



Australian Government

# Australian Government Response

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to the review of the  
Bureau of Meteorology's  
capacity to respond to  
future extreme weather and  
national disaster events  
and to provide seasonal  
forecasting services



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# Minister's foreword

While Australia is often recognised as the lucky country, we are not immune to severe weather, harsh climate conditions and other natural disasters.

To assist us in dealing with the realities of our natural environment, the Bureau of Meteorology has been serving Australians for over 100 years. The Bureau's mission is to provide Australians with the information they need to manage and live within their natural environment, encompassing the atmosphere, oceans, water and land. Through regular forecasts, warnings, monitoring and advice spanning the Australian region, the Bureau provides one of the most widely used services of government.

From its early beginnings, the Bureau has evolved to become the service that the nation depends on for natural hazard warnings about severe weather and natural disasters including floods, fires, storms, tsunamis and tropical cyclones.

As our climate changes and the number and severity of severe weather events increase, our need for better information and more services continues to rise. As such, the Bureau's ability to fulfil the needs of Australians has been put to the test. In recent years, major natural disasters occurring on multiple fronts have led to sustained pressure on the Bureau's capacity to deliver its frontline services.

The Government's response to the *Review of the Bureau of Meteorology's capacity to respond to future extreme weather and natural disaster events and to provide seasonal forecasting services* makes clear our commitment to ensuring the Bureau can continue to provide the services on which we all depend, both now and into the future. Our significant investment in frontline forecasters, a National Centre for Extreme Weather and better infrastructure will lead to better emergency planning, response and management; and ultimately, better outcomes for us all. We will also work with partner organisations and stakeholders to ensure successful implementation of the actions agreed in the response.

Natural disasters, severe weather and climate change will continue to affect the lives of Australians. The Government's response to this review recognises the Bureau's vital role in providing Australians with environmental intelligence for safety, sustainability, well-being and prosperity.



**The Hon Mark Butler MP**

Minister for Climate Change

Minister for the Environment, Heritage and Water

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# Executive summary

The Australian Government announced the *Review of the Bureau of Meteorology's capacity to respond to future extreme weather and natural disaster events and to provide seasonal forecasting services* (the Review) in July 2011 to assess and support the Bureau's capacity to provide essential meteorological, climatic and other scientific information. The Bureau has continued to deliver these services for more than 100 years.

The Review followed the severe weather season of 2010-11, where devastating floods were experienced across many parts of Australia, in addition to tropical cyclones, including cyclone *Yasi*, and bushfires in Western Australia. These incidents demonstrated the large and increasing demand for Bureau services and the sustained pressure this places on the agency.

In addition to its critical extreme weather services, the Bureau provides a range of other essential products and services that assist Australians to make decisions every day about their safety, sustainability, well-being and prosperity. The Bureau also meets many international demands for its services, for example, providing support in response to the Japanese tsunami, New Zealand earthquakes and the Chilean volcanic eruption that occurred in 2011.

In 2011-12, the Bureau issued over 331,000 forecasts and over 21,000 warnings, covering floods, fires, cyclones, tsunami, severe thunderstorms and heatwaves. The Bureau has again played an integral role, in 2012-13, in critical extreme weather services.

These examples highlight the breadth of the Bureau's work and the demands placed on it, which includes warning of potential tsunami and modelling radiation dispersal and volcanic ash in the atmosphere. Balancing the competing demands for the Bureau's services will continue to be a challenge, particularly as these demands are expected to grow into the future.

The Review provides valuable insight into the Bureau's capacity to deliver these services and identifies priority areas for further effort to ensure the Bureau continues to meet stakeholder demands effectively and sustainably. A key aim of this response is to balance the need for short-term action with the need for ongoing evolution of the Bureau's role.

The Review identified, as its highest priority, the need to increase the number of frontline severe weather and flood forecasting staff. It also supported upgrading the Bureau's flood system and standardising service level agreements with emergency service agencies.

As an early and immediate response to these findings, the Government provided funding of \$4.8 million for additional frontline flood and weather forecasters in the 2012-13 Budget. The Government also announced its decision to proceed with commercial advertising on the Bureau's website on a permanent basis in the 2013-14 Budget to support essential services.

In addition to these early responses, the Bureau has already taken action to respond to the Review's priority actions to support consistent service standards and build organisational resilience. This includes areas such as workforce planning and increasing automation. New and emerging technologies have allowed the Bureau, in line with international standards, to increase the use of automated technology for obtaining observational data.

The Government is committed to supporting the Bureau's capacity to contribute to the protection of life and property now and into the future and is providing funding of \$58.5 million to:

- increase over four years the level of frontline meteorologists and frontline hydrologists to reach the staffing levels recommended by the Review in 2016-17;
- establish a National Centre for Extreme Weather (the National Centre) within the Bureau to provide additional response capacity during extreme weather events;
- implement a next generation flood forecasting system and an advanced storm tide prediction system;
- investigate ways for the Bureau to better integrate with emergency services, including through standardising service level agreements and cost recovery arrangements; and
- scope and develop an integrated all-hazards decision system to effectively integrate all of the relevant hazard information (available to the Bureau) onto a single platform to strengthen the Bureau's frontline forecasting and warning capability.

This funding also includes an investment of \$3.7 million in 2013-14 to enable the Bureau to undertake vital infrastructure repairs and upgrades. This will strengthen the Bureau's forecasting processes and its ability to meet the high level of community demand for up-to-the-minute data by providing funding to install communications links to regional forecasting centres, to repair radars that fail, and refurbish a limited number of key automatic weather and rainfall stations. This will also alleviate some of the Bureau's current infrastructure constraints, which was an issue acknowledged in the Review.

In relation to the issuing, interpretation and dissemination of flood warnings, the Review identified a lack of clarity regarding roles and responsibilities, inconsistent arrangements across different jurisdictions, and the absence of binding service level agreements. The Bureau's work in developing agreed service level standards is an important first step in clarifying its involvement in the provision of flood information. The Government will consult the States and Territories through the Australia-New Zealand Emergency Management Committee to develop a clearer pathway for flood management in Australia. The implementation of the next generation flood forecasting system mentioned above will allow the Bureau to provide more timely, accurate and effective flood forecasting and warning services against its defined roles and responsibilities.

Another strategic issue identified by the Review relates to potential improvements in the Bureau's services through enhancements of its supercomputing capacity. High performance supercomputing is essential to enable the rapid collation and analysis of vast amounts of observational information to provide forecasts from daily weather to severe weather events.

In response to the supercomputing options presented in the Review, the Government is investigating the Bureau's future supercomputing needs in line with the Government's requirements for major ICT investments.

The Review identified options for delivery of the Bureau's seasonal forecasting products and services. The Government agrees that the Bureau should not cease or reduce its seasonal forecasts, but that it should develop more targeted or improved products based on a fair and equitable funding model. This may include seeking opportunities for co-investment with other government agencies or the private sector.

The Review also identified broader strategic issues and options for the Government to consider, including the extent to which the Bureau should have a role in the delivery of particular services. Many of these issues and options relate to partnerships with States and Territories and other users. The Government will undertake further consultation to ensure all key stakeholders are involved in discussions on the Bureau's future role.

The Review recommended that the Government focus the Bureau's evolving environmental information role on natural hazards in the first instance. The Bureau's overarching vision is to provide Australians with environmental intelligence for safety, sustainability, well-being and prosperity. The Bureau has already begun its transformation to being the nation's authority in environmental intelligence. It is a critical listening post for changes in rainfall and temperature, the chemical composition of the atmosphere, surface and groundwater availability, land cover and soil condition, the temperature and chemical balance of our oceans, and pollutants in our air, water, soil and oceans.

The Bureau uses this information to deliver weather, climate and environmental intelligence that is a vital underpinning for governments and businesses in making economic, social and environmental decisions. It also provides all Australians with information that helps them plan their activities safely and sustainably. While the Government agrees that protection of life and property from natural hazards must always be at the forefront of the Bureau's priorities, it is committed to retaining and building on the investment made to date in the Bureau's broader role.

The Government's response and supporting funding recognises the Bureau's evolving role in meeting future demands and provides foundations on which the Bureau can continue to adapt to maintain its successful track record in delivering weather, climate and environmental intelligence. The response acknowledges that a number of the actions and options identified in the Review can only be successfully implemented in collaboration with key stakeholders or with additional revenue. The decisions we all make on our safety, sustainability, well-being and prosperity depend on the services the Bureau of Meteorology provides: the whole Australian community has a stake in the Bureau's future.

# Recommended priority actions to mitigate risks requiring early attention

## Priority Action 1:

Boost the number of frontline meteorologists to build response capacity in regional forecasting centres.

## Government response: Agreed

The Bureau plays a vital role in the protection of life and property during natural disasters. For this reason the Government is committed to supporting the Bureau's capacity to achieve this now and into the future.

The strengthening of frontline staffing capacity is key to this. The Bureau's expertise and services assist Australians in dealing with extreme events such as drought, floods, fires, storms, tsunamis and tropical cyclones. A key factor in the survival and recovery rates from natural disasters is the ability to provide accurate and timely warnings on the likelihood and location of extreme events to provide maximum opportunity for Australians to be prepared and to plan emergency responses. The Bureau contributes significantly to all the components of disaster management, from planning, to preparation, to response and finally in the recovery phase. A major part of these contributions comes from the Bureau's frontline weather and flood forecaster staff, and these numbers must therefore be maintained at levels that ensure the best possible weather and flood advice.

The Government considers that boosting the number of frontline meteorologists will help to mitigate the risk of a failure of warning services due to an insufficient number of suitably qualified staff in particular locations at critical times. As an initial and immediate response to the high priorities identified in the Review, the Government provided the Bureau with \$4.8 million funding in the 2012-13 Budget to improve the Bureau's frontline regional severe weather and flood forecasting capabilities. This measure allowed the Bureau to retain 17 internationally recruited meteorologist staff for 2012-13 and recruit and train nine meteorologists sourced from within Australia.

To help further boost the number of frontline meteorologists to the levels recommended by the Review, the Government will provide funding that will allow the Bureau to employ 25 additional meteorologists in 2013-14. The level of funding will increase over the next four years, allowing the Bureau to achieve the frontline meteorologist staffing levels recommended by the Review (42 meteorologists) in 2016-17.

This increase will allow the Bureau to operate forecasting services at more sustainable levels and help communities and emergency service agencies plan for and respond to dangerous weather events.

In addition, the Government is investing in the Bureau's ability to maintain its 24-hour, seven-day-a-week service during peak periods of demand (such as has occurred in the last three years), by establishing a new National Centre for Extreme Weather (see Option 26) within the Bureau that can respond to rapidly emerging hazards across the nation. A further eight meteorologists are to be recruited as part of the establishment of the National Centre to provide the surge capacity necessary for meeting periods of maximum demand on the Bureau's forecasting services.

## **Priority Action 2:**

Boost the Bureau's flood warning capacity by:

- (a) Increasing the number of frontline hydrologists
- (b) Upgrading the flood monitoring system.

## **Government response: Agreed**

The Australian Government is committed to ensuring that the Bureau of Meteorology's flood warning capacity is maintained at an appropriate level to ensure the Bureau can respond to extreme flood events in a timely and sustainable way.

### **Response to 2(a)**

As an initial response to the Review, the Government committed to an early boost of the Bureau's frontline flood forecasting capacity as part of the 2012-13 Budget. This allowed the Bureau to recruit and train seven new additional frontline flood forecasters.

To help boost frontline flood forecasters to the levels recommended by the Review, the Government has provided funding that will allow the Bureau to employ 12 additional hydrologists in 2013-14. The level of funding will increase over the next four years, allowing the Bureau to achieve the frontline flood forecaster staffing levels recommended by the Review (23 hydrologists) by 2016-17.

### **Response to 2(b)**

Monitoring systems are most effective when they provide data that supports flood forecasting systems that can issue forecasts and warnings when conditions change. Because of this the Government supports the Bureau's use of the best available support systems to deliver flood forecasting and warning services.

To this end, the Government has provided resources to implement a next generation flood monitoring and forecasting system. Similar to systems used by the United States' National Weather Service and the United Kingdom Met Office, the system will allow the Bureau to produce more timely, accurate and effective flood forecasting services. The new system will automatically ingest the best available rainfall forecasts along with radar, rainfall and river-height data and provide higher quality flood forecasts than currently possible. It will also enhance the Bureau's capability during extended flood events.

## Priority Action 3:

Formalise and standardise service levels provided to emergency services.

### Government response: Agreed

The Australian Government agrees to work with relevant agencies to harmonise and standardise the services with emergency service organisations and the Bureau of Meteorology.

The Bureau delivers warnings to State and Territory agencies for consideration, interpretation and dissemination within their jurisdictions. In 2011-12, the Bureau issued over 331,000 forecasts and over 21,000 warnings, covering floods, fires, cyclones, tsunamis, severe thunderstorms and heatwaves. Recent extreme weather events have led State, Territory and local governments to become increasingly more risk aware, investing heavily to improve their management of extreme weather events. Often, however, these investments do not take into account the technical support that may be required from the Bureau to give effect to risk mitigating initiatives. The increasing complexity of arrangements within and across jurisdictions, as well as variations in arrangements depending on the types of hazard concerned, is inhibiting the Bureau's ability to effectively meet expectations of emergency service organisations.

As part of establishing a National Centre for Extreme Weather (refer to Option 26), the Government has provided resources for the Bureau to commence work on developing a national approach to working with emergency services in each State and Territory. This activity will involve establishing the requirements of each State and Territory emergency service, and identifying the best possible approach to integrating with emergency services and national disaster responses. Possible measures include:

- introducing nationally consistent standards for an 'all hazards' approach to supporting emergency service organisations;
- adopting cost recovery approaches to the provision of tailored services to specific agencies or jurisdictions as appropriate;
- working towards standardised service level agreements with State, Territory and local government;
- working towards standardised cost recovery arrangements; and
- working towards standardised processes for developing new initiatives that involve intelligence from the Bureau.

# Recommended priority actions that involve strategic choices for Government

## Priority Action 4:

Agree clear allocation of responsibilities to State and local government for flood management, with defined boundaries on the Bureau's role and:

- a) As a minimum:
  - i. Agree to national standards for operation of flood monitoring networks and vest responsibility in fewer agencies
  - ii. Clarify roles and responsibilities for issuing flash flood warnings
- b) And either:
  - i. Focus the Bureau's role on data management and divest responsibility for flood monitoring infrastructure from the Bureau; or
  - ii. Expand and consolidate the Bureau's role in flood management by:
    - a) Re-organising operations (including a new Flood Operations Centre)
    - b) Enhancing the Bureau's flood monitoring network
    - c) Strengthening the collection and provision of flood data by third parties
    - d) Improving the information base for flood warnings, including access to flood risk maps.

## Government response: Agreed in part

The Australian Government recognises that an important first step to improving flood preparation, monitoring and warning arrangements is establishing clear and consistent roles and responsibilities for agencies involved in flood management at all levels of government. However, as identified by the Review, these issues cannot be resolved by the Bureau of Meteorology and Australian Government alone, and will require whole-of-government consultation and cooperation, with State and local governments.

Clarifying and communicating roles and responsibilities is an essential precondition to determining what is required of the Bureau, and therefore what action is needed to secure the necessary capacity. The Government agrees that, as outlined in Priority action 4 a) i), it will also be important to develop national standards for investment in, and operation of, flood monitoring networks and infrastructure. Nationally consistent service level agreements between the Bureau and all river height monitoring agencies would be a useful first step in clarifying the Bureau's role.

In relation to Priority Action 4 a) ii), as noted by the Review, achieving this outcome for flash flood warnings is a particularly complex task that cannot be completed in the short term. As indicated in the Australian Government's response to the *Interim Report of the Queensland Floods Commission of Inquiry*, the prime responsibility for flash flood warnings lies with States and Territories through local councils. The Bureau does not have the capacity to directly communicate with all councils during a major wide-spread disaster event on every occasion.

A comprehensive solution to all of these issues can only be achieved through broader consultation and cooperation with all levels of government. Therefore, the Australian Government will seek to progress this matter in 2013 through the Australian-New Zealand Emergency Management Committee (NEMC) and the Standing Council on Police and Emergency Management (SCPEM) under the Council of Australian Governments (COAG). This will ensure a proper process is followed to address the significant policy and service delivery challenges for flood management, identified by the Review under Priority Action 4 a) i) and ii). This process needs to be completed before any final decision is made on whether to divest some of the Bureau's responsibilities or expand the Bureau's role, as described under Priority Action 4 b) i) and ii).

The Australian Government has already taken some steps that address, in part, some of the priorities identified under Priority Action 4 b).

Under Priority Action 4 b) ii) d), the Review identified the need to improve the information base for flood warnings. The Bureau's current role is limited to predicting river height levels in certain catchments, while States and local governments provide specific information on the impacts of inundation levels on local areas. However, many are not in a position to provide the skills or resources to deliver an adequate interpretation, such as how a flood event is likely to impact individual properties or infrastructure. On 14 November 2011, the Australian Government committed \$12 million to establish a flood risk information portal. The portal will be hosted by Geoscience Australia and will provide a single access point to existing flood mapping data. The portal will be complemented by the development of national guidelines, covering the collection, comparability and reporting of flood risk information to improve data quality and consistency. This measure is an important step in assisting State and local governments to better interpret and undertake risk assessments on the potential impact of river heights and rainfall on their local areas ahead of flood events.

The Review also provided other options to expand the Bureau's role in flood management under Priority Action 4 b). Any decision to expand the Bureau's existing flood forecasting and warnings capacity is dependent on the outcomes of the COAG negotiations (described above). In the meantime, the Bureau will continue to seek efficiencies and improvements in its flood operations within the existing flood management arrangements and available resources. In particular, the new flood forecasting system identified against Priority Action 2 will help maximise the effectiveness of the data collected from the existing flood monitoring network.

## Priority Action 5:

Focus the Bureau's evolving environmental information role on natural hazards in the first instance.

### Government response: Agree in-principle

The Bureau of Meteorology will continue to deliver its existing natural hazard information services including severe weather, tsunamis, bushfire, space weather and flood warnings. These services constitute a large percentage of the overall services delivered by the Bureau.

The Review recommended that the Government focus the Bureau's evolving environmental information role on natural hazards in the first instance. The Bureau's overarching vision is to provide Australians with environmental intelligence for safety, sustainability, well-being and prosperity. The Bureau has already begun its transformation to being the nation's authority in environmental intelligence. The Bureau plays a critical role in monitoring and recording changes in rainfall and temperature, the chemical composition of the atmosphere, surface and groundwater availability, land cover and soil condition, the temperature and chemical balance of our oceans, and pollutants in our air, water, soil and oceans.

Under the ongoing *National Plan for Environmental Information (NPEI)* initiative, the Bureau is established as the Australian Government's central coordinating authority for environmental information. The Bureau is already doing substantial environmental information work, particularly in the area of water. The provision of environmental information is an evolving area of government activity. As there are further developments in this area, the institutional structures of the Bureau and relevant institutions will be kept under consideration.

The NPEI initiative, jointly implemented by the Bureau and the Department of Sustainability, Environment, Water, Population and Communities, is the first phase of a long-term Government commitment to improve the quality and accessibility of environmental information to assist decision-making and to help protect Australia's environmental assets into the future. The NPEI operates under the oversight of the Australian Government Environmental Information Advisory Group. Nine broad areas-of-interest have been identified for whole-of-government collaboration, and are detailed in the *Statement of Australian Government Requirements for Environmental Information*. These areas are biodiversity, biosecurity, climate change, environmental reporting, infrastructure and communities, natural resources, significant places, waste and pollutants, and water.

## Priority Action 6:

Explore opportunities to re-phase investments in large-scale projects and programs such as the Strategic Radar Enhancement Program, the NexGen Forecast and Warning System Products and the Improving Water Information Program.

## Government response: Agreed

The Bureau of Meteorology has explored savings opportunities in relation to the projects and programs set out above. Opportunities for achieving savings are limited and would impact on critically important deliverables.

A one-off saving of \$1.25 million was identified in the Strategic Radar Enhancement Program which was used to offset the boost to frontline staff numbers in the 2012-13 Budget. This was achieved by not proceeding with the relocation of the Wollongong radar. In its current location, this radar still provides coverage for the Illawarra region. Radars were installed under the Strategic Radar Enhancement Program at Hobart and Mount Isa in 2012, and at Waruwi in the Northern Territory in 2013, improving radar coverage and helping to deliver enhanced warnings and forecasts for Australia.

The Next Generation Forecast and Warning System is the Bureau of Meteorology's key project to modernise its forecast and warning functions and has been rolled out in Victoria, New South Wales, Tasmania, South Australia and Western Australia. The Next Generation Forecast and Warning System will be rolled out in Queensland in 2013 and the Northern Territory in 2014 as planned, enabling the Bureau to maximise future productivity gains using the system.

The *Improving Water Information Program* is a part of the Government's national water reform agenda and has now passed the half-way mark of implementation. The new services being developed and implemented through this program are aimed at improving the information base on which to manage vital water security issues facing Australia.

# Recommended priority actions for the Bureau to support consistent service standards and build organisational resilience

## **Priority Action 7:**

Complete the workforce planning project and succession plans as a matter of urgency.

## Government response: Agreed

The Bureau of Meteorology is currently progressing implementation of the Australian Public Service Commission's best-practice approach to workforce planning. The workforce planning project is assisting the Bureau to develop a deeper understanding of workforce movements and shortages and development requirements within occupational groupings and specialised skill areas, and to identify any potential risks to business delivery. Succession planning strategies are being reviewed and re-aligned based on workforce capability analyses undertaken as part of this approach. Development of the Bureau's job profile using the APS job family model was completed in the 2012-13 financial year. Implementation of the workforce planning project for critical roles will be completed in the 2013-14 financial year. Ongoing workforce planning will now be integrated with the Bureau's yearly business planning cycle.

## Priority Action 8:

Firm up approval processes and funding for any departures from provision of the basic product set.

### Government response: Agreed

The Bureau of Meteorology is currently developing a new Customer Service Charter that will be informed by a review of all Bureau products and services.

The new Bureau Customer Service Charter will include:

- a catalogue of the basic products and services that are available free-of-charge;
- a catalogue of customised products and services that are available at a cost;
- the arrangements for developing new products or services where there is customer demand; and
- the levels of services and performance standards the Bureau will meet.

As is currently the case, the majority of the Bureau's services, such as public weather information and warnings, will continue to be provided free-of-charge.

To support the Bureau's ongoing product and service development, the Bureau has established a new Enterprise Portfolio Management Office that is systematically improving the Bureau's project management. This new office is:

- strengthening investment decision-making;
- standardising the project authorisation process across the organisation;
- improving the monitoring and control of the scope of its investment portfolio through adoption of a standard project methodology (PRINCEII); and
- improving the Bureau's performance against the Australian Public Service P3M3 framework.

The new project authorisation process now ensures effective evaluation of benefits, stakeholders, outputs, costs, funding sources and delivery arrangements. This will improve funding and management of any new product or service developments.

## **Priority Action 9:**

Ensure the Bureau puts in place necessary planning and governance arrangements to develop its bid for capital funding to maintain its critical supercomputing capacity.

## **Government response: Agreed**

This priority action is linked to Option 27. The Government is investigating the Bureau of Meteorology's future supercomputing needs in line with the Government's requirements for major ICT investments.

## **Priority Action 10:**

Extend ICT governance arrangements to all applications and subject in-house development to rigorous approval processes.

## **Government response: Agreed**

The Bureau of Meteorology has an established governing body, the Business Information Technology Standing Committee, which oversees enterprise ICT matters. This Committee provides advice to the Bureau's Executive on the most efficient and effective approaches to managing and optimising the Bureau's complex ICT applications and technology. The Bureau maintains and implements ICT applications and technology that are essential to the delivery of the Bureau's core functions. This Committee is informed and supported by select technology and applications review groups which provide a coordinated approach to the management of the ICT function within the Bureau. Decisions around ICT resource allocation, project approval and project or program management are also subject to the Bureau's Enterprise Project Management Office governance framework.

The Bureau has already extended similar governance arrangements to data and information systems, channel management (web services) and all in-house developments.

## **Priority Action 11:**

Review disaster recovery and business continuity plans.

### **Government response: Agreed**

The Bureau of Meteorology's business continuity management system is based on the new international standard ISO22301, which requires that business continuity plans at all levels be reviewed and tested on a regular basis.

A review of ICT components of the Bureau's regional, National Meteorological and Oceanographic Centre, and Ionospheric Prediction Service business continuity plans is scheduled to be undertaken in 2013, following endorsement of the updated IT Branch business continuity plan.

The Bureau's second IT data centre commenced operating in late 2012 and is an important part of the Bureau's operational continuity and disaster recovery plans.

Redundancy for regional IT systems is provided through contingency arrangements, where regions are able to take over each other's mission-critical functions during severe service outages.

## Priority Action 12:

Start a project to introduce organisational process thinking with a view to standardising process and product specifications.

## Government response: Agreed

The Australian Government agrees that the Bureau of Meteorology should aim to achieve greater standardisation of its processes and product specifications. This Priority Action aligns closely with the proposed arrangements for managing the scope of the Bureau's product set, as outlined in the response to Priority Action 8.

As part of this response, the Bureau will:

- capitalise on the rollout of the Next Generation Forecast and Warning System to significantly increase the standardisation of its weather forecast and warning processes nationally;
- build on work already carried out to obtain ISO certification for weather services functions;
- formalise and standardise levels of service provided to emergency managers (further detailed in the response to Priority Action 3);
- review its basic product set to establish boundary limits above which commercial and cost recovery of products and services would occur (further detailed in the response to Priority Action 8); and
- establish a framework for the progression of innovations and projects within a strategic enterprise framework (further detailed in the response to Priority Action 13).

The Bureau will continue to utilise the practiced professional judgement of its frontline staff, which is of particular value in non-standard circumstances.

## Priority Action 13:

Focus leadership practices to re-orient culture away from customisation and experimentation and towards reliable, efficient and consistent documented processes.

## Government response: Agreed in part

The Bureau of Meteorology continues to invest in developing structured and collaborative processes to harness the innovation and specialised capability that resides within the Bureau's operations. This recommended action aligns closely with the proposed arrangements for managing the scope of the Bureau's product set and standardising processes and product specifications, as outlined in the responses to Priority Actions 8 and 12.

At the enterprise level, the Bureau is currently developing a new customer service charter that will be informed by a review of all of its products and services. The Bureau has also recently established an Enterprise Portfolio Management Office to systematically improve its project management practices, and has a maturing P3M3 framework. Opportunities to consolidate ICT resources across the agency are also being considered. This will lead to more business rigour, standardisation and efficiency in the Bureau's approach to ICT development.

Within forecasting, the Next Generation Forecast and Warning System currently being implemented will significantly increase the level of standardisation of the Bureau's forecast and warning processes. Greater standardisation in forecasting and warning processes will also be achieved through the implementation of the next generation flood forecasting system and an advanced storm tide prediction system, both of which are being funded by the Government. In addition, there is increasing use of competency based training programs for a number of specialist forecast and warning services and quality assurance accreditation for weather, flood and oceans warnings and forecast programs.

The Government and the Bureau of Meteorology will continue to encourage standardisation of the Bureau's processes while also fostering a culture of innovation and continual improvement. In terms of the products and services that the Bureau's processes deliver, the Government considers that where appropriate customisation should continue to best meet Australia's climate, water, weather and environmental information needs.

# Options that could provide savings, enhance efficiency or increase revenue for the Bureau

## Option 14:

Increased automation and outsourcing of observations.

## Government response

The Government agrees the Bureau of Meteorology should continue to actively pursue opportunities for efficiency including through increased automation and outsourcing of observations whilst investing in and maintaining essential core services. Over the past three decades, the Bureau of Meteorology has invested significant capital in the automation of observations. The number of staff required to take observations has approximately halved over that period while observation outputs have significantly increased in both quality and quantity. The roll-out of automatic weather stations across Australia has been the largest contributor to this change.

The Bureau will continue to pursue opportunities to increase automation, taking into account the value proposition and factors such as remoteness and accessibility of sites, environmental conditions, workplace safety, life cycle costs, quality monitoring and assurance processes, and conformance of data with user requirements. Automation does not completely remove the need for staff, as systems require regular maintenance and calibration, and periodic replacement. Increased automation also requires different skill sets and staff capabilities.

The Bureau will continue to use outsourced solutions for observations when the value proposition, safety and performance considerations align. Current outsourced arrangements include system development, elements of infrastructure installation and support, and provision of some observations. Surface observations have been historically outsourced on a large scale, with the Bureau currently utilising approximately 300 contract observers. Approximately, a further 6000 volunteers provide highly valued daily to monthly rainfall observations.

Changes to the observations network will continue to be driven by meeting the service demands of Australians, adapting to emerging demands associated with Australia's changing climate and keeping pace with advances in observational technologies that will deliver ongoing improvements.

## Option 15:

Explore options to limit forecaster intervention in site-specific web forecasts.

## Government response

The Bureau of Meteorology will explore options to limit forecaster intervention in site-specific web forecasts. In this regard, the Bureau is currently implementing the Next Generation Forecast and Warning System across Australia which is reducing the level of human intervention in the generation of forecasts. The Next Generation Forecast and Warning System has now been implemented in New South Wales, Victoria, Tasmania, South Australia and Western Australia. The Next Generation Forecast and Warning System will be rolled out in Queensland in 2013 and the Northern Territory in 2014. This has increased the number of site specific forecasts for up to seven days from only six capital city locations to 650 towns nationally.

The Next Generation Forecast and Warning System is underpinned by a set of forecast weather element grids, currently quality controlled by forecasters, for time intervals out to seven days ahead. Each weather element, for each time, is stored in the Australian Digital Forecast Database on a high-resolution 6 kilometre by 6 kilometre square grid and maps are generated for display in the Bureau's public web interface known as MetEye. MetEye was launched on 26 June 2013.

The Next Generation Forecast and Warning System has provided the capability to significantly reduce the requirement for forecaster intervention in site-specific web forecasts. The roll out of the Next Generation Forecast and Warning System has also promoted a culture of limited or no intervention in the system's output. The Next Generation Forecast and Warning System has enabled a significant increase in the number of locations that receive a site-specific forecast. However, in the limited circumstances where intervention is required, such as critical 'short fuse' warnings (e.g. severe thunderstorms) forecasters are able to interact with the weather grids. This intervention is enabled by specially designed grid editing tools. Information stored in the weather grids is also then used in the creation of text forecasts and warnings provided to the public utilising automated text generation software. These are only edited by Bureau forecasters if required.

Through the project, investment has already been made in reducing human intervention in editing grids and forecast text by development of:

- automatic text generation tools;
- enhancement to the underlying numerical weather prediction guidance fields;
- blending of various sources of guidance to improve output;
- better down-scaling of guidance to the required resolution and weather elements needed; and
- monitoring tools to detect problem areas in the output.

The implementation of the Next Generation Forecast and Warning System has significantly improved automated forecast preparation procedures and increased focus on high-impact weather events. The work proposed to be undertaken in response to Priority Action 3 to standardise service levels to emergency service organisations is also expected to identify options to further improve automation.

## **Option 16:**

Centralise media services and establish protocols for media activity.

## **Government response**

The Bureau of Meteorology has established a centralised enterprise-wide communication function which commenced operation in October 2012. The Bureau has consolidated a number of its communication-focussed teams, including media services.

This action will improve resource efficiencies and operational synergies by providing greater flexibility and improved coordination across a wider communication team, particularly during extreme weather events.

The Bureau's media strategy and procedures and guidelines for media management and response have also been refreshed to align with and support the centralised communications function.

## Option 17:

Foster private sector service providers who can offer tailored services or broadcast high quality presentation of general purpose weather information.

## Government response

The Bureau of Meteorology continues to foster private sector service providers who can offer tailored services or broadcast high quality presentation of general purpose weather information.

The Bureau provides the private sector with access to extensive quantities of data that can be used to add value and redistribute to customers through their websites, mobile applications and other services. These arrangements are currently managed through a registered user service which the Bureau provides on a cost-recovery basis.

The Bureau regularly convenes meetings with private meteorological providers to foster the use of Bureau information. It is through this collaborative process that the Bureau was able to accommodate the private sector requirements for warning sub-titles on national television.

## Option 18:

Review level of investment in research activities to free up budget and reduce pressure on computing capacity.

## Government response

The Bureau of Meteorology's investment in research is delivering significant benefits to the Australian public. Narrowing the scope of research activity to focus on immediate operational requirements could pose some risk to the ongoing effectiveness of meteorological operational systems as well as the Bureau's ability to maintain scientific currency and meet future customer requirements. It could also reduce the potential for improvements through innovation.

Nevertheless, the Bureau has undertaken considerable work in line with this option. In 2012-13, savings of around five per cent have been extracted from research resources to meet efficiency targets and support higher priority actions. There is a continuous process of testing the relative value of research investments compared to other priorities.

The Bureau's research activities were also recently examined as part of the 2011 Science Review of the Centre for Australian Weather and Climate Research (CAWCR). The objective of the review, chaired by Professor David Griggs of Monash University, was to assess the quality of CAWCR's science capability, its competitive position nationally and internationally, efficiencies offered by CAWCR and the degree to which it enhances the performance of its partners, the Bureau and the Commonwealth Scientific and Industrial Research Organisation (CSIRO). The review of CAWCR found that CAWCR 'represents a major achievement that has brought considerable benefit to both partners and their stakeholders, and it should be continued and strengthened'.

The Bureau of Meteorology considers that its research activities are not placing direct pressure on computing capacity. The management of supercomputing cycles ensures that research cycles are used to maximise the return on the investment in supercomputing infrastructure by ensuring all available cycles are utilised during those times when the equipment is not required for operations.

At the same time, while the research program is a user of the Bureau's supercomputer, reductions in research activity would not necessarily lead to a decrease in peak supercomputer demands, as research activities utilise the supercomputer's capacity only during periods when it is not being used for operational purposes. Discussion of the Bureau's supercomputing capacity is provided in the response to Priority Action 9 and Option 27.

Compared to international meteorological services, the Bureau devotes a relatively small amount of investment to research activities. An independent peer review, provided as input to the 2011 Science Review of CAWCR, showed that the Bureau spends around four per cent of its Budget on research, compared to 20 per cent for its international counterparts. In 2011-12, the Bureau contributed 61 per cent of its share of CAWCR's operating Budget, with the remaining 39 per cent generated from external earnings. This external funding provides significant benefit to the Bureau, with the majority of externally funded activities contributing directly to the Bureau's operational systems. For example, the Australian Climate Change Science Program, supported by the Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education (DIICCSRTE), enables a more efficient and effective approach to the Australian Community Climate and Earth System Simulator (ACCESS) model, with demonstrated scientific advantages, to the benefit of the Bureau and DIICCSRTE. Such initiatives provide flexibility and encourage greater intra-government partnerships.

## Option 19:

Review and rebalance relative investment in long-term climate modelling and medium-term seasonal outlooks.

## Government response

The Bureau of Meteorology's investment in both long-term climate modelling and medium-term seasonal outlooks delivers important benefits for the Australian public. The Bureau will continue to review and rebalance relative investment, where appropriate, to meet demands placed on the Bureau's services and priority areas. The existing level of relative investment reflects current priorities in climate modelling medium-term seasonal outlooks. Long-term climate modelling is important for informing Australian Government policy development and is currently the most cost effective mechanism for scientific model development to support the Bureau's operations.

The Bureau's engagement with long-term climate modelling is explicitly arranged so that it benefits all earth system modelling in the Bureau, including seasonal prediction and weather prediction. Co-investment in common modelling infrastructure—the Australian Community Climate and Earth System Simulator (ACCESS) model—by the Bureau, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education and the Rural Research and Development Corporation's *Managing Climate Variability Program*, among others, delivers efficiency and scientific excellence that would likely not otherwise be available.

There is a strong nexus between weather, seasonal and longer-term climate modelling, with the investment in long-term climate modelling and seasonal outlooks consistent with the Bureau's investment in the long-term observed climate record. Through the Centre for Australian Weather and Climate Research (CAWCR), the Bureau and CSIRO work in partnership to build knowledge and understanding of climate systems. The CSIRO is also focussed on developing scientific knowledge to improve Australia's ability to adapt to the impacts of climate change. In accord with its mission, the Bureau gives priority to weather prediction and seasonal climate modelling, but levers significant benefit through involvement in long-term climate modelling. Reallocating resources from this activity may constrain the Bureau's ability to provide effective advice on climate matters, including climate-related risks faced by the community.

*A Plan for Implementing Climate Change Science in Australia* (the Plan) identifies the importance of long-term climate modelling, particularly for decision-making in regard to adaptation to climate change and as a critical input to setting appropriate greenhouse gas emissions reduction targets. ACCESS is critical to delivering this national benefit, providing Australia with a competitive information edge and serving the needs of the nation.

Around 11 per cent of the Bureau's funding for core climate change research (excluding investments in the ACCESS model that are rooted in weather and seasonal prediction) is sourced from the Bureau's Budget allocation, with 89 per cent obtained from external sources. These external funding contributions could be put at risk if the Bureau reduced its own funding allocation.

The ACCESS model has now largely delivered on its initial weather and climate change objectives, allowing seasonal prediction to become a relatively higher priority, with the Bureau currently reviewing options for accelerating development of this activity.

Further discussion of the Bureau's seasonal forecasting and prediction activities is provided in the response to Options 23, 24 and 28.

## Option 20:

Cease or reduce the Ionospheric Prediction Service or offer it as a commercial service.

## Government response

An independent review of Ionospheric Prediction Service (IPS) operations will be undertaken to consider the future demand for space weather products and services in Australia and the most effective and efficient options for delivering these activities. The review will be conducted in consultation with a broad range of IPS stakeholders, and will assess the challenges and opportunities the IPS faces based on its present size and scope, including the potential for greater cost recovery and commercial services across the full range of its activities. The review will report to the Director of Meteorology by the end of 2013.

The IPS is recognised as the leading space weather service in the southern hemisphere. It provides space weather services that are essential for undertaking activities in defence and national security, emergency services, remote rural mobile communications, navigation, high-frequency radio and satellite communications and electricity transmission, as well as activities in the aviation, resource exploration and maritime industries.

Services provided to Australian-based users involve considerable analysis of Australasian region data and cannot be delivered by overseas satellite or ground-based data providers to meet their needs. The risks to Australian-based space weather users from possible impacts of large space weather events, such as damage to satellite components, distortion of long-distance radio signals and disruption to electrical power systems and pipelines, would increase in the absence of analysis and prediction services provided by the IPS.

The IPS's services support the daily radar and high frequency communications activities of the Department of Defence and are important inputs to the activities of the CSIRO and Geoscience Australia. Internationally, the IPS supports the activities of the International Civil Aviation Authority and the World Meteorological Organization (WMO), where it is one of only a few international space weather services to provide ionospheric, geomagnetic and solar activity information through the WMO website. The provision of these services also bolsters Australia's standing in the international space community, and affords Australia access to information from other meteorological agencies that is utilised by the Bureau of Meteorology, the Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education and the Department of Defence.

The IPS currently recovers a small proportion of its cost base from the sale of data processing and analysis services, as well as revenue from communications consultancies and sales of systems, software and user training.

## **Option 21:**

Apply a consistent cost-recovery model to all services delivered to State/Territory fire agencies.

## **Government response**

The Australian Government agrees that the Bureau of Meteorology should apply consistent cost-recovery arrangements to all services delivered to State/Territory fire agencies. Establishing consistent arrangements is one of the outcomes the Government is funding in 2013-14 through the work to develop standardised national service levels, in response to Priority Action 3, and as part of establishing a National Centre for Extreme Weather, in response to Option 26.

In addition, the Bureau of Meteorology has commenced work with the Australasian Fire and Emergency Service Authorities Council (AFAC) to develop a national set of fire weather products. This will include definition of the standard product set outside of which cost recovery will apply.

The Bureau regularly reviews and updates its cost recovery arrangements consistent with the Australian Government Cost Recovery Guidelines. These guidelines establish a framework for consistent, transparent and accountable cost-recovery arrangements, which promote the efficient allocation of resources.

## **Option 22:**

Explore options to obtain revenue from advertising on the Bureau's website.

## **Government response**

The Government has decided to proceed with permanent advertising on the Bureau's website to continue to support Government priorities and the Bureau's services. This decision replaces the 2012-13 Budget measure to trial website advertising for 12 months.

A publicly available advertising policy will govern the types of advertising permitted on the Bureau's website.

## **Options 23, 24, 28: (These options all relate to the Bureau's seasonal forecasting capacity)**

Option 23: Phase out seasonal prediction development and modelling and rely on products generated elsewhere.

Option 24: Fund delivery of improved seasonal forecasting services by:

- (a) Identifying potential offsets from government beneficiaries of any additional investment in seasonal forecasting services
- (b) Undertaking market research to establish industry willingness to pay for enhanced seasonal forecasting services

Option 28: Improved seasonal forecasting capabilities

- (a) Improved presentation of existing products
- (b) Enhanced capability—keeping pace with international standards

## **Government response**

### **Option 23**

The Bureau provides a world class climate service, including its Seasonal Climate Outlook and other supporting products such as the El-Niño Southern Oscillation (ENSO) 'wrap up'. These products are relied upon by a broad range of stakeholders and users to make important planning and resource allocation decisions, including the agriculture sector and increasingly by entities in water management, health, energy, tourism, financial services and insurance. These activities also provide an indication of the likelihood of extreme weather events such as heatwaves, bushfires or floods occurring in the coming season and are of high value to the general public and essential to State and Territory emergency management agencies.

The quality and accuracy of seasonal products would be compromised if the Bureau were to rely on international meteorological services to supply climate data, as their capacity to provide accurate and useful seasonal forecasts in Australia is limited.

### **Option 24**

The Government supports exploring options for funding the delivery of improved seasonal forecasting services with the support of government beneficiaries and industry as suggested by this option. However, any significant enhancements to the Bureau's seasonal forecasting products and services (under these conditions) should be based on the demands of users, their willingness to contribute to the costs of provision, and the most appropriate role for the Bureau. The Bureau will continue to engage with industry users and other stakeholders to fully explore opportunities to optimise its seasonal forecasting products and services and to keep pace with international standards.

### **Option 28**

The Bureau is currently implementing changes to improve the useability and functionality of seasonal forecasting products on its website, including improved presentation of existing products. Opportunities also exist for the Bureau to enhance its product offerings to meet the specific needs of individual sectors through forecasts provided at a higher resolution, over targeted time periods and with greater geographical specificity. Such improvements would present a number of potential benefits, particularly to the private sector and State and Territory government agencies.

## Option 25:

Lower yield options identified by the Bureau

- (a) Reduce staffing at remote observing stations
- (b) Close the training facility at Broadmeadows, Victoria
- (c) Consolidate forecasting functions for Northern Queensland
- (d) Outsource the Bureau's library

## Government response

The Bureau of Meteorology continually reviews its operations to ensure that services are delivered in the most efficient way possible. The four options provided here represent a subset of a far wider field of options either previously considered by the Bureau, or under consideration, to deliver efficiencies and meet budgetary targets.

### **(a) Reduce staffing at remote observing stations**

The reduction of staff at remote observing stations is closely linked to Option 14 and the Bureau is examining this possibility in the context of increasing automation. As new observations technology becomes available, each site is reviewed to determine the most cost-effective option for delivering the required parameters. In 2011-12 the Bureau fully automated its observing station at Eucla in Western Australia.

### **(b) Close the training facility at Broadmeadows, Victoria**

The Bureau considers that closure of the training facility at Broadmeadows is not feasible at this time. The facility simultaneously serves to support both training and operational requirements, including radar testing and hands-on training for automatic balloon launchers and radars. The closure of the facility, without a suitable replacement, would compromise the Bureau's ability to test and calibrate equipment, and to train its personnel.

Alternative means of satisfying the operational and training requirements that the facility currently meets will be kept under review by the Bureau.

### **(c) Consolidate forecasting functions for Northern Queensland**

The Bureau is focusing efforts on improved forecasting services for Northern Queensland. The delivery of the Next Generation Forecast and Warning System in 2013 will significantly increase the number of seven-day forecasts available. The Bureau will continue to manage forecaster distribution to ensure essential operations are fully supported.

**(d) Outsource the Bureau's library**

The Bureau has provided a library service since 1908. The collection is a unique repository of specialist science literature that consists of books, manuals, and periodicals in print, electronic and audio-visual formats. It is the only library in Australia that undertakes to collect everything of meteorological relevance that is published in English.

The Bureau's library services have not been formally reviewed since 1996. Since that time, the way information is accessed has changed radically with the advent of the internet, online journals and other electronic communications. The Bureau has also undergone significant change during this period. For these reasons, an examination of the library and its services is appropriate, if not overdue.

A formal review of library services commenced in early 2013 and the report will be finalised for the Director's consideration by August 2013. The review will examine all aspects of the library's services.

# Options to provide enhanced services where there is proven demand

## Option 26:

Additional frontline meteorologists and specialised centres and systems

- (a) Enhanced severe weather units
- (b) National extreme weather centres
- (c) Integrated all-hazards decision system
- (d) Enhanced observation network

## Government response

The Australian Government agrees with the Review's finding that these measures would increase the Bureau of Meteorology's level of capability to respond to severe weather events across Australia and inform enhancements in the Bureau's observation network.

The Australian Government agrees to the establishment of a new National Centre for Extreme Weather (within the Bureau) that provides:

- (a) a national focus for extreme weather intelligence and capability;
- (b) enhanced severe weather capacity during periods of sustained demand; and
- (c) subject to a scoping study, an integrated all-hazards decision system consistent with the Bureau's legislation and mission that can respond to rapidly emerging meteorological and related hazards across the nation, including but not limited to: tropical cyclones, fire weather conditions, riverine flooding, heavy rainfall leading to flash floods, storm tides, monsoon lows, dust storms, emergency dispersion modelling of chemicals and other particulates, tsunamis, east coast lows, blizzards, heatwaves, volcanic ash, road weather alerts, severe swells producing dangerous surf, long period waves causing dangerous conditions for rock fishers, marine weather warnings and high seas ocean warnings.

The Government has funded the establishment of the National Centre that:

- brings together the specialist skills and expertise required to provide services for extreme weather events;
- maximises the use of any additional weather and flood forecasters that can be employed as funding becomes available;
- deploys additional 24-hour, seven-day-a-week assistance during periods of sustained demand;
- ensures the Bureau continues to use and grow Australian expertise;
- provides consistent national forecasting and warning of extreme events, regardless of jurisdiction, by providing additional capacity to deliver briefing to national emergency response efforts and the media;

- reviews ongoing performance of forecast and warning services so that the lessons learnt may be fed back into operations and service improvements;
- accelerates the deployment of specialist prediction models, systems and forecasting expertise to improve current forecasting, commencing in 2013-14 with fire and flood warning functions; and
- scopes the next generation of all-hazard prediction models, systems and forecasting processes to ensure Australia continues to maintain a strong and sustainable meteorological service into the future.

In establishing the National Centre, the Government has also funded:

- the implementation of a next-generation flood forecasting system similar to that used by the United States' National Weather Service and the United Kingdom Met Office to produce more timely, accurate and effective flood forecasting services;
- the development of an advanced storm tide prediction system to provide accurate warnings of the probability and extent of storm surge and extreme waves arising from severe weather such as tropical cyclones and storms;
- the development of national standards (harmonising State and Territory emergency service arrangements) by investigating ways for the Bureau to better integrate with emergency services (refer to Priority Action 3 for more detail); and
- the scoping and development of an integrated all-hazards decision system to effectively integrate all of the relevant hazard information (available to the Bureau) onto a single platform to strengthen the Bureau's frontline forecasting and warning capability.

Further discussion of the Bureau's capability to respond to severe weather events is provided in the response to Priority Action 1.

As noted in the response to Option 14, in relation to enhanced observations networks, the Government agrees the Bureau of Meteorology should continue to actively pursue opportunities for efficiency including through increased automation and outsourcing of observations whilst investing in and maintaining essential core services. The Bureau manages a large and complex infrastructure fleet that is vital for providing the observations underpinning its forecasts and warnings. Much of the Bureau's infrastructure is towards the end of its life and becoming increasingly fragile. Extended radar outages in Western Australia, the Northern Territory and Queensland during January 2013 highlighted the vulnerability of at-risk Australian communities when aged but critical observing infrastructure fails.

To help upgrade the most critical aspects of the Bureau's observation network, the Government has provided \$3.7 million in 2013-14 to allow the Bureau to undertake infrastructure repairs and upgrades. This is an essential short-term investment that will support the Bureau's forecasting processes and its ability to meet the high level of community demand for up-to-the-minute data by providing funding to install communications links to regional forecasting centres, repair radars that fail, and refurbish a limited number of key automatic weather and rainfall stations. The Government will continue to consider opportunities for network enhancements.

## **Option 27:**

Upgrade to the Bureau's supercomputing capacity

- (a) Status quo
- (b) Step change
- (c) Further enhancements

## **Government response**

This option is linked to Priority Action 9. The Government is investigating the Bureau of Meteorology's future supercomputing needs in line with the Government's requirements for major ICT investments.

## Option 29:

Explore use of social media to enhance data gathering from authorised and informal sources and to disseminate weather information.

## Government response

In early 2012 the Bureau of Meteorology finalised its Social Media Strategy and Roadmap 2012-14 which outlines a national approach to all social media activities for the Bureau. The Strategy and Roadmap provides clear objectives and actions, highlights targeted user groups and identifies associated risks and benefits, to guide the development of an implementation of social media within the agency.

The Bureau has been communicating with the public via social media since 2011 through its own Facebook page. This has provided a new avenue to reach and educate the Australian community and promote the Bureau's products and services.

The Bureau is also investigating options to enable the gathering of data from across social media sites and the internet in real time during severe weather events to help inform decision-makers.

The Bureau is trialling a web-based self-lodgement system to allow third-party data providers to contribute to and access meteorological observations and associated metadata in a standardised format.







Australian Government