meteorological Forecasting**

The Fire and Emergency Services Authority (FESA) of Western Australia offers the following submission on the matter referred to the Standing Committee on Long Term Meteorological Forecasting in regard to:

- The efficacy of current climate modeling methods and techniques and long-term C prediction systems.
- Innovation in long-term meteorological forecasting methods and technology.
- The impact on accurate measurement of inter-seasonal climate variability on decision-making processes for agricultural production and other sectors such as tourism.
- Potential benefits and applications for emergency response to natural disasters, such as bushfire, flood, cyclone, hail and tsunami in Australia and in neighboring countries.
- Strategies, systems and research overseas that could contribute to Australia's innovation in this area.

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## Part A: Summary of Key points

FESA uses meteorological information for strategic and operational planning; for both internal purposes and as part of planning and integration of inter-governmental emergency services. Meteorological forecasts and outlooks are used for:

- long term planning - 2 years and beyond for strategic planning of service delivery, inter-government and national coordination, resourcing and others such as land use planning.
- developing prevention and preparation (mitigation and adaptation) strategies for the medium term – 12 month to 2 year outlooks.
- short term preparation based on 7 to 14 day forecasts.
- response to immediate and day to day emergency events with real time data and information for event management including community and industry safety.

Strategic planning is critical to establishing a sustainable capacity to provide emergency service coverage across the full range of natural hazards FESA has responsibility for overseeing and to ensure effective emergency management arrangements are place in Western Australia. The availability and ready access to reliable meteorological forecasting, prediction and climatic outlooks is critical for the effective management and planning of sustainable emergency management operations. Currently the long term meteorological forecasting and prediction information offered by Commonwealth agencies is limited. To meet planning requirements in a State the size of Western Australia, data and information utilised needs to be State and region specific to address vulnerable, dispersed and isolated population groups.

The accuracy of inter-seasonal climate variability measurement is important to FESA's and local government operational planning for forth-coming seasons. This includes the estimation of the local natural hazard risks to mitigate or minimise impact potentials. FESA supports the expansion of the observational network including a program of increasing the use and distribution of automated weather stations to improve data collection.

Accurate, reliable and location specific information is critical to short term (7-14 day) preparation and risk management. During extreme or 'at risk' periods FESA works with government at all levels and communities to implement early preparation and prevention programs prior to onset. This may include the declaration of total fire bans for specific areas of WA as required. The interlinking of planning based on long, medium, short and real time forecasting is integral to reducing risks to the people and property of WA, but also to minimising avoidable cost overruns.

FESA has identified the need for a broader range of data collection across the State to support long range forecasting and prediction capability for all natural hazard types. These include:

- Greater coverage and reporting without the reliance on human presence.
- Enhanced real time data and reporting during events. In particular cyclone monitoring for intensity, impact and forecast tracking. This has particular importance for community safety and especially for the mining and resources industry where interruptions to operations can impact on the Australian and State GDP.
- Hydrological telemetry monitoring and reporting.
- Free access to climatic trend data and analysis for regional areas of WA.

To achieve the above it is acknowledged that there may need to be improved research capability in Commonwealth funded agencies and this could include possible service integration between Commonwealth and State funded agencies.

FESA is therefore highly supportive of maintaining a Bureau of Meteorology (Bureau) regional presence in WA. The following factors require this strong and focussed appliance.

- The size of the State and diversity of weather and climatic conditions across WA.
- The value of maintaining a local context and body of knowledge of WA conditions and locations.
- The importance of continuing and extending the levels of service provided to FESA.
- The value and risks to significant mining and resources industry operations.
- The immeasurable value of maintaining working and strategic relationships in an industry that needs to respond to extreme service needs in a seamless and integrated manner.

FESA's strategic planning has a 15 year horizon. Accurate and reliable long term climatic outlooks and forecasting information are essential to our planning. The major change drivers identified are population and demographic shifts and climate change. We anticipate that climatic changes will affect population densities, locations and land-use and service demands.

## Part B: FESA Background Information

FESA was established in 1999 under the *Fire and Emergency Services Authority of Western Australia Act 1998*, to improve the coordination and planning of emergency services in Western Australia.

FESA comprises the Bush Fire Service (BFS), Emergency Management WA (EMWA), Emergency Services Cadets (ESC), Fire and Rescue Service (FRS), State Emergency Service (SES), Volunteer Emergency Service (VES), Volunteer Fire Service (VFS) and Volunteer Marine Rescue Services (VMRS).

FESA employs over 1250 full time/part time and casual staff. In addition, FESA supports more than 30,000 volunteers who provide an invaluable contribution to achieving our vision of a safer community by delivering emergency services throughout Western Australia.

### Roles and Responsibilities

FESA has adopted an all-hazards approach to emergency management, working in partnership with the community and other agencies to prevent, prepare for, respond to and recover from emergencies.

FESA is the hazard management agency in Western Australia for:

- Fires – rural and urban fires in gazetted fire districts.
- Fires – on Department of Environment and Conservation (DEC) managed land in gazetted fire districts.
- Hazardous materials incidents.
- Floods, cyclones, severe storms.
- Earthquakes, tsunamis.
- Landslides.

We also provide combat and support services, including communications, for:

- Marine search and rescue.
- Land search.
- Urban search and rescue.
- Air search and rescue (including emergency casualty transport).
- Road transport emergencies.
- Rail transport emergencies.
- Animal disease outbreaks.
- Cliff, cave and confined space rescue.

We facilitate State emergency management capacity building through:

- Development of State policy and plans.
- Management of the Western Australian Natural Disaster Relief and Recovery Arrangements.
- Development of mitigation initiatives.

FESA provides advice and support on emergency management issues to key stakeholders at the local, State and national levels, including:

- Maintenance of State emergency management legislation.
- Support to the State Emergency Management Committee and the State Emergency Coordination Group.
- Participation in State and national strategic working groups.
- Provision of emergency management training in conjunction with Emergency Management Australia.

Further information about FESA can be found at <http://www.fesa.wa.gov.au>.

## Part C: Response to Terms of Reference

FESA values the strong working relationship it enjoys with the Bureau which is a key strategic and operational partner in the co-ordination and delivery of emergency services to the public of Western Australia. This relationship and co-dependency is critical to efficient and effective planning and delivery of emergency services. It is critical that FESA has free access to data, information and intelligence.

FESA also provides a range of advisory services to other Government and Non-government agencies on hazard related matters, State risk ratings and mitigation. The quality of this advice is in a large part dependent upon receipt of high quality information from the Bureau. Overall the services provided by the Bureau are essential for FESA's immediate, short, medium and long term planning.

### **Potential benefits and applications for emergency response to natural disasters, such as bushfire, flood, cyclone, hail and tsunami in Australia and in neighboring countries.**

As the national agency for the collection of weather, water and climate data the Bureau provides analysis and monitoring of climate variability and change, the results of which are made freely available at its website. In terms of regional weather predictions and patterns the information and service for short term and immediate relevance is commendable, however there is room for improvement and enhancement.

The types of information that are important to FESA in planning and delivery of services to the people of WA include:

#### ***Weather Elements***

- Precipitation
- Temperature
- Wind
- Humidity
- Sea levels and tides
- Soil hygrometry

#### ***Weather Events***

- Cyclones
- Drought or extended dry periods
- Tornados and severe storms
- Fire
- Flood
- Sea swells, surge, extreme tides, tsunami

FESA uses meteorological information for strategic and operational planning for both internal purposes and as part of planning and co-ordination of inter-governmental emergency services. Meteorological forecasts and outlooks are used for:

- long term planning - 2 years and beyond for strategic planning of service delivery, inter-government and national coordination, resourcing and others such as land use planning.
- developing prevention and preparation (mitigation and adaptation) strategies for the medium term – 12 month to 2 year outlooks.
- short term preparation based on 7 to 14 day forecasts.
- response to immediate and day to day emergency events with real time data and information for event management including community and industry safety.

### **The importance of long term outlooks to strategic planning**

FESA provides emergency services across the largest land mass and coastline in Australia which encompasses a diverse range of topographical and climatic conditions and natural hazards.

Strategic planning is critical to establishing a sustainable capacity to provide service coverage across the full range of natural hazards. Emergency service planning is conducted for prevention, preparation, response and recovery activities. The availability and ready access to reliable forecasting, prediction and climatic outlooks is critical for the planning of sustainable operations and management.

FESA 2023 is the long term strategic plan for FESA's direction and future service delivery. In the development of that plan, a futures exercise was undertaken which included research, horizon and environmental scanning, analysis and interpretation through the development of scenarios. The research identified climate change and population/demographics impacts as the two key drivers of change for the future. Scenarios were developed using the broad climatic outlooks provided by the Bureau and CSIRO. Climatic changes are expected to have a significant impact on decisions for service delivery for the full range of natural hazards experienced in WA.

The total cost of natural disasters in Australia over the period 1967 to 1999 was estimated to be \$36.4 billion in 1999 prices. This translates to an average annual cost of disasters of \$1.10 billion in 1999 prices. The impact of natural disasters in Australia varies considerably from year to year. A few large events dominate the overall cost for the period 1967 to 1999. The EMA data suggest that in years with extreme events, the total cost could be up to \$4050 million.<sup>1</sup>

The 2007 National Climate Change Adaptation Framework recognises that Australia's coastal urban and remote communities are particularly exposed to the risks associated with natural disaster extreme events.

“Climate change impacts need to be factored into natural disaster management risk reduction, emergency services planning, and recovery management, especially for areas more vulnerable to extreme events. Community awareness and developing a culture of preparedness in conjunction with emergency services will contribute to effective adaptation responses.”

In WA, inter-governmental agency response plans (WestPlans) have been developed to address the range of natural and other hazards. Meteorological outlook information is important to ensure the currency and adequacy of these plans including the capacity and deployment strategies to respond to State emergency events.

Adaptation and mitigation programs to build community resilience rely on targeting population groups with relevant and reliable information. To be effective and ensure resources are applied efficiently, program developers need to understand the plausible and predictable natural hazards for which communities need to prepare. Medium and long term forecasts, predictions and outlooks are essential as community change programs require significant lag time to build resilience.

FESA also manages a variety of emergency services mitigation grants including Commonwealth grants. To ensure the most appropriate and strategically important grant applications are supported, decisions need to be underpinned by sound principles of sustainability and community benefit as part of a complete risk based service delivery and community development plan. Long and medium term forecasting is crucial to these plans.

It is understood that the Australian Government is currently undertaking a review of mitigation funding programs. Initiatives submitted for consideration are to address climate change impacts. Access to high quality and discrete meteorological outlooks are critical to successful bids.

FESA is reviewing current strategic service delivery models. Decisions are based on a range of currently available information importantly including the impact of plausible future climatic hazards. Current and future resourcing and infrastructure decisions are constructed using Resource to Risk (hazard) algorithms.

### **Short term planning and inter-seasonal climate variability**

Climate change outlooks for Australia, indicate that there will be an,

“increase in the severity and frequency of many natural disasters, such as bushfires, cyclones, hailstorms and floods. Insured losses from these events are expected to total billions of dollars: 19 of the 20 largest property insurance losses since 1967 have been weather related”.

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<sup>1</sup> Bureau of Transport Economics Report 103 2001. Economic Costs of Natural Disasters in Australia. Canberra

More intense extreme weather events are likely to increase insurance premiums for natural disasters, compounding the problem of under-insurance.<sup>2</sup>

The accuracy of inter-seasonal climate variability measurement is important to FESA's and local government operational planning for forth-coming seasons. This includes the estimation of the local natural hazard risks for minimising impact potentials. Prevention and preparation works that rely upon seasonal forecasts include:

- planning and conducting preventative fuel reduction burning and sea wall maintenance.

For example in a situation where the Bureau provides an outlook of drought conditions which increase fuel loads and fire risk significantly, FESA along with local government and DEC instigate fuel reduction programs. The timing and management of burning to reduce the intensity of events is dependent on short term forecasts.

- review of event response plans, resourcing and capacity.

In response to adverse or extreme outlooks, FESA will deploy personnel, and physical and financial resources to ensure adequacy of the response capability.

- review implementation of community prevention, preparation and recovery programs to promote community resilience.

In addition to enhancing the response capability, FESA engages a higher level of community awareness and preparation based on the level of risk.

- mitigation and adaptation preparation for adverse forecasts.

An example is the cyclone preparedness program that is strongly promoted to ensure that vulnerable communities are stocked with fuel and food supplies, reducing the need for expensive reliance on emergency service supplies support.

It is noted the Bureau acknowledged the importance of accurate inter-seasonal climate variation projections for national and regional adaptation strategies in its February 2008 Senate Standing Committee submission on Climate Change and the Australian Agricultural Sector.<sup>3</sup> The submission states:

"the Bureau of Meteorology is collaborating with CSIRO and a number of other Commonwealth and State agencies in the development of comprehensive data sets aimed at understanding the likely impacts of climate change and variability on Australia's rural industries and pointing the way forward for the most effective ways of adapting on a range of time scales".

...and

"Better understanding of climate variability, with particular emphasis on improving predictions of the onset and course of major droughts and large-scale floods, will be critical to interpreting and applying climate change projections of Australian climate."

FESA also notes that the Bureau has expressed concern about the ongoing capacity to provide accurate information due to the erosion of the observational networks, stating the:

"Bureau's observational networks for establishing the climate record, the foundations of which were laid down 100 years ago, have served Australia well and must be secured for future generations, yet they are gradually being eroded. The Bureau would particularly like to draw the attention of the Committee to the need to maintain and indeed expand this critical component of national infrastructure."

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<sup>2</sup> Australian Government, Department of Climate Change. December 2008. Impacts of Climate Change

<sup>3</sup> Australian Bureau of Meteorology 2008. Submission to the Senate Inquiry on Climate Change and the Australian Agricultural Sector.



FESA supports the expansion of the observational network including a program of increasing the use and distribution of automated weather stations to improve data collection. This would also improve the capacity for improved research and forecasting of a variety of climatic conditions and weather events including tornados in WA.

### **Operational Planning**

Accurate, reliable information is critical to short term (7-14 day) preparation and management. During extreme or 'at risk' periods FESA works with government at all levels and communities to implement early preparation and prevention programs prior to onset. This includes the management of resources, interagency response alerts and planning where required. The inter-agency planning may also include longer term management strategies for recovery and community management of ongoing hazards such as mosquito control following floods or a prolonged wet season in the North West.

The interlinking of planning based on long, medium, short and real time forecasting is integral to reducing risks to the people and property of WA, but also to minimising avoidable cost overruns.

### **The efficacy of current climate modeling methods and techniques and long-term meteorological prediction systems.**

#### ***Current challenges in using climate and long-term meteorological predictions***

Uncertainties remain about how climate change will impact WA in detail but the information available indicates that WA will be subject to increasing weather changes including the hazards of more turbulent cyclone and storm seasons, increasing temperatures and drying over the eastern and southern areas of the state.<sup>4</sup> The Bureau and modeling from other sources such as CSIRO indicate that WA will get hotter and experience greater numbers of days over 35°C<sup>5</sup>.

Current prediction systems are unable to provide more certainty beyond 3 months. Longer term predictions are presented as meteorological outlooks<sup>6</sup>. This information is a viewpoint based on models of probability. To assist emergency service planning that includes service models and decisions on infrastructure expenditure FESA needs reliable information that is based on high probabilities.

Currently navigating the vast amounts of data and information is difficult due to:

- differing terminology and categories for rating the possibility and likelihood of climatic change impacts.
- the highly technical nature of a lot of the information available.
- conflicting viewpoints and scientific positions and arguments.
- generality and lack of specificity of the conclusions, predications and outlooks.

For example, the information available is not definitive and tends to be broad statements such as "increasing dryness in the south of Western Australia". The consequence of this is that at best current information can only be a guide for consideration in longer term planning.

This in turn impacts on budget priorities and submissions for Treasury funding of initiatives and projects that are strategically focused and based on predicted need as opposed to immediate and measured need.

The current reporting of long term meteorological forecasting and prediction information is however limited. It tends to be broadly focused on the global region and Australia wide rather than State level and detailed.

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<sup>4</sup> Range of analysis maps and papers found at: <http://www.bom.gov.au/climate/change/>

<sup>5</sup> CSIRO, March 2009. Climate change: the latest science: Parliament House, Canberra

<sup>6</sup> Meteorological Outlook – a view beyond 3 months

There is also a tendency towards a focus on the east coast of Australia, which while understandable in terms of population density impacts, does not recognise the WA context with vulnerable dispersed and isolated population groups and economically significant mining industry and resource operations.

For example, when considering the effects of climatic conditions on future population demographics in WA, it is plausible that the inland to coastal drift will increase, shifting the focus of disaster impacts to coastal events leaving inland interest even more vulnerable. Access to regionally specific outlooks is critical to planning possible reconfigurations of services for prevention, preparation, response and recovery.

### ***Enhancing the effectiveness of WA's emergency services delivery***

FESA has identified the need for a broader range of data collection across the State to support long range forecasting and prediction capability for all natural hazard types. In particular this could be achieved by the introduction of the following:

- Greater coverage and reporting without the reliance on human presence.
- Enhanced real time data and reporting during events. In particular cyclone monitoring for intensity, impact and forecast tracking. This has particular importance for community safety and especially for the mining and resources industry where interruptions to operations can impact on the Australian and State GDP.
- Hydrological telemetry monitoring and reporting.
- Free access to climatic trend data and analysis for regional areas of WA.

To achieve the above it is acknowledged that there may need to be improved research capability in the Bureau and possible service integration between Commonwealth and State funded agencies.

Based on the following factors, FESA is supportive of maintaining the Bureau presence in WA.

- The size of the State and diversity of weather and climatic conditions across WA.
- The value of maintaining a local context and body of knowledge of WA conditions and locations.
- The importance of continuing and extending the levels of service provided to FESA.
- Potential impacts and risks to significant mining and resources industry operations.
- The immeasurable value of maintaining working and strategic relationships in an industry that needs to respond to extreme service needs in a seamless and integrated manner.

FESA's strategic planning has a 15 year horizon. Accurate and reliable long term climatic outlooks and forecasting information are essential to our planning. The major change drivers identified are population and demographic shifts and climate change. We anticipate that climatic changes will affect population densities, locations and land-use and service demands.

### **CONCLUSION**

FESA looks forward to the committee's response. We would welcome an expansion and enhancement of the excellent services the Bureau currently provides and reiterate the importance of such services to effective and efficient delivery of all aspects of emergency services to the people of WA.

FESA is happy to provide the committee with any further information and will contribute to and support any actions and recommendations pertinent to its functions that are included in the final report.