



Australian Government
Bureau of Meteorology



Annual Report 2022–23



Our vision

To be an organisation of global standing, that is highly valued by the community for our pivotal role in enabling a safe, prosperous, secure and healthy Australia.

Our mission

To provide trusted, reliable and responsive weather, water, climate, ocean and space weather services for Australia – all day, every day.

Our Strategy

Our Strategy is focused on four pillars of success:

Impact and value

Products and services that enhance the wellbeing of all Australians.

Operational excellence

Outstanding people supported by secure, effective and resilient systems, processes and technology.

Insight and innovation

Practical implementation of novel, mission-directed solutions for our customers.

The Bureau way

One enterprise that lives its values through agreed behaviours every day.

Letter of transmittal



Australian Government
Bureau of Meteorology



Office of the CEO

The Hon Tanya Plibersek MP
Minister for the Environment and Water
Parliament House
CANBERRA ACT 2600

Dear Minister

As the accountable authority for the Bureau of Meteorology (the Bureau), I am pleased to present the Annual Report of the Bureau of Meteorology for 2022–23. The report details our ongoing efforts to provide trusted, reliable and responsive weather, water, climate, ocean and space weather services for Australia – all day, every day. The report has been prepared in accordance with section 46 of the *Public Governance, Performance and Accountability Act 2013* which requires that you present the report to the Parliament.

In accordance with the *Public Governance, Performance and Accountability Rule 2014*, I certify that the Bureau has a fraud risk assessment and fraud control plan, and has in place appropriate fraud prevention, detection and investigation procedures for dealing with, recording and reporting fraud, and that all reasonable measures have been taken to deal appropriately with fraud relating to the Bureau.

Yours sincerely

A handwritten signature in black ink, appearing to read 'A. Johnson'.

Dr Andrew Johnson FTSE FAICD
CEO and Director of Meteorology

19 September 2023





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The Bureau at a glance

Our purpose

Our purpose is defined by our mission:

To provide trusted, reliable and responsive weather, water, climate, ocean and space weather services for Australia – all day, every day.

To achieve our purpose – across the domains of weather, water, climate, oceans and space weather – we:

- monitor and report on current conditions
- provide forecasts, warnings and long-term outlooks
- analyse and explain trends
- foster greater public understanding and use of the information we provide
- continue to extend our understanding of, and ability to forecast, Australian conditions.

Our vision

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Authority

The Bureau operates under the authority of the *Meteorology Act 1955* and the *Water Act 2007*. The Bureau is an Executive Agency under the *Public Service Act 1999*, and a non-corporate entity under the *Public Governance, Performance and Accountability Act 2013*. The *Meteorology Act 1955* requires the Bureau to fulfil Australia’s international obligations under the Convention of the World Meteorological Organization (WMO) and related international treaties and agreements.

Portfolio and ministers

At 30 June 2023, the Bureau operated within the Climate Change, Energy, the Environment and Water Portfolio reporting to the Minister for the Environment and Water, the Hon Tanya Plibersek MP.

Funding

The Bureau receives the majority of its funding from the Australian Government (\$345.5 million in 2022–23). Additional revenue (\$101.8 million in 2022–23) was derived from other sources, including the sale of goods and services. More information is provided in the Financial resource management chapter (p.203) and in the Climate Change, Energy, the Environment and Water Portfolio Budget Statements 2022–23.

Under the Portfolio Budget Statements, the Bureau is responsible to the Australian Government for Program 1.1 – Bureau of Meteorology, and for delivering the following outcome:

Enabling a safe, prosperous, secure and healthy Australia through the provision of weather, water, climate, ocean and space weather services.



Top: Senior Meteorologists Rosa Hoff and Baden Gilbert in National Production Services in Brisbane. Bottom: Ashwin Naidu, Aviation Customer Lead at the 2023 Avalon Airshow.

Our staff

At 30 June 2023, the Bureau had 2,374 total staff, including 1,583 ongoing staff, 213 non-ongoing staff, and 578 contractors, as well as over 3,100 volunteer rainfall observers who help maintain Australia's climate record. More information can be found in the People management chapter (p.180).

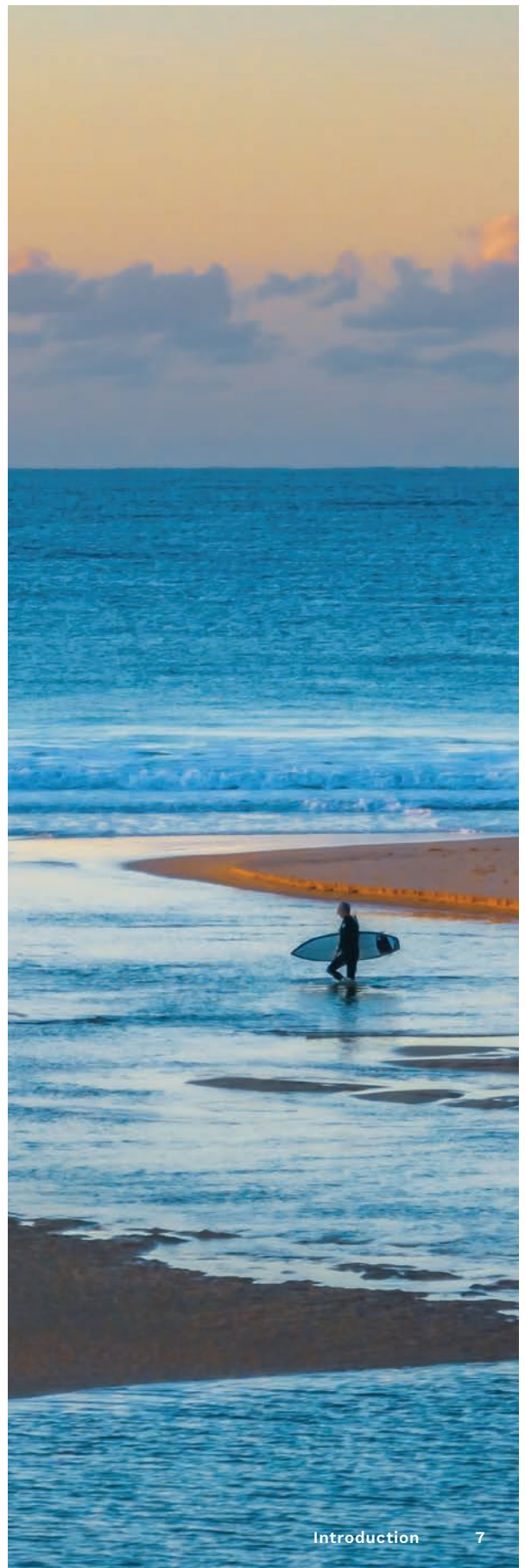
Bureau staff are located across Australia, on remote islands and in Antarctica. The Bureau's administrative and operational headquarters are in Melbourne. The Bureau observe and forecast from the Antarctic to north of the equator, and from the Indian Ocean to the Pacific. More information on the location of our staff and services is provided in the Agency overview (p.28).

Our values

The values that guide our behaviours are:

- safety
- integrity
- customer focus
- passion and tenacity
- responsibility
- humility.

More information on the Bureau's values can be found in the Agency overview (p.28).



The impact and value of our work

The Bureau is entirely focused on providing products and services that enhance the wellbeing of all Australians. Here are some of the ways the Bureau contributes to a safe, prosperous, secure and healthy Australia.



Our severe weather forecasts and warnings

- alert Australians to protect themselves and their property from severe weather such as tropical cyclones, thunderstorms and damaging winds
- enable communities to prepare for and respond to the effects of heavy rainfall including flash flooding
- support emergency services agencies to carry out effective emergency and disaster preparation, response and recovery.



Our flood watches and warnings

- alert Australians to protect themselves and their property from riverine flooding
- enable communities to prepare for and respond to the effects of flooding, including making timely evacuations
- support emergency services agencies to carry out effective emergency and disaster preparation, response and recovery.



Our fire weather forecasts and warnings

- alert Australians to weather conditions conducive to the spread of dangerous bushfires
- help state and territory fire agencies predict fire conditions and make decisions about total fire ban days and bushfire warnings
- allow emergency services to pre-position personnel and equipment to minimise fire damage.



Our marine and ocean services

- support safe navigation of Australia's local and coastal waters and high seas
- alert Australians to dangerous winds, waves, tides, currents and surf conditions
- support ports and shipping operations, fishing and aquaculture industries
- support safe and efficient operation of offshore infrastructure such as windfarms and oil and gas platforms.



Our aviation and defence forecasts and warnings

- facilitate safe and efficient aviation sector operations
- inform flight planning and fuel load decisions
- provide alerts on hazardous weather and atmospheric conditions such as turbulence and volcanic ash
- support Australia's defence operations in Australia and overseas including anticipating global climatic events.



Our UV forecasts and heatwave warnings

- help Australians avoid dangerous UV exposure, to protect against skin cancer
- help protect vulnerable Australians against heat exhaustion and heatstroke
- alert health authorities to periods of heightened demand
- allow energy operators to prepare for increased power demand.



Our climate maps and information

- help Australians understand the nation's climate patterns, trends and variations, and climate-related risks
- support natural resource managers to respond to climate risks and opportunities
- inform solar, wind and hydropower installations and production potential
- support insurance claims processes
- support the development of climate-appropriate infrastructure.



Our water and environmental information services

- underpin water planning, efficient water use and water operations
- guide investment in and maintenance of water infrastructure, and aid decision-making in water supply and irrigation activities
- provide transparency to communities and water users around water management and trade
- support ecosystem management.



Our seasonal climate outlooks

- help farmers make decisions about crop planting, fertiliser application and stock management
- allow emergency managers to prepare themselves and their communities ahead of flood, bushfire and tropical cyclone seasons
- help retailers and tourist operators tailor their activities to seasonal variations.



Our everyday weather forecasts

- help Australians plan their everyday activities, from the daily commute, sporting and outdoor activities, to hanging out washing
- support activities in the construction and transport industries
- help tourism operators and event managers optimise their activities and events, and prepare contingencies when required.



Our space weather forecasts

help defence, aviation, energy, emergency services, and space industries to manage and mitigate the impacts of space weather

help Australians understand how space weather can significantly disrupt the technology that underpins our energy, transport, communication, navigation and financial systems.

2022–23 snapshot

Eye on the environment

69

weather radars

720+

automatic weather stations

13

wind profilers

38

upper air balloon stations

5,600+

hydrological monitoring stations
operated by the Bureau and its partners

~3,100

volunteer rainfall observers

41

sea level stations

43

wave buoys operated by the Bureau
and its partners

54

drifting meteorological buoys

6

ozone monitoring sites

13

terrestrial solar radiation monitors

21

space weather observation stations

30+

satellites operated by
international partners

What we delivered

698,000+

public forecast services

~161,000

marine safety broadcasts

22,000+

weather and ocean warnings

6,000+

flood watches and warnings

18,000+

fire weather forecasts and warnings

1.5 million

aviation forecast products

835+

briefings to the Australian
Government's National Situation Room

500,000+

climate graphs and charts

139

peer-reviewed scientific
journal articles

~110

climate briefings

268

locations in the seasonal
streamflow forecasts service

The reach of our services

almost 1.4 million

Facebook followers

774,000+

Twitter followers

191,000+

Instagram followers

10.4 million

total BOM Weather app downloads
(since launch)

2.3 million

BOM Weather app downloads
(during 2022–23)

688 million

visits to the Bureau's website

5,450

responses to media enquiries

139

media releases issued

~99%

of the population covered
by a Bureau radar

~91%

of the population within 20 km of a
Bureau automatic weather station

Our service highlights

99.0%

uptime of automatic weather stations

95.5%

uptime of weather radars

97.2%

uptime of wind profilers

99.9%

uptime of the Australis
supercomputer

Top 5

performance of ACCESS among
global forecasting models

15.6 minutes

average time from earthquake
to tsunami bulletin

Top ranked

free weather app in Australia in both
the Apple and Google Play stores

84%

of users satisfied with the
BOM Weather app

+47

Net Promoter Score for
community customers

+58

Net Promoter Score for emergency
management customers and partners



How we performed

The Bureau's performance is measured against 12 strategic success measures. For each measure, a critical assessment determines whether the Bureau's performance met expectations, partially met expectations or did not meet expectations. For more information see the Annual Performance Statement (p.33).

Impact and value

The financial and social value we deliver to government, industry and the Australian community.

Performance met expectations

The levels of satisfaction and trust our customers, partners and stakeholders have in the products and services we provide.

Performance met expectations

The utilisation of our services by new customers and the return rate from existing customers.

Performance met expectations

Operational excellence

Our delivery against agreed customer requirements and commitments.

Performance met expectations

Capacity utilisation, system reliability, security and resilience benchmarked against best practice.

Performance partially met expectations

Verification of our products and services.

Performance met expectations

Insight and innovation

The depth, breadth and quality of our external partnerships and collaborations.

Performance met expectations

The conversion rate of ideas to opportunities to customer outcomes.

Performance partially met expectations

The quality and application of our research and development, benchmarked internationally.

Performance met expectations

The Bureau way

Our performance benchmarked internationally against work health, safety and environment best practice.

Performance met expectations

Individual and team actions demonstrate commitment to enterprise values and behaviours.

Performance met expectations

A diverse and inclusive workforce, that reflects the communities we serve.

Performance did not meet expectations

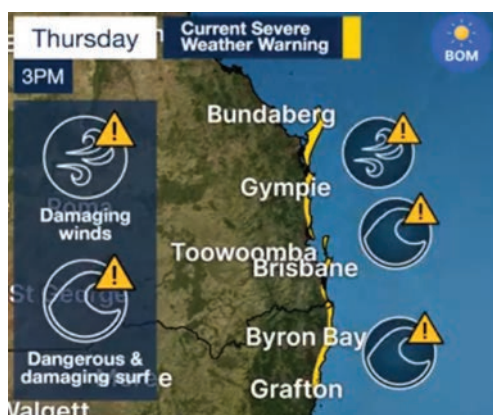
National weather event summary

July

4-7: An east coast low brought several days of heavy rainfall around Sydney and resulted in major flooding of the Hawkesbury-Nepean River, the Hunter Valley and the New South Wales North Coast. A natural disaster was declared for New South Wales following the flooding and heavy rainfall.

12: Fog covered Adelaide's western suburbs and caused several flight cancellations and many more delayed throughout the day.

21-25: An east coast low brought strong winds, rain and heavy seas to south-east Queensland and north-east New South Wales. Swells up to 2.5 m extended north from the Gold Coast to the Capricorn Coast and a hazardous surf warning was issued for the Gold Coast.



August

2: Widespread areas of fog over South-East Queensland delayed flights at Brisbane Airport and reduced visibility around Brisbane.

4: High minimum temperatures across much of south-western Queensland, inland New South Wales and the southern Northern Territory, with large areas more than 10 °C above the August average.

5-8: Minor to major flooding occurred along the Western Slopes of New South Wales, with residents in low lying areas of Wagga Wagga evacuated.

13-17: Heavy rainfall to Victoria and Tasmania, with eastern Tasmania and West Gippsland in Victoria receiving multi-day rainfall totals of 50 to 100 mm. Several rivers in West Gippsland and eastern Tasmania experienced minor to major flooding.

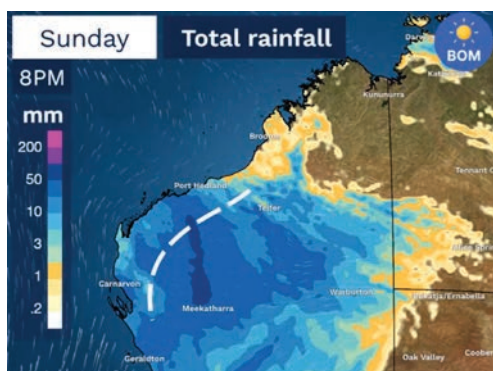
23: Several centimetres of snow settled across the New South Wales Blue Mountains and around Orange, closing roads and delaying trains. A cold front that crossed South Australia brought the state's first reports of snow this winter as snow settled on Mount Remarkable.

29-30: Strong winds and severe thunderstorms crossed western and northern Victoria. There were reports of hail around Mildura and Wentworth (2 to 5 cm diameter) and a funnel cloud and a possible tornado were observed near Lake Tyrell in north-west Victoria.

29: North-easterly winds (Fohn Winds) over western Tasmania resulted in record high August daily maximum temperature at many sites, including Strahan which recorded the highest temperature of 22.5 °C, a daily record for August.

September

3-4: Large parts of the Pilbara and Gascoyne districts in Western Australia received their highest September rainfall on record. Rainfall totals in the inland Pilbara, Gascoyne, Central West, Lower West and Central Wheat Belt were approximately 10 times the September average and contributed to the wettest September on record in affected areas.



4: A low pressure system off the east coast of Australia brought strong winds to Lord Howe Island, with a wind gust recorded at 128 km/h.

7: A cold front that brought heavy rain and hail to Port Augusta, caused flash flooding and inundated streets and collapsed ceilings.

9: Snow fell as low as 300 m elevation in southern Tasmania, including near the summit at kunanyi/Mount Wellington and at Mount Mawson.

15-20: Significant rainfall caused moderate to major flooding in parts of New South Wales and some homes were flooded by the Naomi River at Gunnedah. The State Emergency Services rescued residents from flood waters across the state's Central West Coast.

18: Gusty thunderstorms across Victoria and Melbourne brought large quantities of hail and there were also reports of a tornado in the western suburbs with damage to houses.

23-30: The Naomi River at Wee Waa reached major flood levels, leaving the town's 2,000 residents cut off from neighbouring areas and the State Emergency Services transporting residents across floodwaters.

27: The Greater Sydney Area and the New South Wales Mid-North Coast were hit by storms, with more than 65,000 lightning strikes and heavy rain and hail reported across several suburbs.

October

5-10: Heavy rainfall on already wet soils and full or close to full catchments led to major flooding in New South Wales, Queensland, Victoria and Tasmania in the first half of October.

Inland areas of New South Wales received 50 mm of 7-day accumulated rainfall, while some areas had over 100 mm of rainfall.

12-18: Several days of heavy rainfall caused major flooding in Victoria, northern Tasmania and southern New South Wales. On the 13th many sites across Greater Melbourne had their highest daily October rainfall on record. Major flooding occurred along the Maribyrnong River and resulted in evacuations of inner-city Melbourne suburbs.

19-25: Continued widespread rain on wet catchments resulted in renewed major riverine flooding in Victoria, New South Wales, Queensland and Tasmania. Major flooding occurred along the Loddon River at Kerang in Victoria, Murray River at Echuca and Moama, Mehi River at Moree, Naomi River at Gunnedah and along the Murrumbidgee River and Goulburn River.

24: In South Australia, storms caused flash flooding, road closures and there were reports of a tornado near Hamley Bridge lasting for up to 10 minutes.

24: Severe thunderstorms with large hail hit areas of central and north Queensland, with reports of large hailstones around Gladstone (7 cm in diameter) and Mount Larcom (10 cm in diameter).

30: A low pressure system and cold front crossed south-east Australia, with Oodnadatta Airport recording a maximum wind gust of 139 km/h, the site's highest wind gust on record for October.

November

1: Late spring snow settled across higher elevations in South Australia, Tasmania and Victoria. In Victoria more than 30 cm of snowfall was reported across alpine regions.

1-4: Major flooding of the Lachlan River and Murrumbidgee River at Gundagai, Wagga Wagga and Forbes, resulted in large-scale evacuation orders to be issued for Wagga Wagga and Forbes.

4-9: Moderate to major flooding continued along the Murray-Darling river system, with major flooding along the Darling River extending into January 2023.

12: Severe thunderstorms with up to 423,000 lightning strikes, large hail and wind gusts up to 100 km/h were reported in South Australia. The storm caused significant power outages across metropolitan Adelaide for several days and an interstate transmission line was damaged.

12: A thunderstorm tore through Alice Springs and caused homes to be severely damaged, and at least 80 residences without power the next day.

14-18: Several inland towns in New South Wales including Forbes, Condobolin and Euabalong were inundated from renewed major flooding along the Darling and Lachlan rivers.

19-22: Strong winds, hail and snow to low levels across elevated regions of Tasmania, Victoria and southern New South Wales. Wind gusts were over 100 km/h across Victoria and high sea levels around Lakes Entrance in Victoria caused coastal inundation of paths and local streets.

20-21: Severe thunderstorms with strong winds, hail and heavy rainfall lashed the Mallee region of Victoria, with hailstorms causing major crop damage.

21: Severe thunderstorms hit the Townsville region with more than 100 mm of rain falling in the 24 hours to 9am on 22 November.

27: The Murray River near Renmark, South Australia rose above moderate flood levels. Moderate to major flooding occurred along the Murray River until January.

27: A hailstorm brought strong winds and hail to parts of southern Canberra and resulted in power outages to 3,858 properties.

29: Storms extended from Cape York down to south-eastern Queensland bringing rain, lightning, and large waves along the coast. Power failures were reported across the greater Cairns area.

December

4-9: Severe to extreme heatwave conditions affected large areas of northern Australia during the first half of the month including multiple population centres such as Darwin (Northern Territory), Cairns (Queensland) and Broome (Western Australia).

7-8: Southern areas of Western Australia experienced more than 320,000 lightning strikes as thunderstorms blanketed the region.

8-9: Parts of south-east and central Queensland experienced intense thunderstorm activity and locally destructive wind gusts. Hail stones up to 10 cm in diameter were reported at Anderleigh, north of Gympie and up to 4 cm in Pomona on the Sunshine Coast.

9: Perisher Valley in New South Wales dropped to -7.0°C , equalling the Australian record for the lowest temperature in December.

19: A low pressure trough extending across northern and central Australia brought strong winds across central Australia with wind gusts in excess of 100 km/h at Alice Springs.

22-31: Tropical cyclone Ellie crossed the north-west Northern Territory coast as a Category 1 cyclone. It continued to move inland and dropped to tropical low strength on the 23rd producing heavy rainfall over central and northern parts of the Territory and parts of the Kimberley.

January

1-9: Ex-tropical cyclone Ellie brought heavy rainfall to the Northern Territory and Kimberley region of Western Australia, leading to significant flooding on the Fitzroy River.



The Fitzroy River reached its highest levels on record, peaking at 15.81 m on 4 January at Fitzroy Crossing, isolating the town and many other nearby communities and significantly damaging the Great Northern Highway bridge.

1-7: Heavy rainfall and thunderstorms affected many areas of Queensland. Major flooding occurred along the Georgina River between Roxborough Downs and Glenormiston. Burketown, Doomadgee and Gregory remained isolated into mid-January.

4: An electrical storm sparked a major power outage in Greater Brisbane.

9-14: Lightning ignited spot fires across a large area of the Shire of Donnybrook–Balingup in south-west Western Australia.

14-19: Severe thunderstorms with locally heavy rainfall resulted in flooding in northern and central Queensland. Townsville Aero recorded more than 150 mm in the 24 hours to 9am on the 15th, whilst Proserpine Airport recorded more than 300 mm in the 24 hours to 9am on the 16th.

24: Sydney, the Central Coast and Wollongong were hit by storms, strong winds, rain and hail. Suburbs on the south-west outskirts, like Razorback and Douglas Park, reported hail the size of golf balls.

24: Severe storms, with heavy rainfall and damaging winds affected Victoria. Particularly intense rainfall caused flash flooding in Geelong and surrounds. Thousands of properties across Victoria were left without power.

1-31: Moderate to major flooding that started in 2022 continued along the Murray–Darling river system, with major flooding along the Darling River continuing for most of January.

February

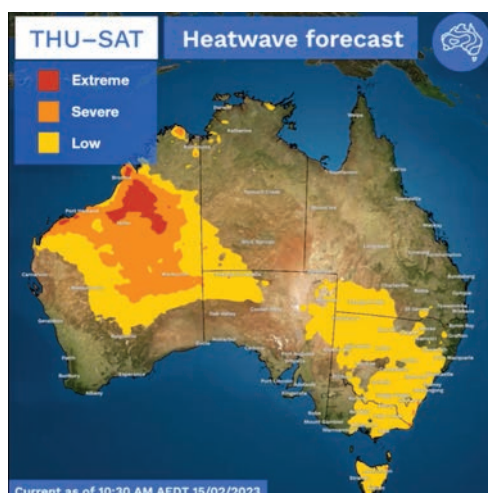
1-4: Severe heatwave conditions affected south-east Queensland, including Brisbane and the Sunshine Coast. Hotter than average temperatures were recorded around Sydney and the east coast of New South Wales.

3: An afternoon storm brought damaging winds that left significant damage across Port Macquarie, with trees and powerlines downed and roofs ripped from buildings.

11-12: Tropical cyclone Gabrielle, a category 3 system, impacted Norfolk Island causing widespread damage.

13: Heavy rainfall caused flash flooding, and large to giant-sized hail hit south-east Queensland and north-east New South Wales as severe thunderstorms moved through the area.

14-18: Heatwave conditions affected many areas of Australia, including severe intensity in southern Victoria, and the Pilbara and central and southern areas of Western Australia. Several fires burnt across parts of New South Wales and in Queensland's Darling Downs near Tara and Miles, where multiple structures were damaged.



21-22: High temperatures returned to parts of the southern mainland – Nullarbor and Tarcoola Aero in South Australia recorded daily temperatures above 43.0 °C on the 21st, while Eucla and Red Rocks Point, in the far south-east of Western Australia, both reached 46.8 °C on the 22nd.

21-28: Storms and heavy rain occurred across the northern tropics during the last week of February, with weekly totals of 150 to 300 mm from the eastern Kimberley (Western Australia), through the Northern Territory Top End and the Cape York Peninsula (Queensland). Minor to moderate flooding resulted in some areas, leading to the closure of the Victoria Highway in the Katherine region.

March

1-10: Storms and widespread heavy rain in the northern tropics, associated with a monsoon trough and a tropical low (16U), continued throughout early March. Ten-day totals of 400 to 800 mm were recorded in an area of the Carpentaria and Barkly districts in the Northern Territory and in Queensland's Gulf Country and North-West districts. This event resulted in major flooding along several rivers across the eastern Northern Territory and north-western Queensland, leading to evacuation of some communities and the closure of many transport routes.

12: More than 100 mm of rain fell in 24 hours at some locations in the South Western Slopes region of southern New South Wales, causing flash flooding. High daily totals led to river rises and flooding along Muttama Creek. The State Emergency Services issued an emergency evacuation order for 880 properties along the creek.

14-20: Heatwave conditions reached severe intensity in the Pilbara. On the 18th and 19th, the highest March temperature on record was observed at many sites in New South Wales and Victoria. There were multiple grassfires and bushfires across Victoria and New South Wales with hundreds of firefighters deployed and total fire bans in place across Victoria and for much of New South Wales and South Australia.

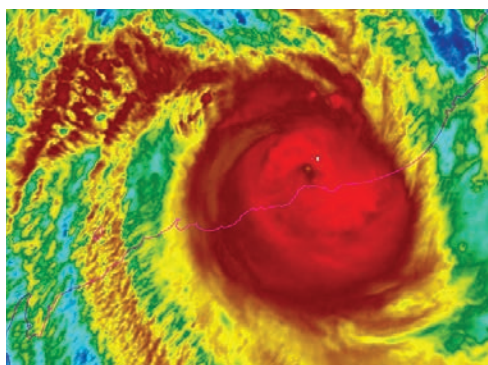
19-20: Strong wind gusts brought down trees across parts of South Australia, resulting in power blackouts. More than 31,000 properties, mostly across Greater Adelaide and the Adelaide Hills were without power on the 20th.

27-29: Weather systems brought several days of widespread rainfall, showers and storms to large parts of Australia.

April

2: Thunderstorms brought heavy rain and daily totals of more than 50 mm to Greater Sydney, resulting in flash flooding that blocked roads and disrupted train lines.

11-14: Tropical cyclone Ilsa formed off the Kimberley coast of Western Australia on the 11th and intensified rapidly to reach severe intensity (Category 3) on the 12th. Ilsa made landfall on the Pilbara Coast on the 14th as a Category 5 system, causing extensive damage in the area. Prior to making landfall on the mainland, Ilsa passed directly over Bedout Island, the sustained wind speed (10-minute mean) of 219 km/h was the highest ever recorded by the Bureau observation network, as was the maximum wind-gust speed (3-second mean) of 289 km/h.



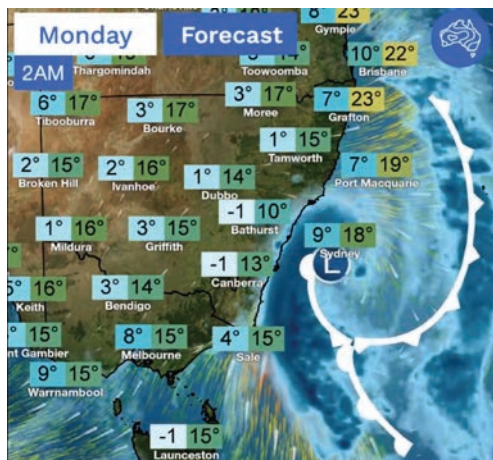
13-16: A cold front that moved across southern Australia produced widespread heavy rain. Several long record stations in Western Australia and South Australia had their highest daily rainfall for April to 9am on the 14th and 15th. Heavy rainfall resulted in flash flooding across Melbourne. Building damage and disruptions to transport were reported.

29: A coastal low formed just off the South Coast of New South Wales, bringing moderate to locally heavy rainfall. Daily rainfall totals to 9am on the 30th of 70 to 100 mm were recorded along the South Coast before the system moved offshore.

May

7: Parts of south-eastern New South Wales and north-eastern Victoria recorded daily maximum temperatures more than 8 degrees below average on the 7th and some stations had their lowest May daily maximum temperatures on record. Cooma Airport (NSW) had a maximum temperature of 2.7 °C, a May record by 2.2 °C.

Many locations in south-east New South Wales and north-east Victoria reported snowfall down to 700 m.



19: A magnitude 7.7 earthquake off the Loyalty Islands generated tsunami waves across the Southwest Pacific region and the Australian east coast. They were mostly small and posed little danger but Lord Howe Island experienced a Marine Threat tsunami with strong ocean currents and dangerous waves and rips in the marine environment.

20-21: A cold front that crossed Tasmania brought damaging to destructive winds with gusts in excess of 100 km/h to much of Victoria, Tasmania and southern New South Wales. Strong winds caused disruptions to electricity supplies and widespread power outages affected various parts of Tasmania.

26: Severe thunderstorms across the Hunter coast and Newcastle brought flash flooding, large to giant hail, waterspouts (near RAAF Base Wiliamtown) and heavy rainfall which locally exceeded 50 mm in one hour.

June

5-6: A cold front brought damaging winds, widespread rain, thunderstorms, hail and flash flooding to south-west Western Australia. Several sites, including Perth Metro, had their highest June daily rainfall total on record on the 5th, while numerous locations had their coldest June day on record on the 6th.

7-9: Severe thunderstorms and heavy rainfall impacted parts of eastern South Australia, Victoria, southern New South Wales and northern Tasmania. Numerous sites in Victoria's north-east recorded daily rainfall totals of more than 100 mm.

15-21: Widespread frost and patchy fog formed over large parts of central and eastern Australia and many sites recorded sub-zero daily minimum temperatures. On the 21st many stations in New South Wales and the Australian Capital Territory had their lowest daily minimum temperature for June on record. Canberra Airport recorded -7.2 °C on the 21st, its lowest June minimum temperature since 1986.

18-20: More than 40 cm of snow fell at Victoria's Mount Hotham, while widespread snow was recorded across elevated areas of Tasmania.

21-25: Multiple cold fronts brought storms, strong winds, high daily rainfall totals and snow to the south of the country. Many sites in south-eastern South Australia had their highest daily rainfall total for June on record to 9am on the 23rd, including some sites with more than 100 years of data.

24-27: Extensive areas of morning fog were observed in eastern Queensland, including about the Capricornia, Wide Bay, and Mackay Coast districts, during the morning for several consecutive days.

25-28: Daily maximum temperatures were above average across most of Queensland, including more than 9 degrees above average in inland areas. Many sites recorded daytime temperatures above 30.0 °C.



Section 1: Overview

Review by the CEO and Director of Meteorology



**Dr Andrew Johnson,
FTSE FAICD**

I am delighted to present the Bureau's achievements in 2022–23. The Bureau again delivered on our mission to provide trusted, reliable and responsive weather, water, climate, ocean and space weather services for Australia – all day, every day.

This year we began implementing our Strategy 2022–2027 (the Strategy). The Strategy builds on our considerable achievements across the last five years to further strengthen our customer focus and amplify the impact and value we provide for Australian communities, industries and governments.

Under this new Strategy, we continued to deliver products and services that contribute in a material way to Australia's public safety, community wellbeing, economic prosperity, national security and environmental health. We made significant progress implementing transformation programs aimed at enhancing our systems, processes and technology. We also strengthened our international and domestic partnerships. I am extremely proud of and grateful for our people, who have consistently demonstrated their great dedication, determination and resilience in delivering our services during the year.

The year was marked by periods of flooding in large parts of Australia as La Niña became established in September and peaked in November, before easing in early 2023. The Bureau's services were critical throughout extensive riverine flooding in Australia's second wettest October and spring on record, including the New South Wales and Victorian areas of the Murray–Darling Basin, and South Australia. Significant flooding also affected northern Tasmania, southern Victoria and southern Queensland during spring. At the end of December and in January significant flooding affected the Kimberley in Western Australia due to prolonged heavy rainfall. Extreme multi-day rainfall in late March and early April resulted in floods in the Northern Territory's north-east and Queensland's north-west. Seven tropical cyclones also occurred in the Australian region, three of which – Ellie, Gabrielle and Ilsa – significantly impacted Australian communities (see p.62). The Bureau's thoughts are with all communities affected by these events.

Overall rainfall for Australia was 32% above the 1961–1990 climatological average at 612.6 mm – the 7th-wettest financial year on record (since 1900) and the wettest since 2010–11. We also observed close to average temperature, with Australia's national mean temperature for the financial year 0.13 °C warmer than the 1961–1990 climatological average.

We delivered impact and value by providing products and services that enhance the wellbeing of all Australians and our services to emergency management agencies helped to limit the physical, social and economic impacts of these severe weather events. In advance of the 2022–23 high-risk weather season (October to April) we provided a range of briefings to government officials including emergency management and defence agencies to support their planning and preparations. We provided critical information and support to communities during extreme events, including throughout significant flood events.

In readiness for future hazards, we launched the Australian Fire Danger Rating System, released a new Heatwave Warning Service, developed a 7-day Tropical Cyclone Outlook Service, and established a 24/7 space weather forecasting centre and deployable meteorologist capability to support the Australian Defence Force.

The BOM Weather app continued to be Australia's most widely used weather application, downloaded by 10.4 million users as of the end of June 2023. The app was Australia's top ranked free weather application in Apple and Google Play stores, with 84% of customers rating their satisfaction level as 'satisfied' or higher. New features added during the year include a new radar mapping experience, flood warning service, and other technical enhancements.

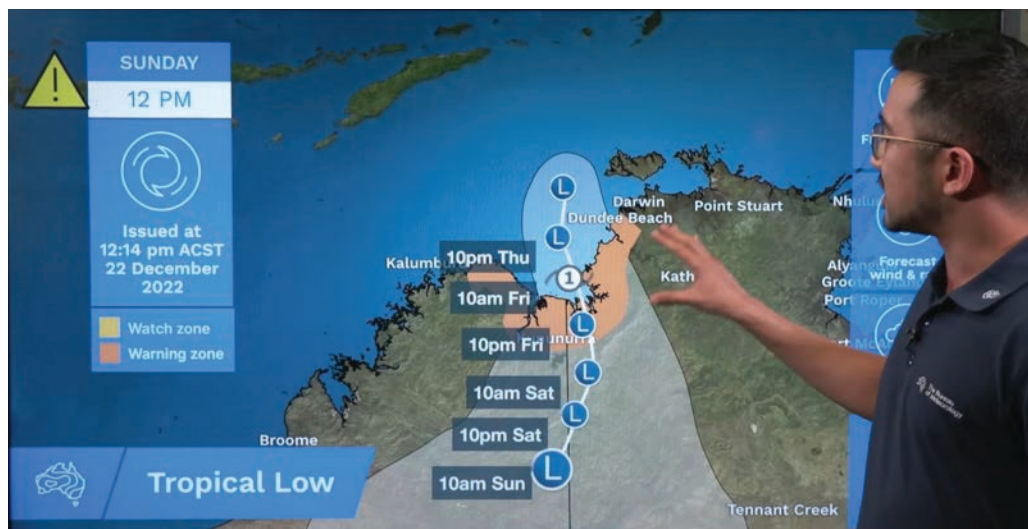
Through our social media channels, the Bureau promoted public safety campaigns on the risks and impact of severe weather and provided insights and information about Australia's unique meteorology.

Through our major transformation initiatives, we delivered operational excellence with a focus on systems, processes and technology. The four-year Public Services Transformation Program concluded, having designed and delivered new ways of providing our weather, water, ocean, and climate services to the Australian community, so that we can better serve and respond to the needs of our customers – now and into the future. Significant milestones for the program in 2022–23 included introducing a mid-morning forecast update for all capital cities, implementing enhanced operational tools to better support service delivery and mobilising a new team of Community Information Officers.

Implementation of the ROBUST Program continued, ensuring the security, stability and resilience of our information and observing technologies. Significant milestones for the program in 2022–23 included completing upgrades to Queensland radar infrastructure at Brisbane and Cairns, installing a range of new automatic meteorological balloon launching systems (AMBLS) and ionosondes, completing security improvements at over 42 observing sites throughout Australia (see p.99) and commencing the commissioning of a secondary high performance computing system.

Through the Business Systems Transformation Program we uplifted our enterprise systems, processes and technologies and implemented a new enterprise scheduling tool to more easily create and better communicate staff rosters.

We upgraded our Hydrological Forecasting System (HyFS) which underpins our national water and flood forecasting services, upgraded our thunderstorm prediction system and developed and trialled a new version of our ocean forecasting system. We also began trialling new global deterministic and ensemble weather prediction models.



A severe weather update by meteorologist Jonathon How forecasting the intensification of a tropical low into tropical cyclone Ellie in December. Ex-tropical cyclone Ellie impacted communities in the Northern Territory and Kimberley region of Western Australia and led to significant flooding on the Fitzroy River.

We systematically delivered insight and innovation, implementing novel, mission-directed solutions for our customers. The 2023–24 Australian Government Budget included several new measures that build on existing Bureau capability, including to remediate flood warning infrastructure in Australia’s highest risk areas over the next 10 years, to establish a single digital platform for national water data management, a new water market website, and water market data standards (p.86), and for the Australian Climate Service to contribute to Australia’s first National Climate Risk Assessment. These investments will ensure the Bureau can continue to provide reliable access to weather and water information, support public safety and grow our impact and value for the water sector.

The Australian Climate Service (ACS) – a partnership between the Bureau, CSIRO, the Australian Bureau of Statistics and Geoscience Australia – continued to build its capability and delivery following its establishment in 2021–22. The ACS undertook a range of activities during 2022–23 to enhance Australia’s climate and natural hazard intelligence capability and improve access to trusted climate and natural hazard data, information and expert advice, including through its support of the National Situation Room during extreme events (see p.132) and work to develop the National Climate Risk Assessment.

Our science, technology, engineering and maths (STEM) Ambassadors continued to promote STEM participation, visiting schools and universities around the country and attending events such as the 2023 Avalon Air Show (see p.114). Our Graduate Diploma in Meteorology course saw a record number of graduates commence the 2023 program, lifting our levels of critical STEM capability (see p.181).

A new bilateral strategic relationship arrangement with Singapore’s Meteorological Service on weather and climate research will focus on weather and climate impacts to deliver enhanced forecast and warning services that inform decision-making and guide climate change adaptation plans for the Southeast Asian and Indo-pacific regions.

An extension to our strategic relationship agreement with the Queensland Department of Transport and Main Roads to explore opportunities for further data sharing, will enable improved outcomes for transport customers in Queensland.

We continued to strengthen our relationships with Australia’s emergency management sector, including through consultation with emergency services agencies on the mid-term review of the Intergovernmental Agreement on the provision of Bureau hazard services to states and territories (see p.56) and by performing secretariat functions for the Hazard Services Forum, the Australian Tropical Cyclone Advisory Group, and the Australian Tsunami Advisory Group.



The BOM Weather app, upgraded with several new features in 2022–23, continued to provide Australians with convenient weather information and important warnings.

We also partnered with Agriculture Innovation Australia to deliver the Agri-Climate Outlooks to improve and enhance seasonal outlook services to Australian farmers, fishers, and foresters (see p.88) and continued to provide reliable and trusted briefings on severe weather and climate risks to Australia’s national security sector, including through our Global Seasonal Outlook (see p.83).

On behalf of Australia, we continued to make important contributions to the activities of the World Meteorological Organization (WMO), including developing and adopting a new Unified Data Policy that will strengthen the exchange of observations data and in turn enhance the quality of global weather, water and climate modelling.

We worked closely with our Pacific partners to devise the Weather Ready Pacific initiative, a Pacific-designed and Pacific-led roadmap for strengthening the region’s weather and climate resilience (see p.82). We also worked with our Pacific partners to develop the *COSPPac Climate Change in the Pacific 2022 Historical and Recent Variability, Extremes and Change Report*, which provides country-specific historical climate change science information for 15 Pacific Island countries and territories (see p.169).

We worked together as one enterprise, living our values through agreed behaviours every day – the Bureau Way. We focused on providing a safe, diverse, respectful, inclusive, secure and flexible working environment in 2022–23 and continued to deliver initiatives in support of our values, including events for International Women’s Day (see p.113), Harmony Week, International Day of People with Disability and International Day Against Homophobia, Biphobia, Interphobia and Transphobia (IDAHOBIT). We strengthened our management of psychosocial risk and implemented initiatives to better support our operational staff when they are involved with ongoing extreme weather events.

Entering the final year of our Innovate Reconciliation Action Plan (RAP) 2021–2023, the Bureau delivered on our commitments to First Nations People through activities such as piloting a Yarning Circles program to provide our people with a safe environment to listen, learn, and lead their cultural learning journey (p.120). We also delivered live indigenous language interpretation through emergency press conferences in the Northern Territory for the first time (p.60).

I am honoured to lead an organisation that delivers such crucial services to our communities, governments and industries when it matters most. Throughout the year our customers, partners and stakeholders provided positive and constructive feedback on the quality of our products and services, the professionalism, dedication and excellence of our staff, and the new technologies and channels we continue to implement. This feedback is crucial for identifying and prioritising how we improve our products and services to deliver impact and value for Australia.



Financial results

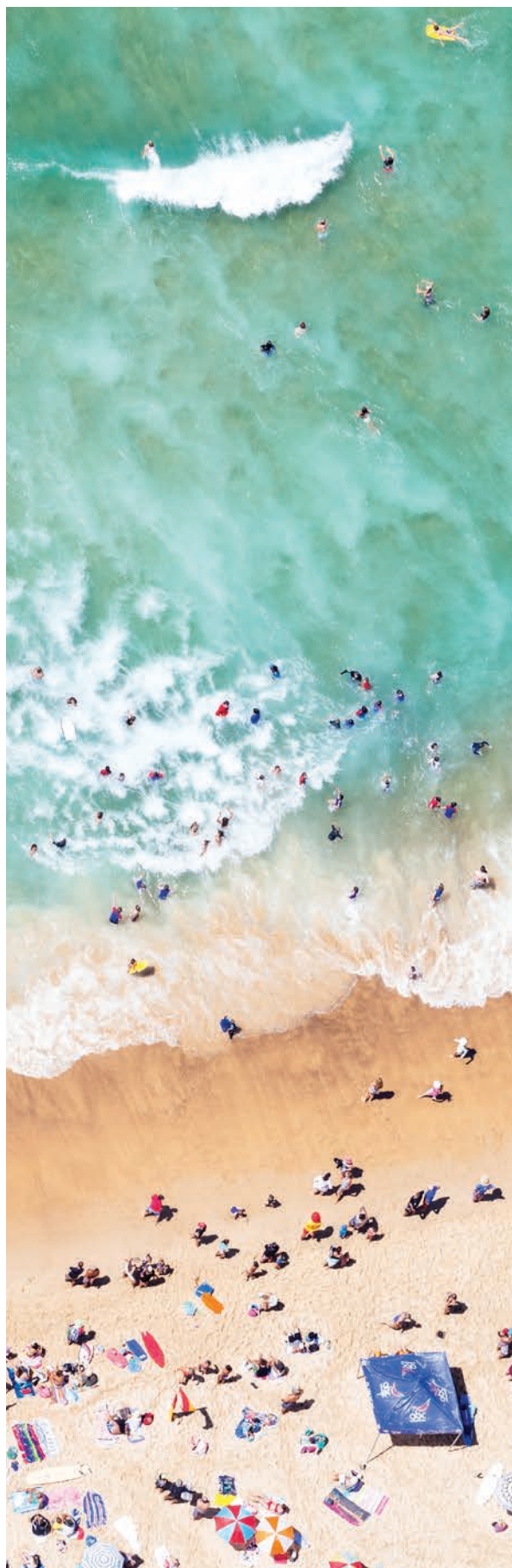
The Bureau reported an operating surplus of \$40.7 million (excluding depreciation, write down and impairment of assets and asset revaluation changes) for 2022–23. This surplus is largely due to externally generated revenue recognised in the current year but used for capital assets.

The Bureau recognised prior period errors across its property, plant and equipment, lease and revenue classes of asset and expenses. The prior period errors relate to incorrect application of accounting standards. The financial statements (p.213) provide more detail on the prior period errors.

Total income for the Bureau for 2022–23 was \$447.3 million. This is an increase of \$41.6 million compared to the 2021–22 year.

Revenue from Government was \$345.5 million in 2022–23, which was \$29.8 million higher than the 2021–22 year. Own-source income was \$101.8 million, an increase of \$11.8 million compared to 2021–22 largely due to increases in income from the aviation industry as a result of the recovery from the COVID-19 pandemic.

The Bureau's operating expenditure for 2022–23 was \$571.5 million, an increase of \$93.0 million (19%) compared with the 2021–22 year.



Outlook for 2023–24

In 2023–24 we will seek to build upon what we have achieved in 2022–23. We will continue to implement actions under our Strategy 2022–2027 to ensure we provide trusted, reliable and responsive weather, water, climate, ocean and space weather services for Australia – all day, every day.

We will continue to play a critical role within the Australian community, contributing to the safety, prosperity, security and wellbeing of the nation. This includes communicating the likely impacts of natural hazards to support effective mitigation, readiness, and response to natural disasters and to help the nation understand and respond to a changing climate.

We will maintain a sharp focus on providing high-quality, accessible, timely products and services to Australian communities, industries and governments based on a deep understanding of their needs and decision-making processes.

We will continue to build deeper and more systematic engagement with our customers and partners, working across government to support Australia’s position and contribution to the global community. We will continue to strengthen our capability across complex and wide-ranging fields to ensure we fulfil our remit as Australia’s national weather, water, climate, ocean and space weather agency.

We will uplift and evolve our operating model, while ensuring the safety, security, resilience, and relevance of our core operations. We will continue to adopt new ways of working, leverage emerging technologies and draw up our deep scientific capability and expertise to ensure we keep pace with the evolving needs of customers we serve and deliver to their expectations.

Our people will continue to underpin our efforts – their expertise and experience are fundamental to delivering the products and services on which Australians depend. To continue to attract and retain the right people, we will ensure the Bureau remains an employer of choice, recognising the needs of each staff member and equipping them with the tools, skills and opportunities to grow and excel.

We will continue to build a customer-focused enterprise culture where people are empowered and grow through clear career pathways in an inclusive, safe, secure and flexible working environment. We will retain a strong commitment to the respect of Aboriginal and Torres Strait Islander peoples and culture and will work to ensure our workforce reflects the diversity of the community we serve.



Anvil Cruz (left) and Naja Dohm (right) are 2 of 39 Bureau trainees undertaking the 2023 Graduate Diploma in Meteorology course – building the capabilities and expertise for the future of the Bureau.

Agency Overview

Role and functions

The Bureau of Meteorology (the Bureau) is Australia’s national weather, climate and water agency and one of the few organisations in Australia that touches the lives of all Australians every day. Since 1908, the Bureau has proudly provided products and services that contribute to economic prosperity, public safety and community wellbeing. These services include observations, forecasts, warnings, analyses and advice covering Australia’s atmosphere, water, ocean and space environments.

The Bureau’s expertise supports governments, emergency services and industry to make informed decisions and assists Australians to live safely and productively within their natural environment.

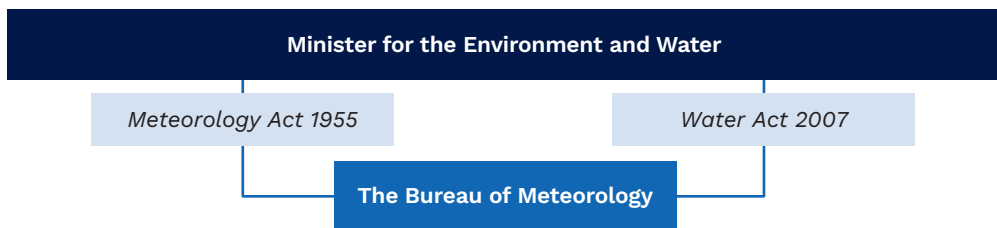
The knowledge of, and insights into, Australia the organisation has gained over this period are unique and irreplaceable. For more information on how the Bureau meets its obligations to the Australian community see the Corporate responsibility chapter (p.160).

Authority

The Bureau operates under the authority of the *Meteorology Act 1955* and the *Water Act 2007*, which together provide the legal basis for its activities. The Bureau must also fulfil Australia’s international obligations under the Convention of the World Meteorological Organization (WMO) and related international meteorological treaties and agreements.

The Bureau is an Executive Agency under the *Public Service Act 1999* (Public Service Act) and a non-corporate Commonwealth entity under the *Public Governance, Performance and Accountability Act 2013* (PGPA Act). Under the Public Service Act, the Director of Meteorology has the powers and responsibilities of an Agency Head.

At 30 June 2023, the Director of Meteorology reported to the Minister for the Environment and Water, the Hon Tanya Plibersek MP.

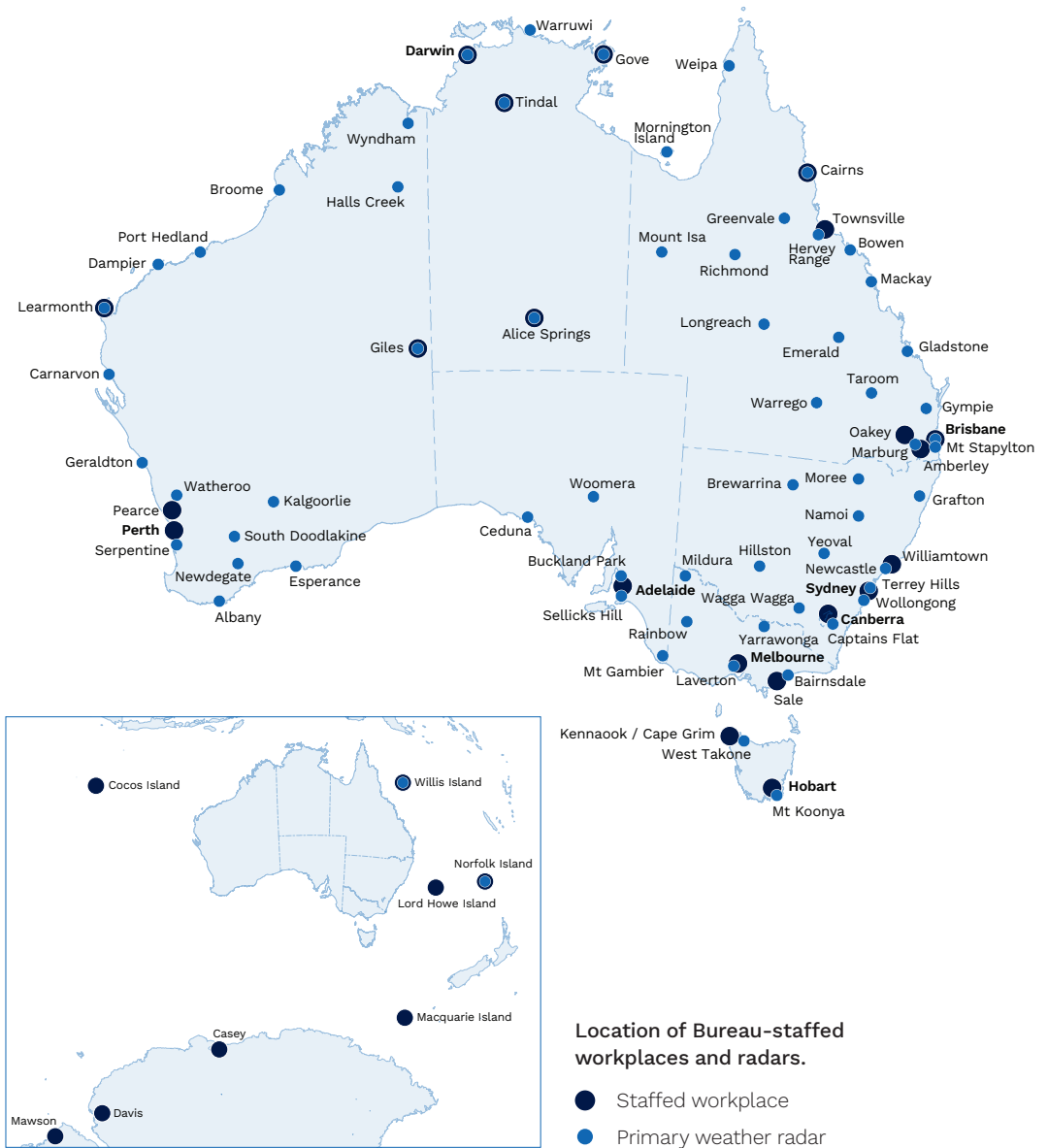


At 30 June 2023, the Bureau operated within the Climate Change, Energy, the Environment and Water Portfolio reporting to the Minister for the Environment and Water.

Location

The Bureau's services span the Australian region encompassing the mainland, Tasmania, Australia's offshore islands and territories (including the Australian Antarctic Territory), and the surrounding oceans and seas. Some Bureau services have greater reach. For example, the Bureau's Volcanic Ash Advisory Centre covers volcanically active regions of Indonesia, Papua New Guinea and the southern Philippines. As a partner in the Joint Australian Tsunami Warning Centre, the Bureau also provides threat information to National Tsunami Warning Centres in Indian Ocean countries.

Bureau staff are located across Australia, on remote islands and in Antarctica. The Bureau's Victorian Office in Docklands, Melbourne, is a centre for administrative and operational activity, and provides overall national strategic planning, management and coordination of the Bureau's services.



Organisational structure

For 2022–23, the Bureau was structured into five Groups, each with defined accountabilities and responsibilities. The Bureau’s CEO and Director of Meteorology was also the Accountable Authority for the Australian Climate Service which is hosted by the Bureau. The Corporate governance chapter provides more detail on Bureau governance and an organisational chart (p. 144).

Staff

As at 30 June 2023, the Bureau had 2,374 total staff, including 1,583 ongoing staff, 213 non-ongoing staff, and 578 contractors. Many staff work around the clock to provide monitoring, forecast and warning services 24 hours a day, every day of the year. Detailed information on the Bureau’s staff and the management of human resources is provided in the People management chapter (p. 180).

Values

In delivering products and services to its customers, Bureau staff individually and collectively uphold the Australian Public Service values of impartiality, commitment to service, accountability, respectfulness and ethical conduct. These values guide our behaviours and how we treat our customers, our partners and each other. The Strategy builds on this, outlining Bureau-specific values and behaviours.

Safety

We are committed to actively improving the health and wellbeing of our people and strive for zero harm.

Integrity

Our integrity is founded on trust, honesty and reliability.

Customer focus

We listen to our customers, understand their needs and are invested in their success. We strive to provide them with an outstanding experience. We are a pleasure to work with and can be relied upon to deliver.

Passion and tenacity

We are proud of our heritage, who we are, what we do and where we are headed. We deliver in times of crisis. Our deep commitment to our nation’s wellbeing drives our success.

Responsibility

We understand and accept our responsibilities. We learn from success and failure. We hold each other to account for our actions and results.

Humility

We are humble in our dealings with each other and our customers. We help each other and operate as one enterprise.

Customers, partners and stakeholders

The Bureau works with a broad range of customers, partners and stakeholders across all sections of the community, and provides special services to an extensive range of Commonwealth, state and local government departments and agencies. These services support emergency management (including prevention, preparedness and response), agriculture, aviation, land and marine transport, energy and resources operations, climate policy, water management, defence and foreign affairs.

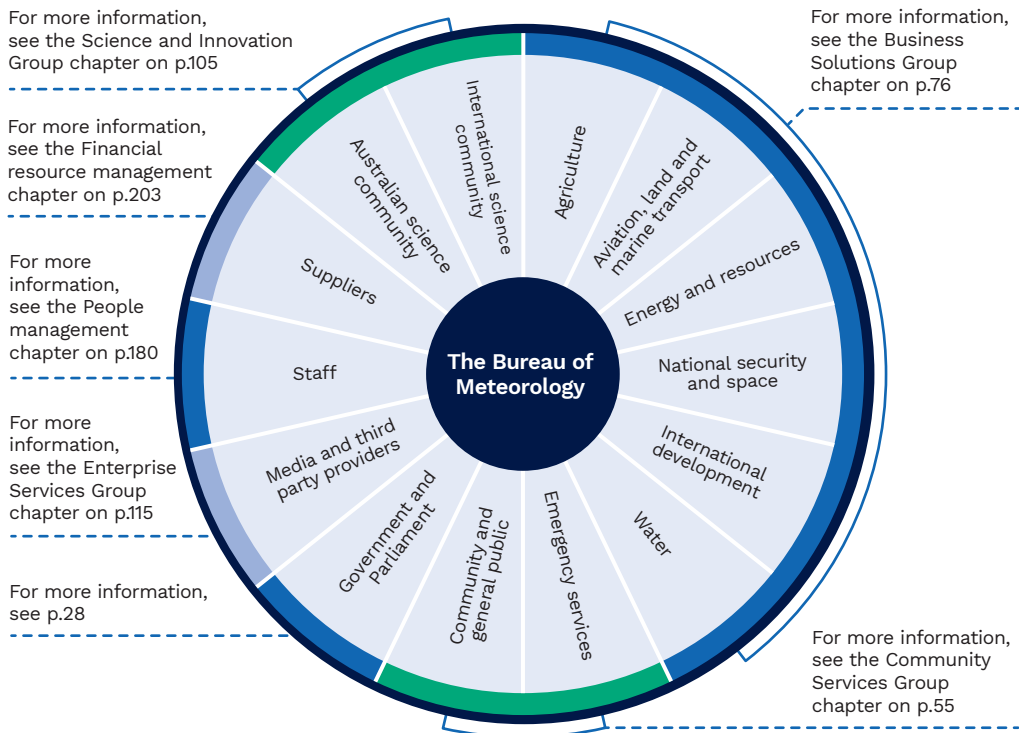
Across almost all sectors of the economy, the Bureau's weather, water, climate, ocean and space weather services support business decisions – from planting to harvesting, excavation to construction, logistics and operational planning. Sector-specific applications of the Bureau's products and services are essential for the safe and efficient operation of many industries (e.g. aviation) that have flow-on benefits for all Australians.

Every day, millions of Australians use the Bureau's information to help make decisions about activities that are affected by the weather. In emergency situations, the Bureau's services enable individuals, families, businesses and communities to make informed decisions about evacuating or preparing themselves for potential or imminent danger.

The national and international meteorological and scientific community is another vital partner, as cooperation through sharing global weather observations and research efforts is an essential and integral part of the Bureau's operations.

Other Bureau stakeholders include government ministers and the Parliament, the Australian science community, the media, staff and suppliers.

For information on engagement and outreach activities refer to the Corporate responsibility chapter (p. 160).



The Bureau's primary stakeholders.

Defence, Security and Services



Section 2: Annual Performance Statement

Introductory statement

I, Andrew Johnson, as the Accountable Authority of the Bureau of Meteorology present the Bureau's 2022–23 Annual Performance Statement as required under paragraph 39(1)(a) of the *Public Governance, Performance and Accountability Act 2013* (PGPA Act). In my opinion, the Bureau's Annual Performance Statement accurately reflects the Bureau's performance in achieving its purpose for the year ended 30 June 2023 and complies with subsection 39(2) of the PGPA Act.



Dr Andrew Johnson
CEO and Director of Meteorology

5 September 2023

Performance framework

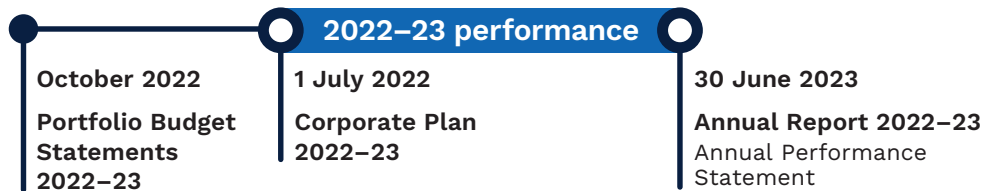
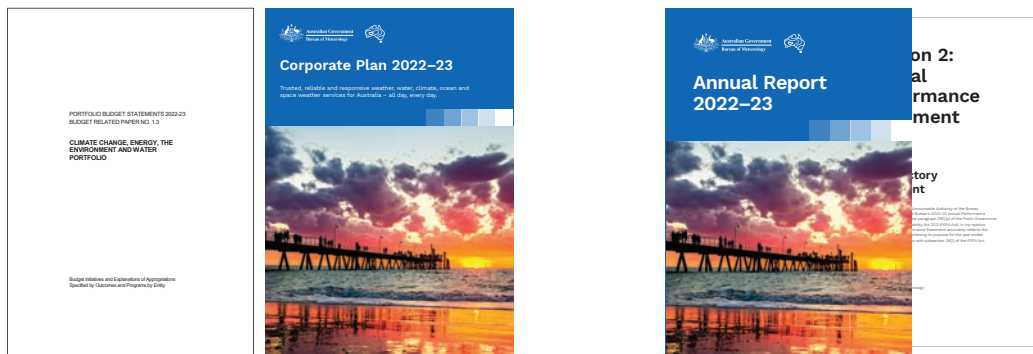
The Bureau operates within the enhanced Commonwealth performance framework in accordance with the PGPA Act.

In 2022–23, resources were provided to the Bureau through the Government Budget as documented in the Portfolio Budget Statements (PBS) for the Climate Change, Energy, the Environment and Water Portfolio. This states the outcome of the Bureau and includes high-level performance requirements. The 2022–23 PBS for the Climate Change, Energy, the Environment and Water Portfolio are available at: <https://www.dcceew.gov.au/about/reporting/budget>.

To provide more detail, the PGPA Act requires each Commonwealth agency to produce a corporate plan at the beginning of the reporting cycle that sets out its purpose, strategies for achieving its purpose and how success will be measured. The Bureau’s purpose, as defined by its mission, is to provide trusted, reliable and responsive weather, water, climate, ocean and space weather services for Australia – all day, every day. The Bureau’s Corporate Plan 2022–23 is available online at: http://www.bom.gov.au/inside/Bureau_of_Meteorology_Corporate_Plan_2022-23.pdf.

At the end of the reporting cycle, agencies are required to produce an annual performance statement and assess the extent they have succeeded in achieving their purpose. The Bureau’s performance is measured using the 12 success measures outlined in its Corporate Plan 2022–23.

This section reports on the Bureau’s results for 2022–23 against the purpose and performance criteria published on pages 19-23 of the Bureau’s Corporate Plan 2022–23 and on pages 135-160 of the 2022–23 PBS for the Climate Change, Energy, the Environment and Water Portfolio.



Analysis of performance against agency purpose

For 2022–23, the Bureau performed satisfactorily against the performance indicators identified in its Corporate Plan, as detailed in the performance results. The Bureau’s performance met expectations against 9 measures, partially met expectations against 2 measures and did not meet expectations for one measure, indicating that the Bureau has been largely successful in delivering its priorities and planned achievements for the year in line with its purpose.

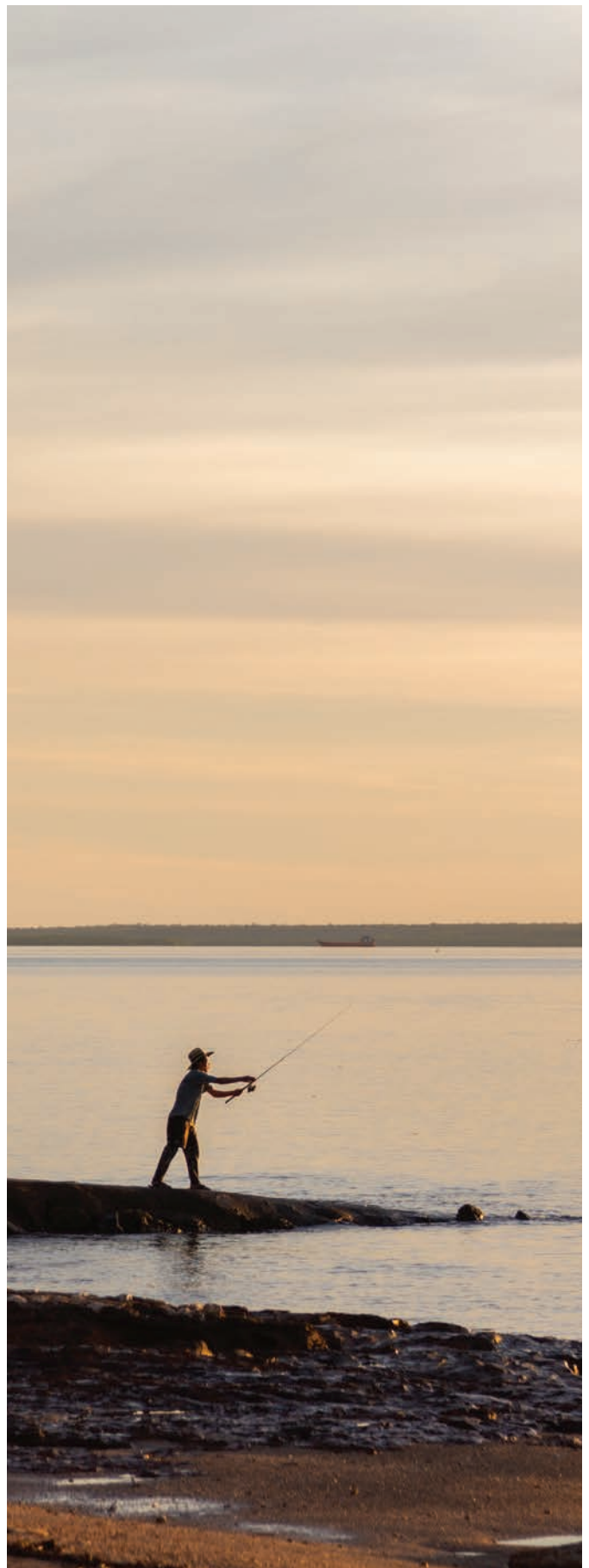
The Bureau’s performance results were achieved in the context of a challenging and dynamic operating environment. This is likely to continue for 2023–24 and the outlook period (2024–25 to 2026–27) as the Bureau seeks to continue to amplify and accelerate the value it provides to Australian communities, industries and governments.

Important challenges and opportunities affecting the Bureau’s performance include:

- meeting the growing demand for more actionable, impact-based and location-specific forecasts and warnings
- meeting the growing demand for future hazard risk information, in the context of future climate projections
- responding to increased public sensitivity to weather events following consecutive years of weather-related disasters
- uplifting the Bureau’s data practices to ensure data and information is in standard, easily accessible and customisable formats
- responding to Australia’s growing investment in renewable energy capacity and its reliance on weather forecasts to maximise productivity
- monitoring and adapting to continued growth in mobile applications and an increasing appetite for personalised, comprehensive and real-time data
- leveraging opportunities offered by exponential increases in data volumes, including potential insights from big data
- identifying, harnessing and operationalising advances in science and technology into effective products and services
- engaging appropriately with rapid growth of generative artificial intelligence model uptake, including conversational ‘chat services’
- ensuring the Bureau remains an expert, authoritative and trusted source of weather and climate information, as other sources of information, including misinformation, grow rapidly
- proactively monitoring and responding to medium-to-long term positioning in key customer and partner sectors
- supporting Australia’s objectives to promote and protect security and prosperity through international cooperation, particularly in the Indo-Pacific region
- monitoring and preparing for the increasing volume and sophistication of cyber security threats.

Significant change initiatives that affected the Bureau's performance in 2022–23 included:

- initiating implementation of the Strategy 2022–2027
- concluding the Public Services Transformation Program which delivered new ways of providing weather, water, ocean, and climate services to the Australian community
- continuing implementation of the ROBUST Program to ensure the security, stability and resilience of the Bureau's information and observing technologies
- continuing implementation of the Business Systems Transformation Program to uplift and streamline finance and human resources systems and processes.



Performance results

The Bureau's performance in 2022–23 against the 12 strategic success measures (SSMs), planned contributing measures and intended targets outlined in its Corporate Plan 2022–23 are shown below.

Impact and value

Products and services that enhance the wellbeing of all Australians.

SSM01: The financial and social value we deliver to the Government, industry and the Australian community.

Performance met expectations

Performance met expectations for 5 contributing measures. Performance met expectations overall, as it did for comparable measures in 2021–22.

Contributing measure

Target

Mitigation of property damage and reduced long-term trend in fatalities from extreme weather events including bushfires, heatwaves, floods, tropical cyclones and severe thunderstorms

Various

Performance met expectations. The Bureau provided customers with information, including forecasts and warnings, to help protect life and property through hazard preparedness and response during severe weather events, contributing to the long-term downward trend in the annual number of fatalities per capita in Australia from bushfires, tropical cyclones and severe thunderstorms. The annual number of flood-related fatalities per capita since 1992 has remained steady. Data showing fatalities attributed to heatwaves is not yet sufficiently robust to compare over time. The Bureau's services are estimated to have helped mitigate around \$602.9 million in damage from severe weather events in 2022–23 based on Insurance Council of Australia estimates of \$7.32 billion in insured losses from floods and thunderstorms.

Economic value added to Australia's agriculture sector

\$30m

Performance met expectations. The Bureau contributed an estimated \$132 million of economic value to Australia's agriculture sector in 2022–23 through the delivery of initiatives such as Forewarned is Forearmed, Climate Services for Agriculture and Agri-Climate Outlooks.

Economic value added to Australia's aviation sector

\$80m

Performance met expectations. The Bureau contributed an estimated \$184 million of economic value to Australia's aviation sector in 2022–23 based on estimated fuel savings and contractual aviation services at new locations.

Economic value added to Australia's energy and resources sectors \$80m

Performance met expectations. The Bureau contributed significant economic value to Australia's energy and resources sectors during 2022–23 through the delivery of tailored forecasts, decision support and consultancy services, helping industry manage environmental and technical challenges with scientific insights. The Bureau contributed an estimated minimum \$80-120 million of economic value to resource sector customers in 2022–23 by providing specialised services to help mitigate the impacts of severe weather, optimise production and keep a highly-exposed workforce safe. The Bureau contributed an estimated \$50-100 million of economic value to energy sector customers in 2022–23.

Economic value added to Australia's water sector \$100m

Performance met expectations. The Bureau's services, information and insight delivered an estimated \$300-400 million in economic value in 2022–23 through water reform in Australia, including support provided to water utilities and state water agencies. The Bureau will continue to improve its methodologies for estimating economic value in 2023–24.

SSM02: The levels of satisfaction and trust our customers, partners and stakeholders have in the products and services we provide.

Performance met expectations

Performance met expectations for 2 contributing measures and performance partially met expectations for 2 contributing measures. The 2 results meeting expectations were considered to provide a greater contribution to the overall performance against the success measure, with performance as assessed meeting expectations overall, as it did for comparable measures for 2021–22.

Contributing measure	Target
General community, key partner and emergency services customers have an overall positive experience	90%

Performance partially met expectations overall.

Customer experience levels showed continued improvement overall.

Surveys found that an average of 79% of general community and emergency management customers had an overall positive customer experience based on their assessment of 'Access, Content, Timing, Relevance and Staff' in 2023, an improvement from 77% in 2022 but below the target of 90%.

81% of community customers reported an overall positive customer experience in 2023, an improvement from 79% in 2022. 77% of partner and emergency management customers reported an overall positive customer experience in 2023, a slight improvement from 76% in 2022.

Industry and government customers are satisfied with the services provided by the Bureau Various

Performance met expectations overall.

- Positive feedback was received from customers in the water sector, including for the completion of the Future Hydroclimate project, delivery of flow forecast and decision support for Narran Lakes and in support of national water reform priorities.
- Positive feedback was received from customers in the agricultural sector, including on the Bureau's collaborative and innovative approach to providing climate information services to farmers and farm advisers through the Agri-Climature Outlooks project.

- Positive feedback was received from customers in the energy and resources sectors, including on the level of detail provided in the briefings, information related to uncertainty, and the useful focus on hazards. Two major customers in the resources sector re-contracted the Bureau for product and service provision following successful completion of existing contract periods in 2022–23.
- Positive feedback was received from customers and stakeholders in the national security sector, including on consultation processes used to improve product delivery. In a survey of 26 customers, 96% of customers were satisfied with the services they received from the Bureau.
- Positive feedback was received from customers of the Meteorological Authority Office with 89% of customers surveyed in 2022–23 either satisfied or very satisfied with its expert advice and engagement.

Annual increase in overall customer satisfaction across the Bureau's digital channels	Various
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Performance met expectations. The BOM Weather App continued to be Australia's top ranked free weather application in 2022–23, with 84% of customers rating their satisfaction level as 'satisfied' or higher, compared with 73% in 2021–22.

Net promoter score for the Bureau's forecast and warning services	Various
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Performance partially met expectations overall.

Surveys reported a Net Promoter Score of +58 for partner and emergency management customers in 2023, a significant decrease from +76 in 2022, and below the target of +62.

Surveys reported an average Net Promoter Score of +47 for general community customers in 2023, consistent with +47 in 2022, and below the target of +55.

These results are around three quarters through the range of possible scores (from -100 to +100), indicating strong customer satisfaction and loyalty despite not achieving the annual targets for 2022–23.

SSM03: The utilisation of our services by new customers and the return rate from existing customers.	Performance met expectations
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Performance met expectations for 2 contributing measures and performance partially met expectations for one contributing measure. Performance met expectations overall, as it did for comparable measures in 2021–22.

Contributing measure	Target
General community preference for Bureau services as a primary source to enable decision-making	35%

Performance partially met expectations. Surveys found that an average of 32% of general community customers nominated a Bureau source as their most used source for accessing forecasts or warnings in 2023, an increase from 28% in 2022 and below the target of 35%.

Key partner and emergency services preference for Bureau services as a primary source to support their decision-making	75%
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Performance met expectations. Surveys found that an average of 96% of emergency management customers nominated a Bureau source as their most used source for accessing forecasts or warnings in 2023, a significant increase from 85% in 2022 and meeting the target of 75%.

Increase in usage and engagement across digital channels, social media and subscription services

Various

Performance met expectations overall.

Usage of the BOM Weather App increased in 2022–23 with:

- an average of 3.8 million monthly active users compared with an average of 3.5 million monthly active users in 2021–22
- a total of 932 million sessions, compared with 895 million sessions in 2021–22.

In 2022–23, the BOM Weather app achieved the significant milestone of 10 million downloads since its release in 2020.

The Bureau's website had 688 million sessions in 2022–23, compared to 808 million sessions in 2021–22.

Growth in engagement across the Bureau's social media platforms continued, with followers increasing across all platforms. As at 30 June 2023 the Bureau had over 2.45 million total followers compared to 1.98 million total followers at 30 June 2022.

Operational excellence

Outstanding people supported by secure, effective and resilient systems, processes and technology.

SSM04: Our delivery against agreed customer requirements and commitments.

Performance met expectations

Performance met expectations for 6 contributing measures. Performance met expectations overall, as it did for comparable measures in 2021–22.

Contributing measure	Target
Delivery against the requirements of the Intergovernmental Agreement on the Provision of Bureau of Meteorology Hazard Services to the States and Territories	Requirements met

Performance met expectations. The Bureau delivered services to state and territory emergency services agencies in line with the Intergovernmental Agreement (IGA) during 2022–23. The Bureau will continue to work with state and territory emergency services agencies to enable further improvements to the Bureau's hazards products and services throughout 2023–24 in response to the scheduled mid-term review of the IGA undertaken during 2022–23.

Forecasts and warnings meet agreed performance targets	Various
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- Key services were delivered as per Service Level Specifications in place for services to the National Situation Room, flood, thunderstorm, tropical cyclone, fire weather, tsunami operations and embedded meteorologists.
- The Bureau issued 5,590 Flood Warnings and 459 Flood Watches during 2022–23, with timeliness of 91.5%, a decrease from 95.5% in 2021–22 and below the target of 97%. 73% of flood forecast lead times met service level specifications, an improvement from 67% in 2021–22 and exceeding the target of 70%. 85% of flood forecast peak height predictions met service level specification targets, an improvement from 74% in 2021–22 and exceeding the target of 70%.
- The Bureau uplifted its severe weather verification capability through the Public Services Transformation Program in 2022–23, noting severe weather verification remains limited by data availability and the localised nature of reports. Each region is assessed based on the average number of minutes warnings were issued before the end of their nominal validity time window. Nationally, the timeliness was 98% for Regional Severe Thunderstorm Warnings, 96% for Detailed Severe Thunderstorm Warnings and 87% for Severe Weather Warnings in 2022–23. The new information available through the capability will be assessed and used to develop baseline targets for 2023–24.
- The Bureau issued 60 tsunami threats and 7 tsunami watch or warning bulletins under the Australian Tsunami Warning System (ATWS) in response to 61 earthquakes during 2022–23. The average response time for ATWS was 15.6 minutes, meeting the target of 30 minutes.
- The Bureau's Tsunami Warning Services achieved ISO 9001 re-certification and Marine (High Seas) services passed the external International Maritime Organization (IMO) Member State Audit Scheme (IMSAS).

General community customers report that the Bureau's information enables their decision-making 60%

Performance met expectations. Surveys found that an average of 62% of general community customers reported that the Bureau's information enabled their decision-making in 2023, a decrease from 65% in 2022, but meeting the target of 60%.

Key partner and emergency services customers report that the Bureau's information enables their decision-making 80%

Performance met expectations. Surveys found that 87% of emergency management customers reported that the Bureau's information enabled their decision-making in 2023, a slight increase from 86% in 2022 and meeting the target of 80%.

Delivery of Defence meteorological services meets or exceeds agreed service levels in support of tactical, planning and strategic activities Requirements met

Performance met expectations. The Bureau's Defence meteorological services met or exceeded agreed service levels as per the Meteorological Service Agreement with Air Command and Joint Operations Command. Feedback indicated satisfaction with the quality, timeliness, accuracy and responsiveness of the services delivered.

Delivery of aviation meteorological services meets or exceeds International Civil Aviation Organization standards and recommended practices for Australia's area of responsibility and aviation industry standards Requirements met

Performance met expectations. The Bureau's aviation meteorological service was re-certified for three years through an external quality management audit in November 2022, demonstrating that the Bureau's aviation services meet the requirements of the International Civil Aviation Organization and the needs of industry.

SSM05: Capacity utilisation, system reliability, security and resilience benchmarked against best practice.

Performance partially met expectations

Performance met expectations for 3 contributing measures and performance partially met expectations for 3 contributing measures. The 3 results partially meeting expectations were considered to provide a greater contribution to the overall performance against the success measure, with performance assessed as partially meeting expectations overall, after meeting expectations for comparable measures in 2021–22.

Contributing measure	Target
Operational systems meet agreed performance targets for uptime and capacity utilisation	Various

Performance partially met expectations overall.

New network-specific service level targets were introduced for the Bureau's observing networks in 2022–23, with 95% availability previously reported for all networks.

- Automatic weather station uptime was 99.0%, unchanged from 99% in 2021–22 and meeting the target of 99.0%.

- Tsunami network uptime was 99.9%, compared with 93.2% in 2021–22 and meeting the target of 85%.
- Radar uptime was 95.5%, compared with 97.3% in 2021–22 and below the target of 97%. Lower availability was due to radar replacement and upgrade outages, and an increase in preventative maintenance outages.
- Satellite network availability was 89%, compared with 98.2% in 2021–22 and below the target of 97%. Lower availability was due to low utilisation of one end-of-life reception system which is due to be decommissioned. The polar reception system performed within the target.
- Upper air network availability was 94.3%, compared with 95.3% in 2021–22 and below the target of 97%. Availability was impacted by resource availability at some sites.
- Coastal Sea level network availability was 90.8%, compared with 93.4% in 2021–22 and below the target of 98%. Restricted availability of non-Bureau supporting infrastructure impacted the Bureau’s ability to resolve long-term outages.
- Marine network availability was 73%, compared with 73.5% in 2021–22 and below the target of 95%. Availability was impacted by the low number of operational ship-borne automatic weather stations, with replacements to be rolled out during 2023–24.
- Space weather network availability was 73.5%, compared with 82.5% in 2021–22 and below the target of 97%. Availability was impacted by long-term magnetometer network outages which will be remediated in 2023–24.
- Flood warning network availability was 96%, compared with 97.6% in 2021–22.
- Ozone network availability was 87.3%, below the target of 95%. Availability was impacted by issues with ozone-sonde consumables quality and performance, with alternative products to be trialled in 2023–24.
- Solar network availability was 0%, below the target of 95%. Data availability continues to be impacted by significant concurrent and longstanding issues. Coordinated remediation activities focused on operationalising new equipment and restoring data flow are currently underway or in the planning stages.

Average system uptime for the Bureau’s Australis supercomputer was 99.95%, compared with 99.9% in 2021–22 and exceeding the target of 99.5%.

Average supercomputer production capacity utilisation was 66%, compared with 56% in 2021–22 and exceeding the target of 30%.

Increase in cyber security cultural awareness and cyber security maturity

Various

Performance partially met expectations.

The Bureau continued to uplift its security maturity, across the governance, personnel, information (including cyber) and physical security domains during 2022–23.

The Bureau strengthened its planning, policies and approach to security practice, application and integration during the year and maintained a strong focus on security training, governance and communication.

A security awareness campaign continued to be successfully implemented across the organisation.

Maturity assessments demonstrated material improvement in relevant technical domains of security measured against Government policy standards.

Increase in data maturity assessed using the Annual Data Governance Maturity Assessment From 3.1 to 3.5

Performance partially met expectations.

The National Archives of Australia benchmarked Check-Up assessment showed an improvement in overall data maturity scores and showed the Bureau is performing above average for Australian Government agencies. The Bureau's annual data maturity self-assessment was below the target set for 2022–23.

Compliance of identified Quality Management Systems to ISO 9001 Certification achieved or maintained

Performance met expectations.

5 certified Quality Management Systems (QMS) maintained their existing certification of compliance to ISO 9001: Aviation Meteorological Services, the Meteorological Authority Office, Defence Weather Services, Energy and Resources Program and Tsunami Warning Services. Certification was achieved for the Operational Technology and Engineering QMS in November 2022.

Sustained, measurable improvement in risk and business continuity maturity based on external surveys and assessments Various

Performance met expectations overall.

The Bureau's Comcover Benchmarking survey showed an average risk maturity score of 2.86 in 2023, increased from 2.23 in 2021. The Bureau's risk maturity increased across all five areas of focus between 2021 and 2023. The Bureau also increased maturity from an internal self-assessment conducted in 2022.

The Bureau's self-assessed business continuity maturity increased from an overall 'Level 2 – Cooperative' in 2021–22 to a 'Level 3 – Standards Compliant' in 2022–23.

Operational forecasters with meteorological qualifications that meet or exceed the international standard defined by the World Meteorological Organization Operational requirements met

Performance met expectations overall.

Of the Bureau's 275 operational meteorological forecasters, 273 had meteorological qualifications that met or exceeded the international standard, as defined by the World Meteorological Organization. The following operational competencies were held:

- 140 aviation forecasting
- 149 fire weather forecasting
- 99 severe thunderstorm forecasting
- 29 tropical cyclone forecasting with 21 as lead forecasters.

Performance met expectations for one contributing measure. Performance met expectations overall, as it did for comparable measures in 2021–22.

Contributing measure	Target
Verification of forecast quality and improvements in forecast accuracy and lead time	Various

Performance met expectations overall.

- The Bureau issued 5,590 Flood Warnings and 459 Flood Watches during 2022–23, with timeliness of 91.5%, a decrease from 95.5% in 2021–22 and below the target of 97%. 73% of flood forecast lead times met service level specifications, an improvement from 67% in 2021–22 and exceeding the target of 70%. 85% of flood forecast peak height predictions met service level specification targets, an improvement from 74% in 2021–22 and exceeding the target of 70%.
- The Bureau issued 139 Fire Weather Warnings, 18,499 Fire Weather Forecasts and 2,739 Incident Weather Forecasts during 2022–23. The average accuracy of Grassland Fire Danger Indices was 87% and Forest Fire Danger Indices was 92%, both exceeding the target of 75%.
- The Bureau issued 800 Tropical Cyclone Outlooks and 108 Tropical Cyclone Advises during 2022–23. Forecast track location errors were consistent with the 5-year average for lead times of 0–36 hours, but slightly greater than the 5-year average for lead times of 48–120 hours. Intensity errors were slightly above the 5-year average for lead times of 0–36 hours, but were similar at 48 hours lead time, and much lower than the 5-year average for lead times of 72–120 hours.
- The Bureau issued 2,961 Regional Severe Thunderstorm Warnings, 639 Detailed Severe Thunderstorm Warnings and 1,227 Severe Weather Warnings during 2022–23. Severe weather verification is limited by data availability and the localised nature of reports. Each region is assessed based on the average number of minutes warnings were issued before the end of their nominal validity time window. Nationally, the timeliness was 98% for Regional Severe Thunderstorm Warnings, 96% for Detailed Severe Thunderstorm Warnings and 87% for Severe Weather Warnings.
- The Bureau issued 182 heatwave forecasts and 291 heatwave warnings following the launch of the new Heatwave Warning Service in October 2022. Performance targets for the service remain under development in consultation with partner agencies.
- The Bureau's seasonal climate outlooks achieved a forecast skill that was close to or slightly exceeded performance targets during 2022–23. The average accuracy of the operational chance of above median seasonal forecasts, measured in terms of annual weighted percent consistency was 76% for rainfall, 74% for maximum temperature and 75% minimum temperature, all exceeding the target of 60%.
- 90.5% of next-day maximum temperature forecasts were within 2 °C of the observed temperature compared to 89.4% in 2021–22. 83.5% of next-day minimum temperature forecasts were within 2 °C of the observed temperature compared to 82.9% in 2021–22.
- 90.2% of all next-day wind speed forecasts were within 5 knots of the observed wind speed compared to 87.3% in 2021–22. 86.2% of next-day coastal wind speed forecasts were within 5 knots of the observed wind speed compared to 83.2% in 2021–22.
- During 2022–23, 2 peak season reviews and 8 event debriefs were conducted, including a total of 582 observations, 128 insights and 145 recommendations or proposed actions. Triage and prioritisation of these recommendations and proposed actions will continue in 2023–24, including through the development and trial of a new Debriefing and Lessons Management Framework by implementing the Australian Institute of Disaster Resilience's OILL (observation – insight – lesson identified – lesson learned) process.

Insight and innovation

Practical implementation of novel, mission-directed solutions for our customers.

SSM07: The depth, breadth and resilience of our external partnerships and collaborations.

Performance met expectations

Performance met expectations for 2 contributing measures. Performance met expectations overall, as it did for comparable measures in 2021–22.

Contributing measure	Target
Value and effectiveness of partnerships and collaborations, assessed by the Bureau and its partners	Various

Performance met expectations overall.

Strong relationships were renewed and established with a wide range of customers, partners and stakeholders – nationally and internationally – during 2022–23.

The Bureau continued to expand existing relationships and establish new partnerships in the national security, space and land transport sectors, and will continue to pursue opportunities and collaborations with partners on services and products in 2023–24.

The Bureau also continued to grow its support of national decision-making bodies such as the Australian Parliament and taskforces, including through inquiry submissions and appearances.

The Bureau continued to maintain significant partnerships and collaborations with key science agencies, enhanced scientific research activities with university partners and further expanded its relationships internationally through a new bilateral Strategic Relationship Arrangement with Singapore's Meteorological Service to deliver a multi-year program of collaboration on weather and climate research.

Achievement of performance standards specified in relation to the Bureau's function as a regulator under the <i>Water Act 2007</i>	Met
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Performance met expectations, noting that interim arrangements for the Bureau's delivery of functions as a regulator as required under the *Water Act 2007* were in place during 2022–23. The Bureau developed best practice principles and performance objectives in consultation with water data providers.

SSM08: The conversion rate from ideas to opportunities to customer outcomes.

Performance partially met expectations

Performance met expectations for one contributing measure and performance partially met expectations for 2 contributing measures. Performance partially met expectations overall, after meeting expectations for comparable measures in 2021–22, noting that new contributing measures were added for 2022–23.

Contributing measure	Target
Agreed Hazards Services Forum recommendations delivered on time	100%

Performance partially met expectations. The Bureau continued to progress 17 recommendations on the Intergovernmental Agreement (IGA) that remained outstanding through the Hazards Services Forum in 2022–23. A mid-term review of the IGA undertaken during 2022–23 found that outstanding action items required re-prioritisation and identified new priorities to be progressed. The Bureau will continue to work with state and territory emergency services agencies to enable further improvements to the Bureau’s hazards products and services throughout 2023–24.

Proportion of customer-driven major and moderate initiatives that successfully pass through the Research to Operations gateway	100%
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Performance met expectations. 100% (5 in total) of major and moderate initiatives successfully passed through the Bureau’s Gateway to Operations Reference Group in 2022–23.

Customer outcomes delivered from ideas and opportunities	Case studies
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Performance partially met expectations overall. The Bureau continued to implement a range of product and service enhancements for customers during 2022–23, although comprehensive performance reporting on its innovation pipeline remains a focus for improvement. Through its Benefits Management Framework, the Bureau regularly reports on the progress of benefits realisation from its projects. During 2022–23, external customer benefits related to public safety, community wellbeing, national security and economic prosperity were achieved.

SSM09: The quality and application of our research and development, benchmarked internationally.

Performance met expectations

Performance met expectations for 4 contributing measures and performance partially met expectations for one contributing measure. Performance met expectations overall, as it did for comparable measures in 2021–22.

Contributing measure	Target
Performance of the Bureau’s global Numerical Weather Prediction model in comparison to other meteorological agencies	In the top 5 globally

Performance met expectations. The Bureau’s global weather models ranked within the top 5 global models based on World Meteorological Organization scores. The Bureau’s ACCESS-GE was the third highest ranked ensemble model for the southern hemisphere and ACCESS-G was the fifth highest ranked model for the Australian and New Zealand domain.

Proportion of Bureau scientific publications in peer-reviewed journals that have an Impact Factor of 3.0 or above ≥70%

Performance met expectations. 75.5% of Bureau scientific publications were published in peer-reviewed journals with an Impact Factor of 3.0 or above during 2022–23, compared with 81.2% in 2021–22 and exceeding the target of 70%.

Forecasts and warnings display continuous improvements with respect to attributes such as lead time, accuracy and timeliness Measured improvements

Performance partially met expectations overall.

The accuracy of STEPS3 rainfall nowcasts consistently outperformed ACCESS-C3 rainfall forecasts in 2022–23, demonstrating lower error scores and higher correlation values for all lead times and across all regions.

The accuracy of automated forecasts measured as a weighted mean across 6 surface variables increased in 2022–23 and showed 11 lead-hours of skill better compared with 2021–22.

Five million observations were assimilated per cycle in the Bureau's ACCESS-G model in 2022–23, slightly less than in 2021–22 due to the loss of the MetOp-A satellite. The number of aircraft observations assimilated increased after previously being impacted by the COVID-19 pandemic. The number of observation types assimilated in 2022–23 remained steady, however is expected to increase in 2023–24 when the APS4 model upgrade is completed.

The accuracy of seasonal forecasts indicated an ongoing long-term positive trend in the performance of the Bureau's seasonal outlooks for maximum and minimum temperature and rainfall over Australia.

Measures to assess the accuracy of ocean and marine forecasts, gridded historical analyses and Australian regional models remained under development in 2022–23 and are expected to report on performance in 2023–24.

Product and process improvements are implemented on schedule 100%

Performance met expectations. Process ownership was established for all approved process models and maturity was shown to have improved across process governance and process documentation dimensions.

Proportion of new transformation priority systems transitioned into operations 100%

Performance met expectations. The Bureau's Enterprise Integration Platform was operationalised in November 2022 and the Enterprise Test Capability Uplift completed in June 2023.

The Bureau way

One enterprise that lives its values through agreed behaviours every day.

SSM10: Our performance benchmarked against work health, safety, wellbeing, security and environment best practice.

Performance met expectations

Performance met expectations for 2 contributing measures and partially met expectations for 2 contributing measures. The 2 results meeting expectations were considered to provide a greater contribution to the overall performance against the success measure, with performance assessed meeting expectations overall, as it did for comparable measures in 2021–22.

Contributing measure	Target
Compliance with legislation, government policy and mandatory governance requirements	Met

Performance expectations met overall.

Zero non-compliances of the work health and safety legislation were reported in 2022–23. Privacy and FOI matters were managed appropriately.

Financial processes complied with relevant legislation and were audited as per requirements, noting that there was one instance of significant non-compliance of the finance law under section 19(1)(e) of the PGPA Act which was remediated through the 2022–23 financial statements process (see p.228).

Procurement processes complied with relevant legislation and were audited as per requirements.

Internal verification and compliance audits confirmed environmental management compliance and Environmental Management Plans developed by the Bureau were accepted by third parties as compliant. External audits confirmed a minor non-compliance associated with the 'Ships of Opportunity' programme which was rectified.

The Bureau established its Integrity and Compliance Advisory Group to manage the relevant legislative changes to commence in 2023–24.

Lost time injury frequency rate	Better than industry benchmark
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Performance partially met expectations. The Bureau's overall lost time injury frequency rate (LTIFR) for 2022–23 was 3.5, fractionally above the Australian industry benchmark of 3.4 for Professional, Scientific and Technical Services (Safe Work Australia). The LTIFR remained below the industry average for 9 months of the year and tapered back down after an increase in April and May. There were 9 lost time injuries during 2,548,181 total work hours in 2022–23.

Staff wellbeing index as measured by organisational surveys	>70%
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Performance partially met expectations. The Bureau's 2023 APS Census Wellbeing Index was 68%, marginally below the target of 70% and unchanged from 68% in 2022 and 2021.

Protective security maturity score	Rated as 'Developing'
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Performance met expectations. The Bureau continued to build its protective security maturity during 2022–23.

The Bureau strengthened its planning, policies and approach to security practice, application and integration during the year and maintained a strong focus on security training, governance and communication.

In 2022, the Bureau's protective maturity rating was 'developing', with the next maturity assessment to be undertaken in September 2023.

SSM11: Individual and team actions demonstrate commitment to enterprise values and behaviours.

Performance met expectations

Performance met expectations for 2 contributing measures and partially met expectations for one contributing measure. Performance met expectations overall, as it did for comparable measures in 2021–22.

Contributing measure	Target
Positive perceptions of leadership effectiveness as measured by organisational surveys	65%

Performance met expectations. The Bureau's 2023 APS Census 'Immediate supervisor leadership' score was 77% and 'SES manager leadership' score was 67%, both meeting the 65% target and unchanged from 77% and 67% respectively in 2022.

Positive employee connection to strategy as measured by organisational surveys	80%
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Performance partially met expectations overall. The Bureau's 2023 Culture Survey showed:

- a score of 76 for 'Personal contribution to Strategy', a slight decrease from the 2021 score of 79
- a score of 73 for 'Team contribution to Strategy', a slight decrease from the 2021 score of 75.

The Bureau's 2023 APS Census showed:

- a positive workforce response of 77% for 'Customer focus will continue to guide our strategy and operations. I understand what this means in my day-to-day role.' below the 81% score from 2022
- a positive workforce response rate of 53% for 'I feel connected to the Bureau's Strategy 2022–2027'. This score was introduced in 2023.

Positive employee engagement as measured by organisational surveys	>75%
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Performance met expectations. The Bureau's 2023 APS Census Employee Engagement Index was 74%, marginally below the 75% score from 2022 and the target of 75%.

SSM12: A diverse and inclusive workforce, that reflects the communities we serve.

Performance did not meet expectations

Performance did not meet expectations for one contributing measure. Performance did not meet expectations overall, after partially meeting expectations for comparable measures in 2021–22.

Contributing measure	Target
Organisational diversity and inclusion targets met	Various

Performance did not meet expectations overall. Female staff comprised 37.1% of the Bureau's workforce in 2022–23, an increase from 36.7% in 2021–22, and below the target of 50% by 2025.

Aboriginal and Torres Strait Islander staff comprised 1.2% of the Bureau's workforce in 2022–23, compared to 1.3% in 2021–22, and below the target of 2.7% by 2023.

People identifying with a disability comprised 2.4% of the Bureau's workforce in 2022–23, compared to 2.5% in 2021–22 and below the target of 7% by 2025.

The Bureau will undertake a range of activities in 2023–24 as it seeks to improve its organisational diversity. A new First Nations function will be established and will develop the Bureau's 2024-2026 Reconciliation Action Plan and First Nations Employment Plan. The Bureau will continue to utilise Australian Public Service talent pathway programs. The Bureau will also develop a new Diversity and Inclusion Plan to bring together all diversity domains into one plan.

Upholding capability

As described in its Corporate Plan 2022–23, the Bureau has a responsibility to maintain a complex and wide-ranging field of capabilities to ensure it meets its purpose. To this end, the Bureau is implementing the 16 strategic actions identified in its Strategy 2022–2027 and progressing capability developments across five broad themes: strategy, people, relationships and geographical footprint, infrastructure and technology, and asset management and financial sustainability.

Achievements in capability development

The sections below identify the Bureau’s achievements in capability development across the five themes identified in its Corporate Plan 2022–23.

Strategy

Capability aim: To further align the Bureau’s strategy, culture, investment and governance activities to drive coordinated, responsive and accountable service delivery across the enterprise.

To enhance its strategic capability, the Bureau has:

- continued to mature its strategic foresight or ‘futures strategy’ capability to support the organisation in navigating changes in its operating environment
- continued to mature its centralised transformation capability and delivered tools, training and leadership coaching to uplift skills and embed best practice
- matured its risk management approach and culture, incorporating risk evaluation into decision-making across the enterprise and providing regular risk reporting to the Security, Risk and Business Continuity Committee and Executive Team
- continued to mature and integrate its planning, performance monitoring and evaluation skills and processes to better support budget and investment decisions.

Relationships and geographical footprint

Capability aim: To help Australia manage its natural resources and build resilience to hazards and a changing climate through focused engagement with industries and governments, and through provision of timely information to communities. This will enable the Bureau to enhance customer outcomes by providing timely, expert advice on risks, impacts and opportunities that supports improved decision-making when it matters most. The Bureau also actively partners and collaborates nationally and internationally to deliver better outcomes for customers.

To enhance its relationships and geographical footprint the Bureau has:

- continued to build the Australian Climate Service in partnership with CSIRO, the Australian Bureau of Statistics and Geoscience Australia to support a safer, adaptive and prosperous Australia that is resilient and prepared for climate challenges and natural hazards
- continued to operate a national decision support services team, serving customers, partners and stakeholders across multiple jurisdictions to build operational resilience

- systematically engaged and strengthened relationships with its customers, partners and stakeholders to better understand, measure and monitor how its services enable them to deliver their operational priorities
- worked within international and intergovernmental forums to promote cooperative advancement in science and technology, and partnered with Australian Government agencies, international meteorological agencies and universities to develop new innovations that advance the Bureau's services.

People

Capability aim: To foster a workforce that is skilled, agile and equipped for the future, ensuring its teams have the skills and knowledge required to achieve the outcomes of the Bureau and meet customer needs. To grow a diverse and inclusive culture that reflects the community it serves.

To maintain and enhance its people capability, the Bureau has:

- continued to strengthen its workforce and culture through diversity, inclusion and STEM initiatives, including through delivery of the 2021–23 Innovate Reconciliation Action Plan
- continued to support the development of a leadership and cultural transformation through Strategy in Action workshops and the Bureau Way Manager Program
- embedded an enterprise scheduling tool to maximise productivity and wellbeing through effective fatigue management, particularly during prolonged severe events
- sought to enhance the Bureau employee experience by recognising high performance, responding to employee perceptions and prioritising staff wellbeing.

Infrastructure, technology and data

Capability aim: To continue to invest in the Bureau's data, enterprise-wide data management and applications to enhance digital capability and provide technological solutions that enable all Australians to easily access and utilise our services to meet their individual needs. The Bureau will enhance its information systems, observations technology, infrastructure, processes and data to ensure they are fit-for-purpose in delivering secure, stable and sustainable services, particularly during high-impact events.

To maintain and enhance its infrastructure, technology and data capability, the Bureau has:

- continued to implement the ROBUST program, including completing upgrades to Queensland radar infrastructure at Brisbane, Mackay and Cairns, installing a range of new automatic meteorological balloon launching systems (AMBLS) and ionosondes, and completing security improvements at over 42 observing sites throughout Australia
- continued to improve the quality and reliability of its radar capability, installing new radars to replace existing radars at Serpentine in Western Australia and at Gove in the Northern Territory, and completing radar upgrades at Waruwi and Berrimah in the Northern Territory, Cairns and Willis Island in Queensland and Mount Koonya in Tasmania
- achieved certification of its Operational Technology and Engineering Quality Management System in compliance with the ISO 9001:2015 Quality Management Standard
- continued to implement its Information Technology Strategic Plan 2022–2027 and Observations Ecosystem Roadmap to chart the course for its information and observations technology capabilities.

Asset management and financial sustainability

Capability aim: To ensure that Bureau's assets are safe, sustainably managed on a whole-of-life approach and deliver the intended service in accordance with the Bureau's mission and its customer expectations. The Bureau will mature its asset management capabilities by better integrating its planning, costing, procurement, contract management and strategic vendor management expertise.

To enhance its asset management and financial sustainability capability, the Bureau has:

- completed implementation of its enterprise asset management system to enable improved reporting on asset performance and facilitate data-driven asset management and funding decision-making
- continued implementation of its Business Systems Transformation Program to stabilise and modernise its core corporate enterprise resource planning systems, streamline service delivery and reduce red tape
- continued to mature its procurement and strategic vendor management through a new procurement service model and an expanded offering that includes commercial advice and contract negotiation
- continued to uplift its property management capability, including through a review of its leasing arrangements and designing and managing new accommodation fit-outs.





Section 3: Group Performance

Community Services

Goal: Deliver world-class and customer-focused weather, water, climate forecasts and ocean analyses to achieve the greatest impact for customers, contributing to zero lives lost through natural hazards and \$1 billion of added social and economic value to the Australian community.

The Community Services Group is responsible for providing high quality weather, water, climate and ocean services to the Australian community and emergency management sector. These services are aimed at preventing loss of life and reducing the social and economic impacts of natural hazards. The group's focus is to do this in a resilient, efficient and sustainable way that enables the Bureau to deploy its capabilities when and where they are needed most.

The group's services span the breadth of Australia, its territories and oceans. These services are delivered in a tiered approach with national context typically derived centrally and tailored locally to meet customer needs..

For 2022–23, the group consisted of 3 programs with the following responsibilities:

Program	Responsibilities
National Production Services	<ul style="list-style-type: none"> • National production and coordination of forecast and warning services • Assessment of warning potential and service escalation needs • Incident management • Consistency of quality assurance, verification, performance reporting and monitoring and continuous improvement process across the Community Services Group
Environmental Prediction Services	<ul style="list-style-type: none"> • National warning, forecasting and modelling services for flood, thunderstorms, severe weather, fire, heatwaves, cyclones, oceans, tsunamis, water, climate and drought • Lead the development and implementation of service enhancements aligned to Bureau policy and customer requirements • Service capability and capacity enhancements • Staff competency assessment and development • Quality assurance, verification, performance reporting and monitoring of warning services
Decision Support Services	<ul style="list-style-type: none"> • Understanding public and emergency management partner needs, requirements and decision-making processes • Operation of a multi-hazard decision support capability including both on-site and embedded meteorology, hydrology, climatology and communications services • Engagement with the Australian community • Local and regional delivery of media and social media content related to weather, climate, water and ocean • Local environment monitoring and escalation of issues, impacts and intelligence

Throughout 2022–23, the Community Services Group focused on delivering 4 outcomes that support the achievement of the Bureau’s Strategy and purpose. The group’s achievement in delivering each of these outcomes is outlined below.

Outcome 1: Understand and meet Government, Emergency Service and Australian Community priority needs

Achieving the outcome

Refreshing the Intergovernmental Agreement on the provision of hazard services

In 2022–23, the Bureau undertook a mid-term review of the *Intergovernmental Agreement on the provision of Bureau of Meteorology Hazard Services to the States and Territories* (the IGA).

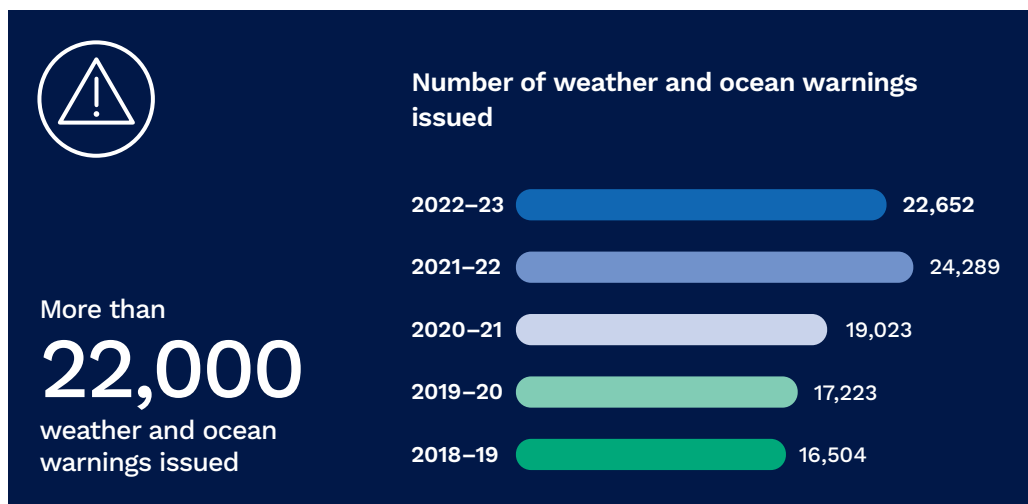
The IGA was established in 2017 and formalises and standardises the services provided by the Bureau to state and territory emergency services agencies. Consultation during the review included 13 Hazards Services Forum (HSF) member interviews and 7 hazard-specific focus group discussions held across Australia. Written feedback was also received.

Several broad themes emerged during the consultation process, including:

- the value the HSF provides within the emergency management sector
- the need for the IGA and HSF to keep pace with the changing operating environment
- the need to make further improvements around roles, responsibility and governance
- the opportunity for the Bureau to take on a national coordination and leadership function.

Feedback also raised the need for updates to the IGA Service Schedules, which is being considered by the Bureau using the HSF as a customer advisory forum to advise on sectorial priorities.

HSF endorsement of the review report will be sought in early 2023–24, with recommendations that enable further improvements to the Bureau’s hazard products and services to be implemented as practicable.



Strengthening connections with a broad spectrum of emergency management practitioners

The Bureau is represented on nearly 80 external committees and sub-committees in the emergency management sector, connecting at all levels of government.

The Bureau’s Hazard Preparedness and Response National Team also played a central role as secretariat on several key forums, bringing together experts on disaster risk policy. In 2022–23, this included the Hazards Services Forum, the Australian Tropical Cyclone Advisory Group, and the Australian Tsunami Advisory Group. Through these forums, the Bureau has been able to make improvements to tropical cyclone warning products based on user feedback and advice, undertake scenarios and drills to increase preparedness for real-world events and gain critical understanding of the emergency sector’s hazard-specific needs. The Bureau also engaged with the Australian Institute of Disaster Resilience on the 2021–22 Major Incidents Report, which provides an overview of incidents involving the fire and emergency services sector.

Supporting international marine safety standards through national partnership

Under the leadership of the Australian Maritime Safety Authority (AMSA), the Bureau and other Australian Government agencies demonstrated Australia's compliance with international marine safety obligations imposed by the International Maritime Organization (IMO).

The IMO is the United Nations (UN) specialised agency for the safety and security of international shipping. The mandatory IMO Member State Audit Scheme (IMSAS) is completed every 7 years and is used to assess the extent to which Member States comply with requirements set out in the relevant UN conventions and protocols, such as the *International Convention for the Safety of Life at Sea 1974 (SOLAS)*.

Australia's IMSAS audit process in April 2023 consisted of questionnaires and face-to-face interviews with the IMO Audit Team. The Bureau demonstrated its quality delivery of the SOLAS compliant marine weather products and services for navigational safety in Australian coastal waters and open ocean. The audit process also deepened the Bureau's collaboration and engagement with other Australian maritime related agencies.



Ship entering Newcastle Harbour.

Understanding the extent of climate change in the Pacific

The Bureau has been working with its Pacific partners under the Climate and Ocean Support Program in the Pacific (COSPPac) to understand average and extreme climate conditions including rainfall, air temperature, tropical cyclones, sea surface temperature, sea level and ocean waves. This work culminated in the release of a report on historical and recent climate variability for 15 Pacific Island countries or territories (see p.169).

Highlights and significant events

Declaring La Niña in the Pacific Ocean

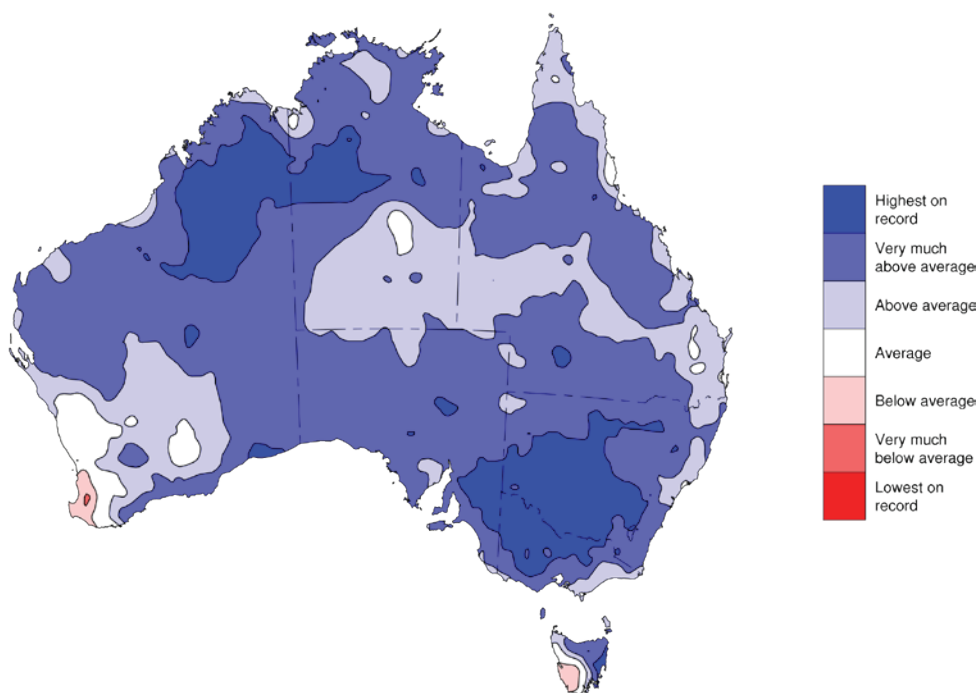
The Bureau provides long-range forecasts to support the community, partners and emergency services in planning for the likely climate conditions in the weeks and months ahead. Closely aligned with the long-range forecasts for Australia are forecasts of large-scale influences, called Climate Drivers, that impact the country's weather and climate.

A major Climate Driver for Australia is the El Niño-Southern Oscillation (ENSO) in the Pacific Ocean which has 3 different phases: El Niño, La Niña and Neutral. Tropical Pacific conditions are monitored by the Bureau's ENSO Outlook service.

Following the end of the 2021–22 La Niña, a La Niña Watch was activated in June 2022, indicating around double the usual chance of La Niña redeveloping later in the year. In August, this was raised to La Niña Alert (around 3 times the usual chance of a La Niña event). On 13 September, the Bureau announced a La Niña was underway, with conditions meeting both ocean and atmospheric indicators.

Ahead of spring 2022, the ENSO Outlook consistently forecast a likely La Niña development. Long-range forecasts indicated a wetter than average spring for most of the eastern half of Australia, with many areas having more than double the usual chance of an unusually wet spring (predicted to be in the wettest 20% of all springs on record).

Consistent with the Bureau's long-range forecasts, much of south-eastern Australia had its highest spring rainfall on record. Spring 2022 was the wettest on record for the Murray-Darling Basin, with extensive flooding affecting all eastern states. The La Niña in the tropical Pacific was a key Climate Driver, along with a negative Indian Ocean Dipole and a persistent positive Southern Annular Mode, all occurring against the background of global warming.



Spring 2022 rainfall deciles, ranked against all years since 1900.

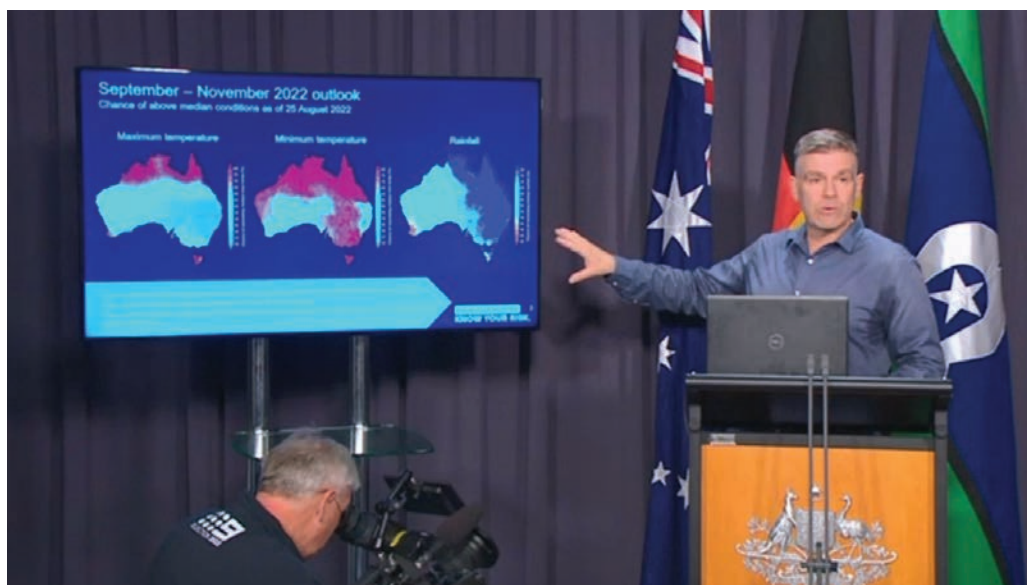
Delivering high-risk weather briefings at Parliament House

Each year, the Bureau's National Hazard Preparedness and Response – National team facilitates key seasonal outlook briefings, including inside Parliament House. These briefings ensure government officials and emergency management and defence agencies can plan and prepare for the high-risk weather season ahead.

In 2022–23 the Bureau delivered high-level briefings to Australian Government Ministers, Senators and Members of Parliament, and worked closely with the Australian Climate Service to produce scenarios for use in briefings and planning activities across government, industry and non-government organisations.

The briefings commenced in July, with the Bureau's CEO and Director of Meteorology, Dr Andrew Johnson delivering a high-risk weather outlook – in partnership with then Director General, Emergency Management Australia, Joe Buffone – to the National Emergency Management Ministers' Meeting at Parliament House. Several briefings were provided at Parliament House, including to the Minister for Emergency Management, Senator the Hon Murray Watt, and other elected officials, on the likelihood of high-risk weather events in the coming months. A media briefing was delivered with Minister Watt.

In the first week of September, the Bureau's high-risk weather season briefing was presented to Senators and Members of Parliament alongside the National Emergency Management Agency (NEMA).



Bureau Senior Climatologist Greg Browning provides an update on high-risk weather for the season ahead.

Meeting the needs of remote communities during major flooding in the Northern Territory

When floods hit the Northern Territory (NT) in March, emergency press conferences involving the Bureau included live interpreting in an indigenous language for the first time. In-language messaging for remote NT communities is important because 75% of community members speak an Aboriginal language at home.

Severe flooding forced evacuations in the communities of Kalkarindji, Daguragu and Pigeon Hole in the Upper Victoria River region of the NT. Three media events over 3 days with in-language messaging increased the accessibility and relevance of warnings for those communities.

Successful delivery of live indigenous language interpretation was many months in the making. Preparation began in late 2022, with collaboration between the Bureau’s Hazard Preparedness and Response and Community Engagement teams, the Aboriginal Interpreter Service, the NT Emergency Service and NT’s Government’s Public Information Group to prepare and deliver specialist training of interpreters and key emergency services partners.



Commander Danny Bacon, NT Police, Fire Emergency Services, Sharon MacMillan, Aboriginal Interpreter Service and Shenagh Gamble, Bureau of Meteorology at a press conference at the Peter McAulay Centre, Darwin in March.

The work earned the Bureau a Highly Commended at the Emergency Media and Public Affairs (EMPA) Awards in June. The work also contributes to the delivery of Action 5 of the Bureau’s Reconciliation Action Plan, which is to *Continuously strive to improve the Bureau’s services and products to ensure the physical and cultural safety of Aboriginal and Torres Strait Islander customers.*



‘Mock’ media event during training workshop with Lisa Sennett, Public Information Group, Mosese Raico, Bureau of Meteorology, Miriam Ngalmirimirin, Aboriginal Interpreter Service at Peter McAulay Centre, Darwin, October 2022.

The 2022–23 tropical cyclone season

There were 7 tropical cyclones in the Australian region during 2022–23, below the long-term average of between 9 and 13 tropical cyclones each season. Five tropical cyclones – Darian, Freddy, Gabrielle, Herman and Ilsa – reached at least Category 3 intensity (severe tropical cyclone) while in the Australian region. Three cyclones – Ellie, Gabrielle and Ilsa – brought significant impacts to Australian communities. Tropical cyclone 01U was not named in real time, however upon reanalysis after the event, it was determined that it did attain tropical cyclone intensity.

Severe tropical cyclone Ilsa was the first category 5 tropical cyclone to impact the Australian coastline since Marcia in 2015. Ilsa made landfall around midnight local time along the east Pilbara coastline of Western Australia, tracking directly over Pardoo Roadhouse. The roadhouse and nearby pastoral stations were devastated by the 230 km/h winds in the destructive core of the cyclone. The peak 219 km/h 10-minute mean wind observation and the 289 km/h wind gust at Bedout Island measured during the passage of Ilsa are the highest known wind observations ever recorded on a standard Bureau instrument.

Forecasts issued by the Bureau’s Tropical Cyclone Warning Centre for severe tropical cyclone Ilsa were very accurate at long lead times, aided by a high degree of confidence in the forecast track from the global model ensemble outputs. Up to 6 days before Ilsa impacted the coast, emergency services and industry were briefed on the possibility of a severe impact along the east Pilbara or west Kimberley coast. The accuracy of forecasts up to 4 days out were particularly high when compared to historical forecasts.



Track map of tropical cyclones during 2022–23.

Next steps

Key activities to be delivered in 2023–24 to help achieve Outcome 1 include:

- delivering an enhanced pre-season awareness campaign to people at greater risk in Australia, by leveraging established relationships with partner organisations to build community resilience

- standardising Service Level Agreements or Strategic Agreements with key domestic and international customers and partners
- uplifting the Hazards Services Forum as the Customer Advisory Forum for the emergency management sector and establishing hazard-based sub-committees.

Outcome 2: Our high-impact products and services enable decisions and lead to action

Achieving the outcome

Helping Australian communities respond to weather and climate-related events

In the lead up to and during Australia's 2022–23 high-risk weather season, which ran from October to April, the Bureau provided over 3,000 technical briefings to help the emergency management sector and various government agencies plan for the season. The Bureau continued to deliver its embedded capability within state-based emergency services across the country, with meteorologists and hydrologists providing intelligence to support key decisions that keep the community safe.

An example of this occurred during a flood event in Central Queensland in January, where the Bureau meteorologist embedded in Queensland Fire and Emergency Services (QFES) was able to provide exact advice on the areas that would receive high rainfall – notably on inland areas. This resulted in more effective and timely deployment of rescue teams to support members of the community, with emergency services moving their coastally located swift water rescue capability to the inland areas that were at risk of flash flooding.



HPR Queensland Manager Laura Boekel and Brad Commens from Queensland Fire and Emergency Services.

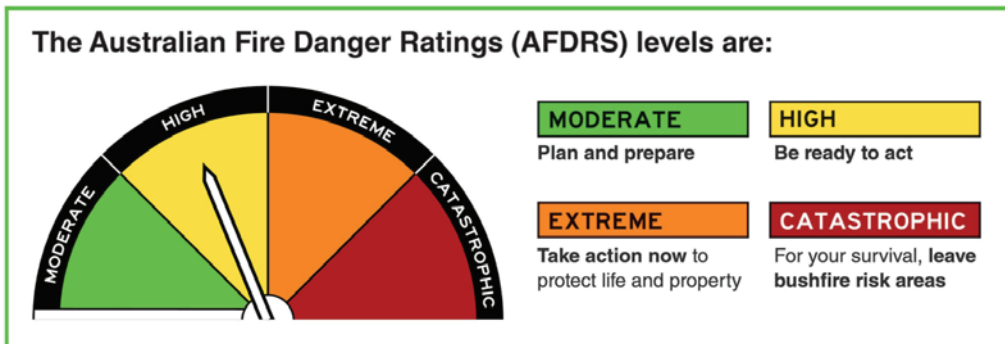
Helping Australians better understand bushfire risk

In September, the Bureau implemented the new Australian Fire Danger Rating System (AFDRS) in partnership with emergency management agencies across Australia. The AFDRS provides a new way to calculate and communicate fire danger.

The AFDRS is a new operational system based on improved fire behaviour models, improved forecasting capability and better mapping of fuel parameters. This drives improvement in the Bureau's current fire weather services which inform crucial decision-making by emergency service agencies and the wider community during bushfire events.

Previously, each state and territory had its own rating system. Now, across the country, fire and emergency services are applying nationally consistent colours, signs and terminology. The number of ratings has been reduced from 6 to 4, with concise and action-orientated messaging that can be easily understood.

These changes help to ensure that whatever the season or fuels, Australians can understand the level of threat and what actions they need to take to stay safe.

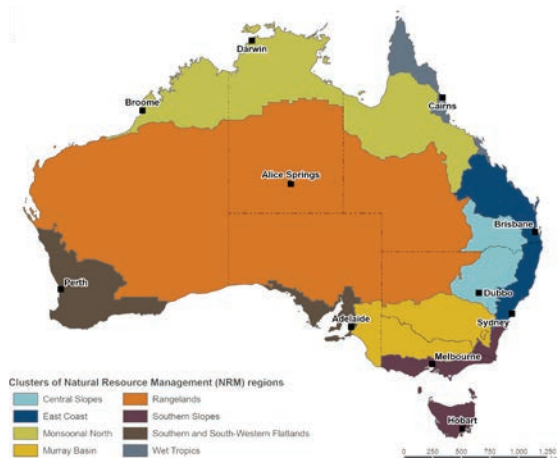


The new Australian Fire Danger Ratings.

Delivering new water data projections to our customers

The Bureau's Australian Water Outlook provides a suite of services and outputs for commercial water managers, government water agencies, researchers and other customers to support climate, weather and water-sensitive decisions. These include forecasts, hydrological projections and historical data on Australia's hydroclimate.

In September, the Bureau published 8 new National Hydrological Projections Assessment reports to provide customers with background and guidance materials on using the National Hydrological Projections.



The 8 regions that are assessed in the hydrological projections assessment reports.

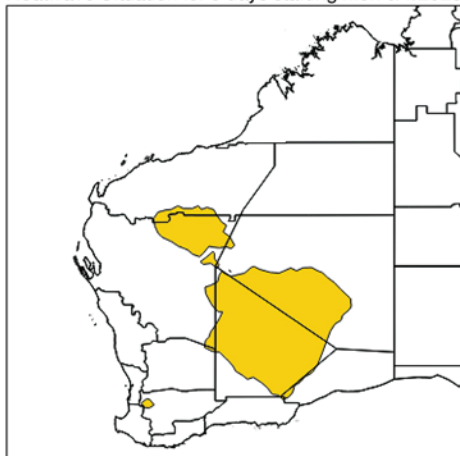
The reports present information in the form of ‘storylines’ of plausible future hydrological extreme events, such as floods and droughts, and long-term hydroclimatic changes in precipitation, runoff, potential evapotranspiration and soil moisture.

Keeping Australians safe in summer with a new heatwave warning

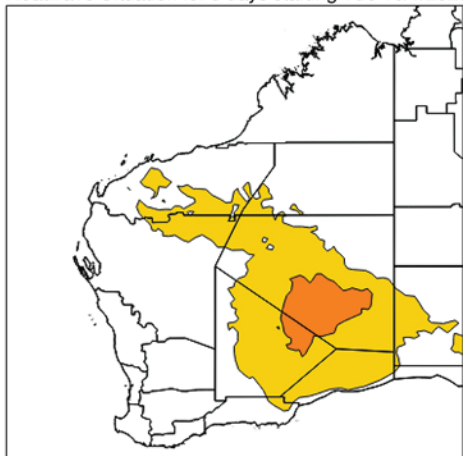
In October, the Bureau launched a new Heatwave Warning Service to support the public in taking steps to prepare and mitigate the impacts of heatwaves. This followed a successful trial with partner agencies during the 2021–22 season. Warnings are sent to emergency management agencies and through public facing channels including the Bureau’s website and the BOM Weather app.

The service assisted partner agencies to communicate the health risks of the extreme heat at the appropriate time. The timely, relevant information ensured health departments were better equipped to assist those vulnerable to heatstroke, including through implementing mitigation strategies to assist at-risk people in the impacted areas.

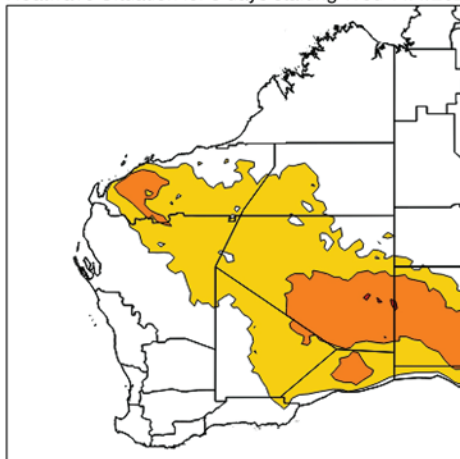
Heatwave Situation for 3 days starting Mon 9/1/2023



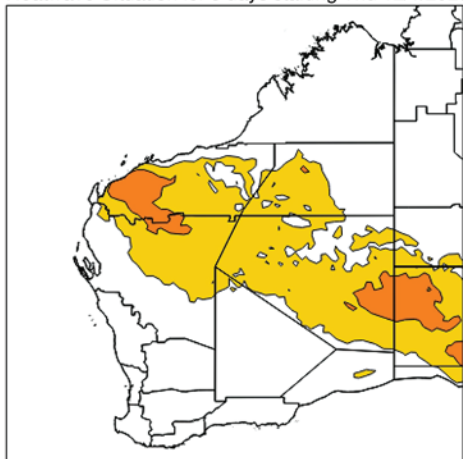
Heatwave Situation for 3 days starting Tue 10/1/2023



Heatwave Situation for 3 days starting Wed 11/1/2023



Heatwave Situation for 3 days starting Thu 12/1/2023



No Heatwave	Low-Intensity Heatwave	Severe Heatwave	Extreme Heatwave
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Graphical imagery from a heatwave warning for Western Australia in January 2023.

Highlights and significant events

Supporting the community through major floods of the Murray–Darling Basin

Throughout 2022, prolonged wet conditions and saturated soils across eastern Australia led to widespread major flooding throughout the Murray–Darling Basin. Spring 2022 was the wettest on record for New South Wales and Victoria since 1900.

Record flood levels were observed during 2022 and flood impacts were significant, including along the Murray River at Echuca, Victoria, which had its highest flood peak since 1916. In Eugowra (Mandagery Creek, New South Wales), 80% of homes were damaged. Other towns severely impacted included Shepparton and Seymour in the Goulburn catchment; Albury, Echuca and Mildura along the Murray River catchment; and Rochester in the Campaspe catchment.

Ahead of the prolonged flooding, in early spring 2022 the Bureau advised there was an increased likelihood of widespread flooding across eastern Australia. Throughout the event the Bureau issued more than 300 flood warnings for the Barwon, Darling and Murray Rivers. During this time, the NSW State Emergency Services responded to 24,500 incidents of which approximately 15,000 were from the areas that include the Murray–Darling catchments.

The Bureau held media conferences with state Premiers, the NSW State Emergency Operations Controller (SEOC), emergency management ministers and emergency services agencies. Daily severe weather and flood briefings were provided to emergency management authorities, local Members of Parliament and mayors of councils impacted by the floods. At the peak of the flooding along the Murray River, daily briefings were provided to the Victorian and New South Wales Emergency Services. Specialist Bureau meteorologists, hydrologists and community engagement practitioners were embedded with the emergency services in the State Control Centres, including 24/7 coverage during peak periods.



Steven Bernasconi, Manager Hazard Preparedness and Response NSW/ACT, responding to questions from the media during the 2022 floods in NSW.

Collaborating with international colleagues on tropical cyclone services

In December, the Bureau was well represented at the tenth International Workshop on Tropical Cyclones (IWTC-10) in Bali. The World Meteorological Organization (WMO)-sponsored event brought together 130 tropical cyclone researchers and operational experts from 45 countries, in addition to over 300 online registrants.

The theme of the workshop was ‘improved science and services for better decision-making’ and aimed to assess progress in tropical cyclone science and services over the past 4 years and recommend areas of focus for the next 4 years.

A total of 20 working groups across 6 topics worked for 12 months to produce reports supporting the workshop's objectives, that were presented to the wider group. Breakout sessions then discussed each of the topics and the workshop culminated with a consensus of 21 recommendations that will help guide science and service development activities until the next IWTC.

The gathering was a great success, presenting opportunities to make connections and share experiences to harness the collective wisdom of the broader tropical cyclone community. The world-leading work the Bureau is doing to better harness the power of ensemble weather models and to deliver products tailored to customer needs was commented on by many attendees. The Bureau's strong representation and acknowledgement is recognition of our operational expertise and high standing on the global stage.



BMKG Indonesia and Bureau of Meteorology forecasters strengthening connections.

Working with United States colleagues to share severe weather knowledge

An international exchange initiative in 2023 made significant strides towards establishing closer relationships and collaboration with our colleagues in the United States. The exchange of staff took place between the Bureau's Environmental Prediction Services Severe Weather team and the US National Oceanic and Atmospheric Administration, National Weather Service, Storm Prediction Center. This collaboration aims to improve the Bureau's capability to deliver severe weather meteorological activities that assist in disaster preparedness, mitigation and response.



Andrew Bufalino, Senior Meteorologist from the Bureau's Thunderstorm and Heavy Rainfall team, completing a Tornado Warning simulation at the Storm Prediction Center.

In February and March, the Bureau hosted a member of the Storm Prediction Center team during a period of enhanced operational demand to accelerate severe weather knowledge and streamline meteorological processes. In May and July, the Storm Prediction Center hosted members of the Bureau’s Thunderstorm and Heavy Rainfall team during their period of elevated operational demand.

Both organisations benefited from the initiative. The collaborative and mutual exchange of scientific and technical talent, skillsets and knowledge has resulted in a more comprehensive and effective approach to severe weather forecasting and warning capabilities. It has also fostered a deeper understanding of the challenges faced by each organisation and has facilitated the development of new approaches to addressing these challenges. Moving forward, this will continue to be an important part of the Bureau’s work in delivering operational excellence.

Next steps

Key activities to be delivered in 2023–24 to help achieve Outcome 2 include:

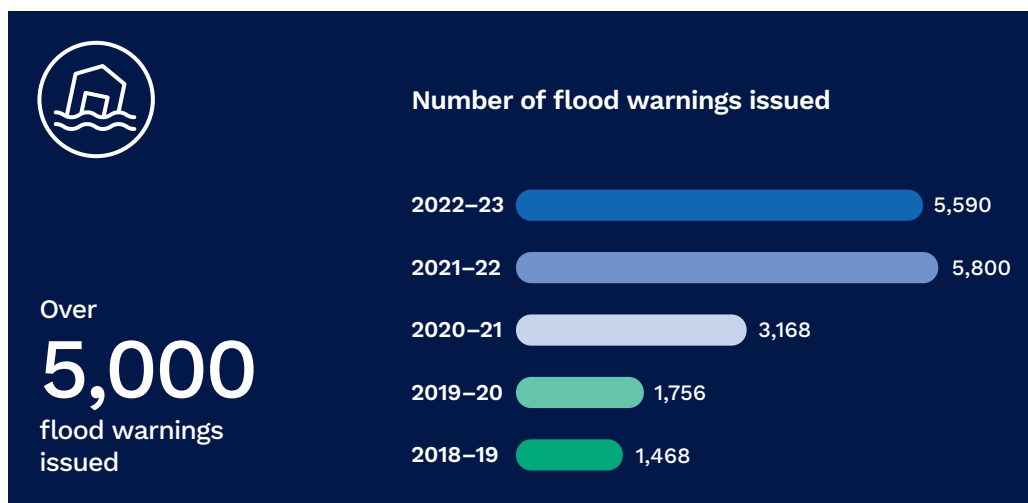
- further developing the Future Warnings Framework and delivering a nationally consistent multi-hazard, impact-based warning and alerting system for the Australian community
- delivering the Australian Smoke Dispersion System
- continuing response to recommendations from the 2022 Flood Inquiries.

Outcome 3: Resilient, sustainable, national operations delivered across Community Services Group

Achieving the outcome

Delivering improved reliability, security and performance for flood forecasting systems

In September, the Bureau’s Hydrological Forecasting System (HyFS) was upgraded to the latest software version and was moved to new infrastructure. This was the biggest update to HyFS since its launch in 2015 and the major milestone was achieved during a very challenging year of flood operations.



HyFS underpins the Bureau's national water and flood forecasting services. The new version delivers improved capability, security, resilience and reliability with new infrastructure, improved architecture, and a suite of new business features. Some of the features include new rainfall forecasts, improved map displays, improved archive integration, automated performance analysis, and new user documentation and training. These changes have made an enormous difference in achieving operational excellence and impact and value for the Australian community.

Enhancing integrated operations through Operational Tools

As part of the broader Public Services Transformation (PST) initiative, the Bureau implemented a process-centric approach to enhance integrated operations. Recognising the significance of the Microsoft 365 platform, the project aimed to leverage its capabilities to fulfill the operational tool requirements of the group.

During the delivery phase, the focus was on the development of Microsoft PowerApps build and uplift, alongside establishing support arrangements tailored to operational needs. This phase was successfully completed, culminating in the launch of Operational Tools in late May.

The new platform makes it easier to record and retrieve data and provides a single dashboard displaying the status of various operational functions at any given time. These changes improve the way the group communicates among teams, allocates staff, and works in real-time to deliver resilient and nationally consistent services. Looking ahead, the Bureau will continue to make improvements to the application that align with the evolving requirements of operational teams.

Standing up national community information capability

As part of the goal to deliver continuous local and national weather narratives to the Australian community, the Bureau provides more than 700 scheduled radio crosses across the country each week.

In October, the Bureau changed the way it does routine radio crosses by creating a new Community Information team specialising in the clear communication of high-quality weather information for local communities. The team is made up of meteorologists and science communicators trained in meteorology and local knowledge for the regions they serve.

These specialist communicators are trained to deliver content in an accessible style, tailored to local audience needs – enabling the Bureau's operational meteorologists to focus on forecasting and warnings. This allows for increased flexibility so that the team can adapt to changing media requirements, scale up to meet an increase in demand during major weather events, and manage the workforce during staff leave or movements.



Jessica Lingard, Community Information Officer at work in the Bureau's Perth office.

Internationally certifying Australia’s national tsunami operations

In May, the Joint Australian Tsunami Warning Centre (JATWC) was recertified for ISO 9001 for another 3 years after successfully passing the independent external auditing process.

The Bureau operates the JATWC in partnership with Geoscience Australia, delivering tsunami warnings nationally to Australian communities and tsunami threat advisory services internationally to 27 other Indian Ocean countries.

The tsunami warning service was first certified in July 2020 as an ISO 9001 compliant Quality Management System. With the service being further enhanced and the national tsunami operation made more resilient, recertification was necessary to assure this essential work.

Ensuring resourcing for essential flood and water services

At the start of 2023, the Bureau implemented a long-term rostering and resourcing plan for the Environmental Prediction Services, National Water Operations Team. The approach identifies planned resources with the appropriate skills to provide 24-hour coverage, 7 days a week. This allows the team to meet anticipated service demands, adjusting in accordance with climatic or seasonal variance and flexibly scaling based on risk.

The resourcing plan also incorporates fatigue management principles ensuring the health and wellbeing of the Bureau’s people with longer-term planning supporting greater work-life balance. It allows to the team to carry out continuous national flood risk assessment, provide ongoing monitoring of flood warning network data and systems, and deliver flood warning products and services to Australian communities.

Highlights and significant events

Providing new mid-morning updates for capital cities

The Australian community has a diverse range of requirements for routine forecasting services. One common requirement is responsive, accurate and up-to-date forecasts that reflect the conditions people are experiencing wherever they are.

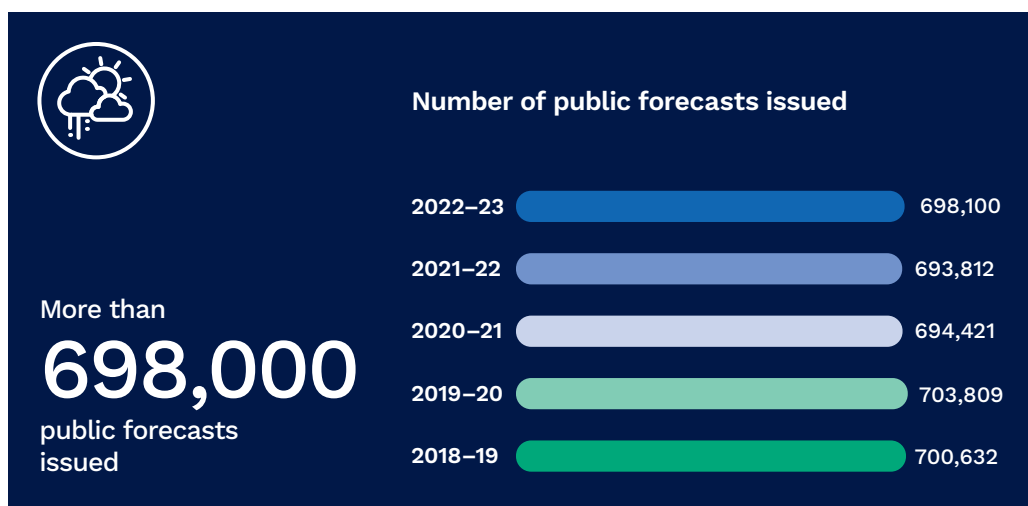


Storm over Sydney CBD.

One of many avenues the Bureau is exploring to meet this demand is increasing the frequency of its routine public weather forecasting services. A first step in this journey was completed in June when a mid-morning update was introduced for all capital cities. Rolling out this service nationally built on practices already in place in Sydney, Canberra and Brisbane.

Updating capital city forecasts every day ensures this high-profile product always describes the weather for the remainder of the day and removes any emphasis on conditions that have already occurred e.g. fog, frost, or early morning showers. It provides the community with the latest information to inform their decisions and plans as they carry out their day. The initiative also represents a 50% increase as forecast updates move from twice daily to 3-times per day.

Planning is well underway to extend the mid-morning update across all routine public weather services over the coming years.



Updating our Telephone Weather Services to better serve community needs

The Bureau commenced a phased migration of telephone services to an upgraded platform in late 2022.

Customers access information from the Bureau in different ways, with some members preferring to call our 1300 Telephone Weather Service. This is a perfect solution for people with limited or no access to online information, or for customers looking for the convenience of having current warnings and forecasts read to them over the phone. For example, some customers who are blind or have low vision find this solution an essential part of how they obtain the latest information from the Bureau.

The uplift of the Bureau’s telephone services commenced with the 1300 warnings services and then progressed to the 1300 forecasts for each state and territory. The final stage, which included the Bureau’s national services, went live on 30 March. In total, 39 different 1300 services were successfully migrated to the new platform.

The new platform takes advantage of an advanced text to speech capability, which significantly reduces the need to manually record voices for the audio output. This allows the Bureau to provide a much-improved customer experience. Going forward, the new platform creates a pathway for future enhancements, such as delivering warnings and forecasts in a language other than English.

Building a national approach to public warnings for coastal hazards

The Bureau took a significant step towards improving coastal hazards services by establishing a dedicated Coastal Hazards operational function within the Community Services Group. This operational function has transitioned the Bureau away from an historical state-based approach to a new national one.

This is an important outcome of the Public Services Transformation (PST) program and sets the foundations for improvements in the years ahead. As part of this change, an ongoing review is being conducted into coastal hazards products to ensure a nationally consistent approach to warnings which is more in line with community expectations.



Coastal inundation at The Entrance, New South Wales

Next steps

Key activities to be delivered in 2023–24 to help achieve Outcome 3 include:

- continuously improving the delivery of nationally consistent operations across the group and its programs
- increasing the frequency of routine public weather forecast services
- leading the Forecast Improvement projects and integrating their outcomes to drive production processes and service outputs.

Outcome 4: A valued, safe and inclusive workforce with a clear sense of purpose

Achieving the outcome

Enhancing wellbeing services for our front-line staff

During 2022–23, the Bureau introduced an enhanced wellbeing service for staff to access, to better support frontline staff who participate in long running and high impact events on a shiftwork basis. This type of work can result in multiple psychosocial hazards including high job demands, fatigue and exposure to traumatic events.

The service was implemented using the Bureau's Employee Assistance Program (EAP) provider, Converge International. There are 3 elements to the program – an education component, wellbeing check-ins with an EAP counsellor and on-site support. The service provides employees with regular one-on-one support to ensure that they are assessed for coping and wellbeing. It also provides strategies that are relevant to an employee's individual situation and circumstances.

Facilitating fatigue management using the new Enterprise Scheduling Tool

In June, the Bureau's Community Service Group and Aviation Operations teams went live with a new Enterprise Scheduling Tool, replacing the multiple spreadsheets and other media being used to create and communicate staff rosters. The convenient mobile-enabled solution means managers and staff can easily view schedules and manage their availability, anywhere and at any time.

The new Enterprise Scheduling Tool enhances the capability for monitoring work schedules to facilitate safe and equitable workforce design. Quantifiable fatigue limitations contained within the Bureau's Enterprise Agreements and Fatigue Management Procedure can be monitored and reported using the tool.

Managers and Roster Coordinators receive warnings when employees are close to, or have reached, specific limits such as: hours per shifts, hours per week, minimum rest periods between shifts and consecutive days worked. This information enables managers to make informed decisions when monitoring workloads, designing roster and shift patterns, approving shift swaps, and when deploying staff in response to surge events.

With over 500 users, the new tool and dedicated Roster Coordinators help drive national consistency through a common scheduling approach that promotes fairness and transparency. These enhanced rostering abilities ensure schedules are filled with suitably skilled staff to maintain continuous service delivery and foster a staff welfare focus. The changes aid the Bureau's ability to nationally govern capability and capacity levels, react to high impact events, and deploy resources to meet customer needs.

Leveraging customer feedback to deliver exceptional customer relationship management

Customer feedback and complaints – captured in the Customer Relationship Management System – provide valuable opportunities for learning, change and growth. The Bureau's national customer service team, Weather Connect, aims to use this feedback to enhance customer satisfaction, deliver exceptional service and improve customer outcomes.

To help embed the Bureau's revised customer service charter (see p.119), a customer engagement training session was conducted using a marine services customer case study. The training explored how the Weather Connect team – in collaboration with Bureau subject matter experts – could resolve the customer's concerns, acknowledging their views and ideas and gathering valuable insights for ongoing marine product enhancements.

The Weather Connect team achieved a 100% completion rate for the Intermediate Customer Engagement Training, helping to ensure the Bureau provides consistent messaging and customer experiences across multiple channels. This training has significantly enhanced the Bureau's tactical customer service and is now being rolled out to uplift other customer engagement activities in priority sectors.

Highlights and significant events

Honing our skills in delivering climate risk intelligence

In May, close to 40 of the Bureau's operational climatologists, hydrologists and support staff gathered in Melbourne for a 3-day training event focused on how the Bureau develops and provides strategic climate risk intelligence to its customers.

The training provided an opportunity for capacity building, collaboration, knowledge exchange and skill enhancement. Workshops, presentations and hands-on sessions took place. These aimed to enhance technical, media and communication skills and promote new Bureau processes and ways of working with existing and new partners (including the Australian Climate Service).

In addition to academic benefits, the training cultivated networks and collaborations among climatologists and hydrologists. Personal interactions and networking enabled the formation of professional relationships, leading to future collaborations, mentoring and knowledge sharing. By harnessing the expertise and collective efforts of the Bureau's operational climate staff, the Bureau aims to advance its understanding of climate change risks, develop effective strategies and tools for improved resilience and adaptation, and deliver the best science-based climate intelligence and information.

These collaborations are intended to extend beyond the training and result in joint initiatives, enhancing the collective impact of the climatology community across the Bureau.



The Bureau's operational climatologists and hydrologists taking part in the Environment Prediction Service's climate training event.

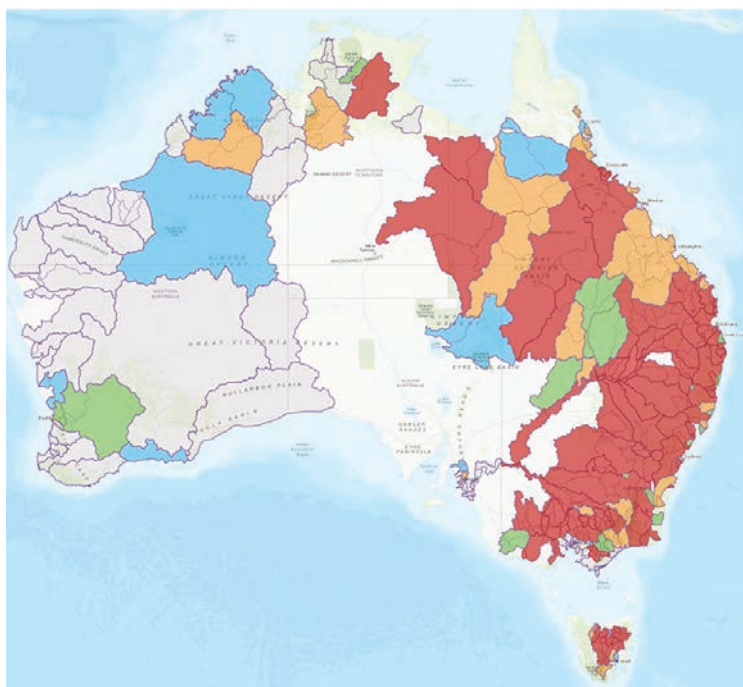
Building the strength of our national team in flood operations

Due to the extensive flooding in 2022 (both the number of simultaneous catchments in flood, and the longevity), several decision support hydrologists received additional training to expand their knowledge of catchments across the country.

This meant hands-on, on-the-job shadowing and learning between local and inter-state hydrologists. Through the training, staff learnt more about the catchments and critical thresholds for decision-making which affect the community.

By developing a national group of decision support hydrologists, the Bureau has more operational resilience, particularly when facing fatigue from widespread and high-impact flood events.

This national support was put in place during flood events in 2022–23, with decision support hydrologists supporting colleagues from other regions to allow much needed recovery while still enabling specialist briefings to be delivered to emergency services 7 days a week.



This map shows the highest flood classifications (the severity of flooding) reached in different areas across Australia in 2022. A large proportion of the country experienced major flooding (red) which meant that large areas were inundated by flood waters. Moderate (orange) and minor (green) flooding also occurred. The blue areas indicate where generalised flood warnings were provided (this is when there is insufficient data to make specific predictions, or in the developing stages of a flood).

Next steps

Key activities to be delivered in 2023–24 to help achieve Outcome 4 include:

- continuing to develop a proactive safety culture and processes that focus on all aspects of fatigue, wellbeing and staff psychological safety
- continuing to enhance the group's diversity and inclusion and use of flexible working arrangements
- investing in the strategic leadership capabilities of the group's emerging leaders.

Business Solutions

Goal: Business Solutions Group enables customers in the Bureau’s focus sectors to achieve their missions by contributing to the prosperity, safety and security of those sectors and Australia as a whole.

The Business Solutions Group is responsible for building deeper, more focused, and systematic engagement with the Bureau’s customers and partners. Its goal is to deliver greater impact, innovation, quality and value in critical sectors including agriculture, aviation, land and maritime transport, energy, resources, national security, water and international development. The group also delivers on the Bureau’s function as a regulator under the *Water Act 2007*, to bring together Australia’s water information.

For 2022–23 the group consisted of five programs with the following responsibilities:

Program	Responsibilities
Agriculture and Water	
Aviation, Land and Maritime Transport	<ul style="list-style-type: none">• Deepening the Bureau’s relationships• Developing a deep understanding of each sector and its needs
Energy and Resources	
International Development	<ul style="list-style-type: none">• Delivering responsive, coordinated, world-class services
National Security and Space	

Throughout 2022–23, the Business Solutions Group focused on delivering 4 outcomes that support the achievement of the Bureau’s Strategy and purpose. The group’s achievement in delivering each of these outcomes is discussed below.

Outcome 1: The Bureau enables the Commonwealth and our customers to deliver on their objectives, to a value of \$2 billion and zero lives lost through natural hazards.

Achieving the outcome

Supporting Australian aviation – all day, every day

The Bureau’s meteorological services are essential to the operation of Australia’s aviation sector. The Bureau is the sole and mandated provider of aviation meteorological forecast and warning services for Australian airspace, which covers 11% of the globe. It also provides the Asia-Pacific region with critical aviation hazard services, such as for volcanic ash.

Each year the aviation sector directly contributes approximately \$35 to \$69 billion (or around 3–5%) to Australia’s GDP and indirectly supports more than 500,000 jobs in supply chains, tourism and investment in other industries. During 2022–23, the Bureau provided more than 1.5 million aviation forecast products to the sector, an average of 4,130 per day.

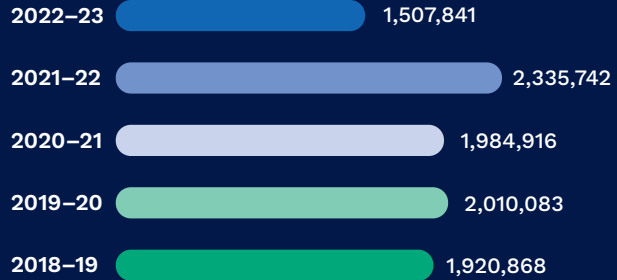


Over

1.5
million

aviation forecasts
delivered

Aviation forecast products delivered



* Note that the method used to calculate forecast products delivered was revised in 2022-23 resulting in a lower number of products compared to previous years. According to the previous method, over 2.2 million products were delivered in 2022-23.

Providing ad hoc aerodrome forecasts in support of emergency operators

In recognition of the high importance of air-based medical and rescue services, and in supporting the requirements of emergency operations, the Bureau provides additional or extended aerodrome forecasts (TAF), for approved emergency users, when required.

In 2022-23, Aviation Operations provided 161 additional TAF or TAF extensions to support emergency users including the Royal Flying Doctors Service (RFDS), Careflight, Lifeflight, SES, Police, Air Ambulance, Toll Rescue, and other helicopter rescue operators.

In early 2023, Lifeflight was tasked with a retrieval to the west of Toowoomba. The retrieval was complicated due to thunderstorms and high humidity in the area that were changing rapidly. The Lifeflight crew were supported by the Bureau during the five-hour mission from 8pm to 1am local time, and were in contact with Bureau forecasters several times throughout the night.

Lifeflight noted that the assistance provided by the forecasters was outstanding and greatly assisted the service they were able to provide to the medical team. Ultimately, the patient was able to be delivered to receive the care they required in a timely and efficient manner. Lifeflight acknowledged this was significantly aided by the support provided by the Bureau.



An RFDS pilot preparing for a flight by examining Bureau weather forecasts.

Protecting aircraft, passengers and crew from the impacts of volcanic ash

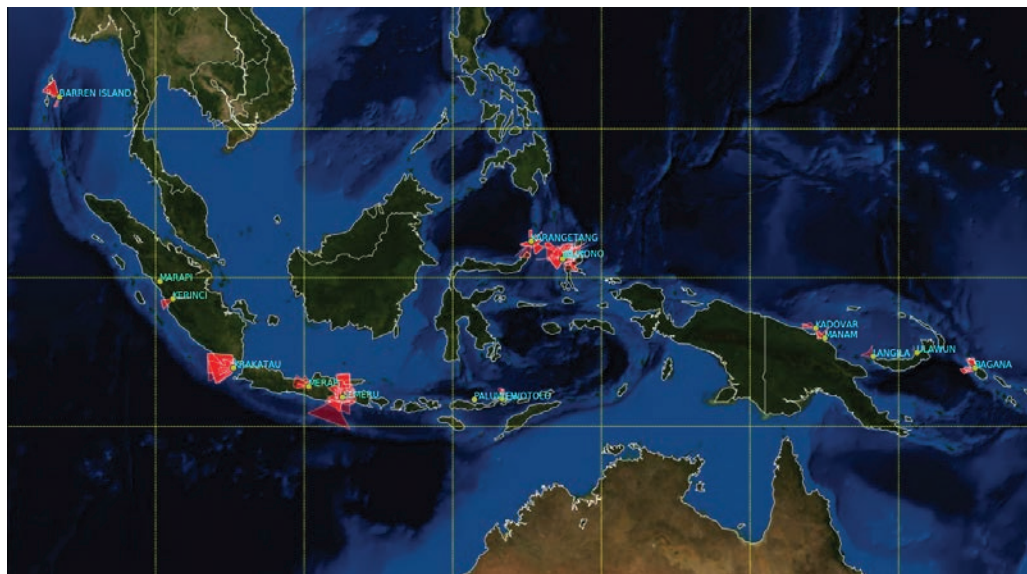
The Bureau's Volcanic Ash Advisory Centre (VAAC Darwin) provides advice to the aviation industry about the location and movement of potentially hazardous volcanic ash. Operating out of Melbourne, VAAC Darwin is staffed by meteorologists who are specially trained in the detection and forecast movement of volcanic ash, which is a known hazard to aviation.

The VAAC Darwin, one of 9 Volcanic Ash Advisory Centres worldwide, is responsible for the area that encompasses the active volcanic regions of Indonesia, Papua New Guinea and the southern Philippines, and extends southwards to the pole.

In 2022–23, the VAAC Darwin issued a total of 2009 volcanic ash advisories. This included advisories for 3 high impact events which generally have discernible or visible ash that is impacting or expected to impact aircraft at cruising levels or international aerodromes.

These high impact events were associated with 3 Indonesian volcanoes:

- Dukono from 15 November
- Semeru from 4 December
- Merapi from 11 March 2023.



Location of volcanoes for which volcanic ash advisories were issued by the Bureau in 2022–23. The red polygons represent the extent of ash dispersion for which advisories were issued.

Filling the gaps in the map – new weather observations in the Pacific

The Bureau's extensive automated observation network ensures that the real-time weather information essential for the continuity and safety of aviation services can, in Australia, be taken for granted. However, at Kanton Island – the largest, northern most island of the Phoenix Islands in the Republic of Kiribati – manual weather observations have prevailed and local weather information has often not been available for several months at a time. The closest near-real-time data have come from about 1000 km away, in Tarawa or Kiritimati (Kiribati), or from Tuvalu.

With the support of the Department of Foreign Affairs and Trade, the Bureau partnered with the Kiribati Meteorological Service during the year to install a Micro Weather Station on Kanton Island. The station provides real-time access to fundamental weather data (e.g. temperature, pressure, wind speed), as well as observations of phenomena never before measured on Kanton, such as visibility, and cloud height and amount. Access to this data improves air safety for Kanton airport, as well as filling a large weather observation gap in the Pacific's storm-prone airspace.

New technology to support deployable meteorologists

The Bureau has recently augmented its ability to provide the Royal Australian Airforce (RAAF) with outstanding meteorological support wherever it operates, in Australia and abroad.

For many years, the Bureau has embedded meteorologists at RAAF air bases across Australia. More recently, the Bureau has expanded its deployable meteorologist capability to provide seamless support to domestic and offshore operations and exercises by Defence and/or other Australian Government Departments. Deployment of Micro Weather Stations and equipment that improves the connectivity and security of our communication equipment enables our meteorologists to actively work in remote locations and to provide timely forecasts, warnings, and observations, anywhere, at any time, on short notice.

Improving industry productivity with Rio Tinto

In October, the Bureau started providing Rio Tinto's Operational Excellence Team with logistics forecasts, particularly tailored rainfall information, aimed at enhancing operational efficiency.

Facilitated by the Bureau's accurate predictions, Rio Tinto reported significant efficiency improvements following a few rainfall events in early 2023. A direct economic impact of approximately \$6 million has been associated with the Bureau's services, as validated by Rio Tinto, over 3 distinct weather events confirming the significant value delivered.

In recognition of the valuable input and considerable productivity benefits brought about by the Bureau's forecasts, Rio Tinto has requested these services be extended to an additional site from late 2023.

Highlights and significant events

Improving water information in the Murray-Darling Basin

The Bureau has continued to put customers first in the development of the Murray-Darling Basin Water Information Portal. The portal seeks to reduce asymmetry of access to water data and information across the Murray-Darling Basin by systematically documenting user needs, testing features with users to gain their feedback and responding by making enhancements. The portal serves a diverse range of users including farmers, First Nations people, local governments, communities, environmental groups and recreational water users.

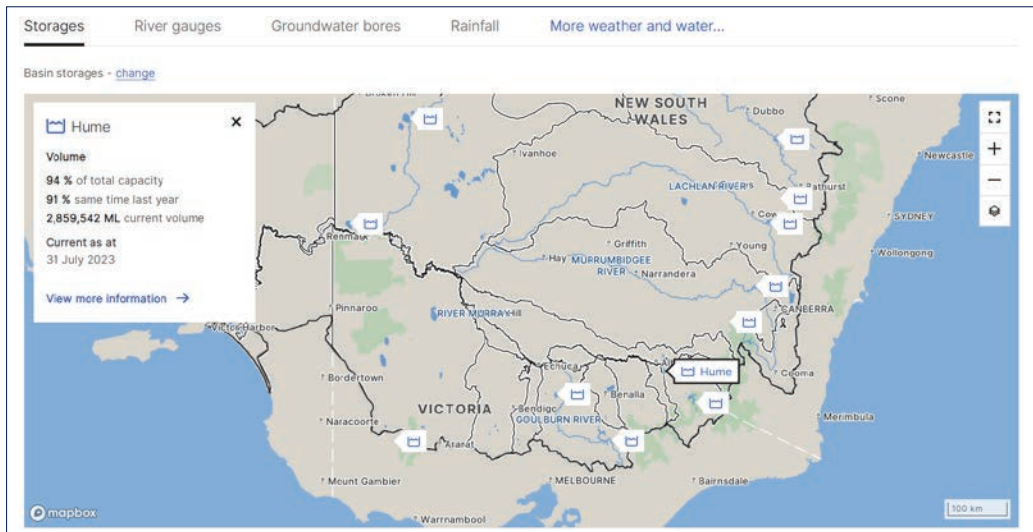
The portal brings together information about water availability, water in storages, groundwater, streamflow, allocation volumes, water take, water markets, water quality, rainfall and soil moisture for the Basin. Version 4 was released in May with many new features including:

- groundwater levels for representative bores including the impact of groundwater use and recharge on water levels in aquifers
- groundwater trade information, complementing the surface water trade information already available in the portal
- new river diagrams for the Border Rivers system, comprising the New South Wales Border

Rivers, Queensland Border Rivers and Moonie catchments, and for the Northern Victoria river system, comprising the Ovens, Broken, Goulburn, Campaspe and Loddon catchments

- detailed information on river flow and water availability in a user-friendly design
- a ‘what’s new’ section to highlight Portal updates.

The Portal is being developed by the Bureau in partnership with the Murray–Darling Basin Authority, the Department of Climate Change, Energy, the Environment and Water, and Basin state government agencies. Version 5 will be delivered in late 2023.



A screenshot of the Murray-Darling Basin Water Information Portal, showing the volume of water stored in Hume Dam.

Establishing a 24/7 space weather forecasting capability

Although space weather forecasts don't appear in routine weather segments, they provide essential information that contributes to the wellbeing of all Australians. Space weather is created by the Sun, including solar flares and geomagnetic storms that can pose a serious threat to communications and technological systems. Forecasts of significant space weather events enable operators of critical energy, emergency management, aviation, space and Defence infrastructure to protect assets from damage.

The Australian Space Weather Forecasting Centre (ASWFC), based in Adelaide, was officially opened in October by the Hon Tanya Plibersek MP, Minister for the Environment and Water. The ASWFC provides a 24/7 operational centre from which the Bureau's space weather forecasting team can continuously monitor and forecast space weather conditions and their possible effects to ensure mitigating actions can be taken by operators and decision-makers in Australian industry sectors and the community.

The ASWFC has responded to 3 significant space weather events since its opening, including the largest geomagnetic storm in over 6 years, reinforcing the Bureau's role as Australia's leading authority on space weather. The Bureau's space weather capability has been pivotal in ensuring there is national recognition of the threat that space weather poses to critical infrastructure, and cascading impacts to national security, economic prosperity and safety of people.

Growing recognition of this hazard in Australia was demonstrated in early 2023 when space

weather was included as a 'natural hazard' in Home Affairs Critical Infrastructure Risk Management Program (CIRMP) which sits under the *Security of Critical Infrastructure Act 2018*. As such, critical infrastructure asset owners must now manage space weather risks in line with the rules in the CIRMP. The Bureau's space weather team supports asset owners via its forecasting capability and assistance in coordinating space weather hazard exercising to test mitigation and response plans.



The Bureau's Dr Kate Brand (centre) provided a demonstration at the opening of the Australian Space Weather Forecasting Centre to the Hon Tanya Plibersek MP, Minister for the Environment and Water (left) and the Hon Susan Close MP, Deputy Premier of South Australia (right).

Building stronger ties with the international space weather community

In December 2022, Dr Kate Brand – the Bureau's National Manager for the Australian Space Weather Forecasting Centre – visited the UK and US space weather forecasting centres, identifying areas for international collaboration, and strengthening relationships.

Working together and knowledge sharing on an international level is important due to the broad geographical extent of significant space weather events and the considerable uncertainties involved with space weather forecasting. Following on from this visit, Dr Tom Grace and James Lannan, from the Bureau's National Security and Space Program, attended and presented at the US Space Weather Workshop 2023, held in Colorado in April.

The event brought together government agencies, academia and industry to discuss space

weather and its impacts. Further discussions included representations from space weather, national security, and emergency management on how to implement consistent and coordinated government responses to significant space weather events that require global-scale impact-mitigation strategies.



Presentations at the US Space Weather Workshop 2023.

Next steps

Key activities to be delivered in 2023–24 to help achieve Outcome 1 include:

- commencing – in partnership with Pacific customers – new phases of flagship international development programs (e.g. COSPPac3), with a focus on transition to Pacific leadership
- developing a decadal Space Weather Roadmap to establish priorities for providing reliable and timely space weather intelligence to support national security, economic prosperity and safety
- expanding the delivery of tailored rainfall guidance for open cut mines to additional customers in the Pilbara region to extend the value delivered to the resources sector via improved operational decision-making.

Outcome 2: Bureau priorities reflect highest impact customer needs.

Achieving the outcome

Supporting the Pacific’s Meteorological Roadmap through Weather Ready Pacific

Economic losses from cyclones and flooding in the South Pacific region in 2020 were estimated to cost approximately USD \$1 billion with at least 71 lives lost. The risks posed by extreme events are increasing and will become more intense in the coming decades.

In recognition of this rising threat, the Bureau worked closely with its Pacific partners to devise Weather Ready Pacific, a Pacific-designed and Pacific-led roadmap for strengthening the region's weather and climate resilience. Weather Ready Pacific includes an array of capacity building, infrastructure and governance support to bolster Pacific National Meteorological services. It will help the region better forecast and disseminate severe weather warnings and assist nations in adapting to the impacts of climate change.

At the February Pacific Islands Forum Special Leaders meeting in Suva, Fiji, Pacific leaders welcomed Australia's initial AUD \$30 million contribution to support delivery of Weather Ready Pacific in partnership with the Pacific Meteorological Council. Underpinning this outcome has been the Bureau's role in connecting and aligning technical organisations in the Pacific with development partners in Australia and New Zealand.

Employing a strategic approach to prioritising and communicating sector opportunities

The Energy and Resources team developed an Impact and Value Assessment approach to improve the strategic focus of the team and to articulate sector priorities to the broader organisation. This initiative employs a custom scoring system across various important categories to pinpoint high-impact, high-value sector opportunities.

As a direct outcome of this new information, the team has begun refocusing efforts and reallocating resources towards the impactful sector initiatives. This shift in focus not only fosters a deeper engagement with customers and partners as part of the process, but also supports the Bureau in understanding the potential value of delivering to sector priorities.

Providing weather and climate services to support Australia's national security

The Bureau's National Security and Space Program (NSSP) delivered a series of verbal briefings during 2022–23 to provide reliable and trusted forewarnings of severe weather and climate risks to national security interests. Briefings included:

- the quarterly Global Seasonal Outlook briefing across government
- high-risk weather season briefings to decision-makers and planners across the Department of Foreign Affairs and Trade and Department of Defence
- an introductory briefing to students at the Australian War College
- a climate security brief to Australian National University's National Security College's Security Foundation course
- space weather briefings to international space agencies and key government partners.

The Bureau collaborated with government agencies and academia to provide integral environmental data to inform climate security assessments on issues of national interests.

In November, NSSP convened a roundtable for officials and experts from across government agencies and policy institutes to consider better integration of climate and weather intelligence into national security considerations.

Highlights and significant events

Supporting climate resilience and productivity with Climate Services for Agriculture

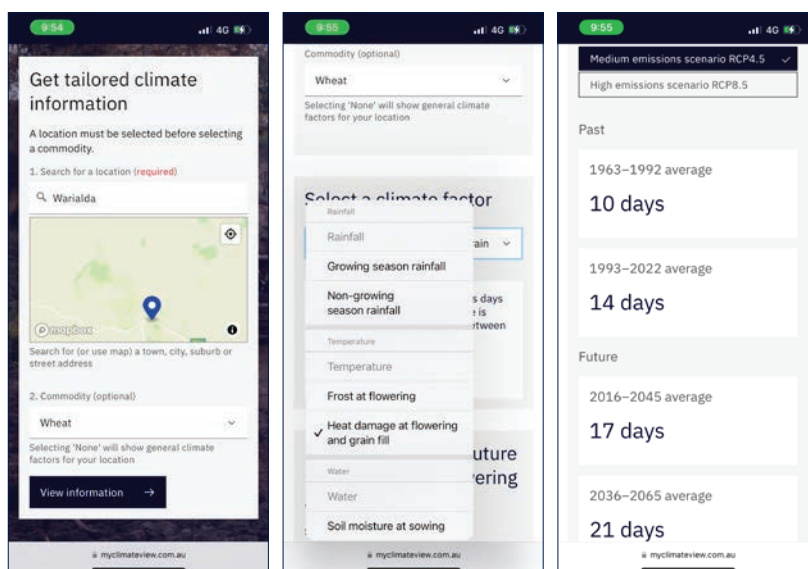
Climate Services for Agriculture (CSA) is a joint program between the Bureau and CSIRO, and is funded through the Australian Government's Future Drought Fund to help Australian farmers adapt to climate variability. CSA has delivered an online tool called My Climate View.

My Climate View provides farmers with historical climate data, seasonal outlooks and future climate projections, delivered through a user-friendly interactive online platform.

Updates to the platform delivered during 2022–23 include:

- bespoke climate information for specific commodities: mangoes, potatoes, bananas, almonds, apples, barley, canola, cotton, dairy, lupins, northern beef, northern sheep, oranges, sorghum, southern beef, southern sheep, sugar cane, wheat and wine grapes. Users interested in these crops can study how the climate will affect growing opportunities
- options for user customisation of temperature thresholds, rainfall thresholds and date ranges to allow users to adjust thresholds and date ranges for certain climate indices.
- a new Temperature Humidity Index (THI) for beef, dairy and sheep that combines temperature and humidity projections to determine the likelihood of fertility, production or welfare-limiting heat stress
- a News and Events section for updates related to CSA, including training events where users can learn how to use the platform and contribute to its ongoing development.

Western Australian beef farmer Dale Park is an early adopter of CSA who is encouraging other farmers to get on board and adopt the tool for their businesses. He said he's tested CSA against the conditions he's seen, and the results have been very good. Mr Park said he would advise other farmers to look at CSA to become aware of what the future might hold, and to plan accordingly.

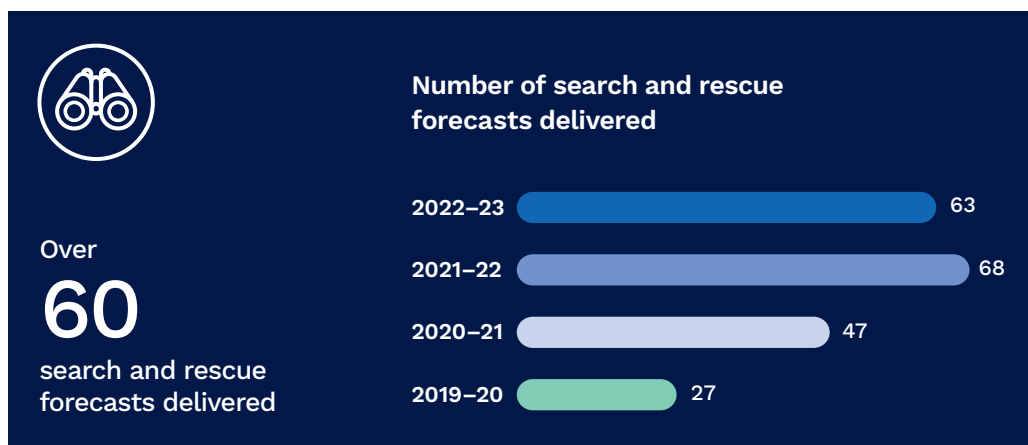


Three screenshots from the My Climate View platform, showing indicators for wheat production at Warialda, New South Wales.

Supporting search and rescue operations

The Bureau's Aviation Operations team is responsible for providing the search and rescue (SAR) forecast service to the Rescue Coordination Centre at the Australian Maritime Safety Authority (AMSA). Bureau aviation forecasters issued a total of 63 SAR forecasts in 2022–23 to support multiple SAR events.

An example included services to support a search in December 2022, for an overdue 4.2 metre aluminium dinghy with one person onboard in the vicinity of Thursday Island (located approximately 39 kilometres north of Cape York Peninsula in the Torres Strait). Bureau forecasts supported a night search in challenging weather conditions, with the search team unable to locate the dinghy. A second search the following morning, again using forecasts provided by the Bureau, located an upturned boat, and a short time later, a survivor in the water who was successfully winched to safety.



Keeping the Kimberley connected during flood response and recovery

In December 2022 and January 2023, flooding generated by ex-tropical cyclone Ellie severely impacted the Kimberley community, including significant damage to the Great Northern Highway, Fitzroy River Bridge at Fitzroy Crossing and flood warning infrastructure located on the river.

During the adverse weather event, the Bureau implemented an extended 24/7 aerodrome forecast for Fitzroy Crossing airport (YFTZ), which was invaluable in maintaining vital aviation operations in the area. This included a rescue aeromedical helicopter and resupply operations to isolated communities in the Kimberley.

Replacement of the damaged Fitzroy River Bridge with a new 2-lane bridge over the Fitzroy River commenced in May and will involve significant in-river works until at least mid-2024.



A Royal Australian Air Force C-27J Spartan aircraft conducts a reconnaissance flight of airfields in the Kimberly Region where heavy rainfall from ex-tropical cyclone Ellie had isolated communities. (Image courtesy of the Department of Defence).

The Bureau will continue to provide specialist advice to the Fitzroy Bridge Alliance during the reconstruction of the New Fitzroy River Bridge to support the safety of personnel working on the project and to enable timely removal of equipment located in the riverbed, should forecast river levels exceed project thresholds.

Next steps

Key activities to be delivered in 2023–24 to help achieve Outcome 2 include:

- guiding Pacific partners – including National Meteorological Services and regional organisations – in operationalising Australia’s initial investment in Weather Ready Pacific
- developing a decadal Defence Plan that addresses how the Bureau supports basing of defence forces around Australia and supports emerging 5th generation combat capabilities
- exploring how the Impact and Value Assessment framework developed by the Energy and Resources Program can be adapted by other teams across the Bureau to increase clarity and support improved prioritisation.

Outcome 3: The Bureau is a partner of choice for our customers and stakeholders.

Achieving the outcome

Working across agencies to deliver reform to water markets in the Murray–Darling Basin

In 2022, the Australian Government released a Water Markets Reform Roadmap for the Murray–Darling Basin. The Roadmap covers a suite of reforms that will be delivered across Commonwealth and state government agencies to restore trust, transparency and integrity to water markets.

The Bureau is leading the data and systems components of the Roadmap, and over the next 4 years will deliver:

- a new National Water Data Hub, which will collect more water markets data from state governments, irrigation infrastructure organisations and water market intermediaries
- a new Water Markets Data Standard, which will mandate what data must be provided, by which organisations, how often it must be provided and how it must be provided
- a new Water Markets Website, which will provide real time trade and pre-trade data, and provide equitable access to information for market participants.

During 2022–23, the Bureau worked closely with water markets regulators – the Australian Consumer Competition Commission and the Inspector General for Water Compliance – to better understand what data is required for them to do their jobs. The Bureau also worked closely with the Digital Transformation Agency to develop the Business Case for the Water Data Hub and began consultation with data providers on the scope of the reforms and approach to implementation.

Establishing a new phase in the Bureau's partnership with Papua New Guinea

The Bureau has historically played a significant role in supporting the Papua New Guinea (PNG) National Weather Service (NWS), stemming from a past in which the Bureau actively managed the PNG NWS until 1975. In recent years, the Bureau's support to the PNG NWS has focused on aviation weather. This long-standing partnership was strengthened in June 2023 with the signing of a twinning arrangement supported by the Australian High Commission in Port Moresby. This arrangement allows the Bureau to maximise the impact and value it provides in PNG by working directly with the PNG NWS to support improved weather observations infrastructure and capacity development in weather service provision.

Strengthening our partnership with Woodside Energy

In May, Woodside Energy selected the Bureau to provide a suite of critical meteorological services following a competitive tender process. This success is testament to the Bureau's meteorological skills, customer support capability and deep industry expertise, honed over decades of service delivery to the resources sector. This continues the long-standing partnership between Woodside and the Bureau, with both organisations gaining significant value from working closely together.

Weather is highly impactful for Woodside. With many operating assets in exposed locations and vulnerable to hazardous weather, timely and accurate weather forecasts are key to Woodside's operational success and the safety of their staff.

Supported by the Bureau's specialised teams, the Bureau's Energy and Resources Program looks forward to delivering the proposed service elements, continuing to uphold our commitment to excellence and quality and contributing to the success of resources sector organisations such as Woodside Energy.



The Bureau's weather and maritime services are critical for offshore oil and gas operations.

Maintaining our focus on service quality

The Bureau's Aviation Meteorological Services Quality Management System (QMS) was re-certified in November, successfully maintaining its certification of compliance to the International Organization for Standardization (ISO) 90001:2015 Quality Management Standard. Full recertification was achieved without any major non-conformances, highlighting the Bureau's commitment to quality, best practice and the maturity of its aviation QMS.

The aviation QMS supports the Bureau's position to provide high-quality, high-impact products and services. The ISO 9001:2015 continues to provide a strong framework which supports improved outcomes for aviation customers, continuously supporting the delivery of quality aviation meteorological products and service. The November audit demonstrated that effective internal audits, performance monitoring and a continuous improvement approach enhance the quality system's effectiveness in an environment that is continually changing.

The Bureau's Energy and Resources Program also maintained its ISO 9001:2015 QMS certification, demonstrating a strong commitment to high-quality forecasting services. An external monitoring audit conducted in April was a testament to this commitment, with the audit process revealing only a single minor non-conformance. This achievement speaks volumes about the program's dedication to quality and its continuous pursuit of operational excellence on behalf of its customers.

Leveraging MET5 capability for global impact

In 2022–23, the Bureau strengthened its commitment under the Meteorology Five Eyes Community of Practice (MET5), which leverages the special trust that exists amongst the members of the Five Eyes intelligence alliance comprising Australia, Canada, New Zealand, the United Kingdom and the United States. Based on work completed in Australia, the Bureau led international data exchange trials with MET5 counterparts in Canada and the UK to enable more effective operational data exchange between nations, and to realise the benefits of interoperability and resilience. This approach continues to support effective data exchange that has been demonstrated during various military exercises at the global level. The commitment has elevated how the MET5 can better collaborate on global challenges in supporting Australia's national security agenda in a way that is secure, systemic and maintains the trust of our supported national security agencies, particularly Australia's Defence forces.

Highlights and significant events

An innovative partnership to support resilience in the agriculture sector

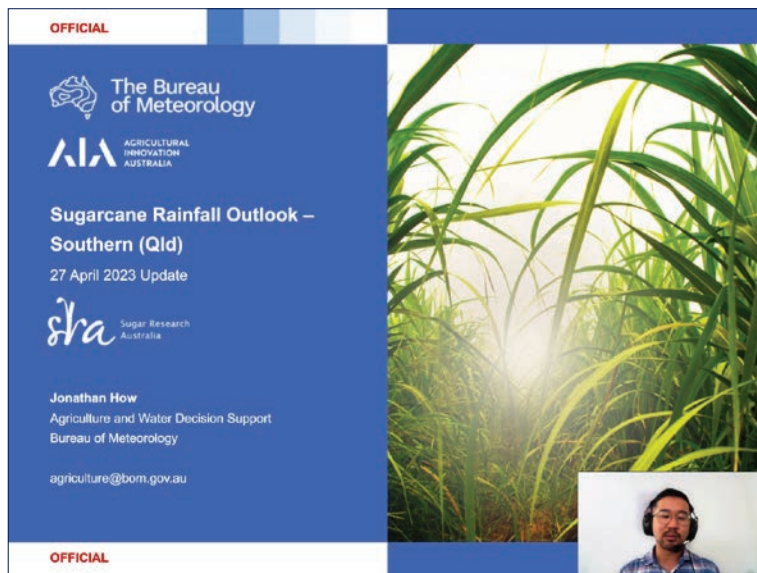
During 2022–23, the Bureau partnered with Agriculture Innovation Australia (AIA) to deliver the Agri-Climate Outlooks (ACO) initiative. ACO is a 4-year program to improve and enhance seasonal outlook services provided to Australian farmers, fishers, and foresters in recognition that they need the most reliable, accurate and timely seasonal forecasting information to help manage and adapt to changing climates.

AIA has facilitated cross-sectoral investment into the initiative through a collaboration of 10 of Australia's Rural Research and Development Corporations: Meat & Livestock Australia, Australian Eggs, Australian Wool Innovation, Dairy Australia, AgriFutures Australia, Grains Research and Development Corporation, Fisheries Research and Development Corporation, Cotton Research and Development Corporation, Sugar Research Australia and Hort Innovation.

ACO has five workstreams which can be scaled up and down in response to demand from the different Research and Development Corporations:

- an agriculture decision support service
- upskilling and training for growers and their advisers to accurately interpret and utilise weather, climate and water products to inform agricultural decisions
- products that fill identified gaps and support high-value decision-making
- development of methods to overlay skill on the Bureau’s seasonal outlook products and promote the methods as best practice to other seasonal outlook service providers
- improvements to Australia’s high calibre sovereign seasonal forecasting, through improved accuracy of multi-week to seasonal forecasts.

AIA CEO, Sam Brown, described the collaboration as ground-breaking because they were working together on a large-scale project to help growers and mixed-production enterprises mitigate the impacts of climate on their enterprises. Given the significant and devastating impacts of climate on agricultural and food production – with recent floods, extreme weather events and subsequent food shortages and supply chain challenges – Mr Brown believes this initiative will improve the relevance, trust and ease of use of climate information in their decision-making.



Bureau meteorologist Jonathan How delivering agricultural decision support via the Bureau’s YouTube channel.

Collaborating with the aviation sector to better understand space weather

In October, the Bureau hosted 2 space weather workshops for the aviation sector. The purpose of these workshops was to learn about what airlines and air navigation service providers can do after they have been notified of a space weather event in order to minimise the impact on aviation operations.

With aircraft now more reliant on communication and navigation systems, the warning of space weather events allows airlines and air traffic control to take appropriate precautions or actions to ensure safety is maintained.

During the workshops, space weather events exercises were conducted, and participants discussed their operational responses to these events. It was a great learning experience and a positive step in being prepared for potential high impact space weather events.

A follow-up space weather exercise for the aviation sector, focused on Global Navigation Satellite System advisories, is planned for late 2023.



Space weather expert Rebecca Kuster discussing the impact of space weather with a pilot.

Next steps

Key activities to be delivered in 2023–24 to help achieve Outcome 3 include:

- continuing to partner with the Department of Climate Change, Energy, Environment and Water to deliver on the Government’s vision for a better water future
- working with the Bureau’s Meteorological Five Eyes counterparts to enhance data sharing capability, explore improving polar model performance, sharing climate monitoring data and products, and examining oceanography data and model capability.

Outcome 4: Business Solutions Group is a healthy, diverse, engaged workforce supporting a customer-focused organisation.

Achieving the outcome

Gathering customer insights to strengthen service delivery

The Business Solutions Group has led the adoption of an enterprise Customer Relationship Management (CRM) system in the Bureau. The CRM is now used systematically to:

- capture all customer inquiries and feedback in a central place to ensure they are routinely documented and responded to
- document the key opportunities to deliver more value and impact to our customers
- use customer insights to inform product management.

Since 2020, the Business Solutions Group has gathered 2,400 insights about its customer's requirements for weather, water and climate services and is now using these insights to prioritise resourcing.

Showcasing the Bureau's critical weather services to aviation, national security and space sectors

From 28 February to 5 March, representatives of Australia's aviation, national security and space sectors engaged with Bureau experts at the Australian International Airshow and Aerospace and Defence Exposition (Avalon Airshow), held at Avalon Airport near Geelong, Victoria. Given the Bureau's critical services to these sectors, this was a great opportunity to showcase new and existing Bureau products and services to specialist aviation, space and defence industry audiences. Our key message at this event, 'Space Weather. All day. Every Day', was designed to normalise space weather alongside terrestrial weather.



Aviation Meteorologist Maggie O'Reilly demonstrating Bureau products.

The event is the largest of its kind in the southern hemisphere, spanning commercial, civilian and defence interests. It includes an extensive, high-technology trade display as well as flight demonstrations, giving the Bureau the opportunity to showcase its capabilities while networking with some of the world's leading organisations in these expanding sectors.

Establishing a Bureau defence cloud data transfer solution

Working closely with the Australian Geospatial-Intelligence Organisation (AGO), the Bureau delivered a scalable and secure cloud-based data transfer solution to enable the sharing of larger volumes of environmental data between the Bureau and its Defence partners. The system currently supports the daily transfer of atmospheric and oceanographic data in the order of terabytes and will be expanded in future to support an increased variety of datasets for Defence, including space weather.

Next steps

Key activities to be delivered in 2023–24 to help achieve Outcome 3 include:

- revising and evolving Sector Services Plans for priority sectors
- contributing to an enterprise-scale workforce plan that assesses future demand across technical workstreams and establishes processes for sustaining and growing the Bureau's workforce.

Data and Digital

Goal: To provide our customers and colleagues an outstanding experience all day, every day.

The Data and Digital Group (DDG) is responsible for the Bureau’s data, observation and information technology that underpins the Bureau’s core operations through to production and dissemination to customers. The group’s focus is to efficiently manage service-focused, secure, resilient and adaptive information and observations technology portfolios that leverage emerging technologies and data, enabling the Bureau to deliver personalised services and products.

For 2022–23 the group consisted of 6 programs with the following responsibilities:

Program	Responsibilities
Planning and Architecture	<ul style="list-style-type: none"> • Technology policies and standards • DDG planning uplift • Demand and pipeline management • Enterprise architecture
Observing Systems and Operations	<ul style="list-style-type: none"> • Operation of the observing network • Observations planning and delivery • Maintenance and sustainment of the network
Data	<ul style="list-style-type: none"> • Data governance, advice and standards • Data management specialised services • Data requirements and quality • Managing data partnerships • Data services
Digital Channels and Customer Experience Design	<ul style="list-style-type: none"> • Customer research and user experience design • User design and prototyping • Digital channel development and operations • Digital customer analytics • Digital planning
Application Services	<ul style="list-style-type: none"> • Delivery of ICT applications and platforms • Digital workplace services • Testing and quality assurance
Service and Infrastructure Management	<ul style="list-style-type: none"> • Reliable and secure ICT operations • High-performance computing • ICT support services • Cyber operations

Throughout 2022–23, the Data and Digital Group focused on delivering 4 outcomes that support the achievement of the Bureau’s Strategy and purpose. The group’s achievement in delivering each of these outcomes is discussed below.

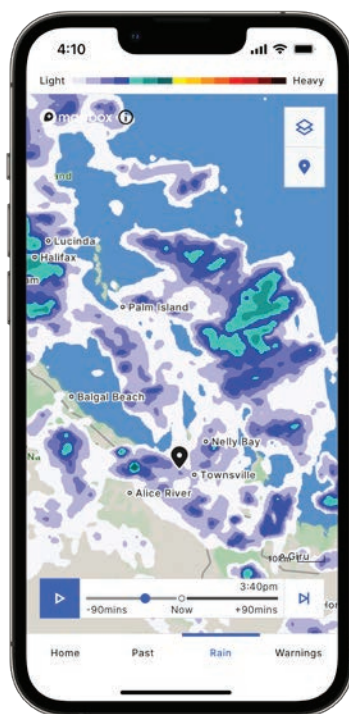
Outcome 1: Strengthen our customer focus to maximise the Bureau’s Information Technology (IT), Observations Technology (OT) and Data capabilities to meet the needs of Bureau customers both now and into the future in collaboration with our colleagues who engage with customers.

Achieving the outcome

Using customer insights to drive service improvements

The Bureau is committed to improving digital channels to continue to meet customer needs. The Bureau implemented an improved customer analytics tool that helps collect, analyse and develop insights to enhance and improve customer experience. The feedback helped deliver enhanced customer features on the BOM Weather app, such as warning notifications and 90-minute rain radar forecasting.

In June 2023, the Bureau’s website and BOM Weather app received 106 million visits, equivalent to 2,445 visits starting every minute. The Bureau’s website continues to be Australia’s most popular and reliable source of weather, water, climate, ocean and space weather services. The Bureau continued to progress development of its new website to improve security and resilience to meet the needs of the Australian community.



The BOM Weather app delivers critical features such as 90-minute forecasted rain radar.

Improving the Bureau’s data and information management maturity

Under the Australian Government’s Building Trust in the Public Record Policy (Building Trust Policy), agencies are required to self-assess their data and information management maturity and performance using an assessment survey developed by the National Archives of Australia (NAA).

The Bureau’s latest benchmarked results for the Check-up Plus survey show a steady improvement in maturity, from 3.3 in 2020 when the survey was last completed, to 3.6 during 2022.

During the year, the Bureau created a new position – a Chief Statistician – in response to a recommendation of the Bureau’s Data Integrity, Advisory and Assurance Committee. This is an external committee of independent experts providing advice and assurance to the Bureau on matters including metrology, observational processes, data collection, data management, policy, governance, data analysis, quality control, quality assurance and communication. The Chief Statistician will complement the Committee’s expertise in understanding of measurement uncertainty, through closer alignment of statistical and metrological (measurement science) approaches.

Highlights and significant events

Delivering live, local weather to over 10 million Australian devices

In 2022–23 the BOM Weather app achieved the significant milestone of 10 million downloads since release in 2020. Customer satisfaction has significantly increased from 61% (June 2022) to 86.4% (June 2023). The app currently ranks number one in Australia for free weather app usage in both the Apple and Google Play stores.

Key features delivered during 2022–23 include an enhanced radar mapping experience, with up to 90 minutes of forecast rain activity now visible in the animated Rain screen. An Apple iOS widget was released, allowing users to get the day’s weather highlights at a glance, in addition to a number of safety features, including updated fire danger ratings, the addition of heatwave and marine wind warnings, and the ability for users to receive warning notifications for up to 3 locations.

The growing suite of safety features help users to make informed decisions when it matters most.



The Bureau shared its success with social media users.

Next steps

Key activities to be delivered in 2023–24 to help achieve Outcome 1 include:

- implementing key priorities of the Digital Channel Roadmap focused on enhancing BOM Weather app features
- completing the public beta testing phase of the new Bureau website
- implementing the data maturity uplift roadmap.

Outcome 2: Information Technology (IT) and Observations Technology (OT) operations delivering resilient and secure services all day, every day.

Achieving the outcome

Delivering an Enterprise Integration Platform

The Bureau's new Enterprise Integration Platform (EIP) went live within a secure network environment in November, providing the Bureau with a modern data exchange platform that will be used to share information with customers, partners, and internal Bureau applications in a more secure and resilient way.

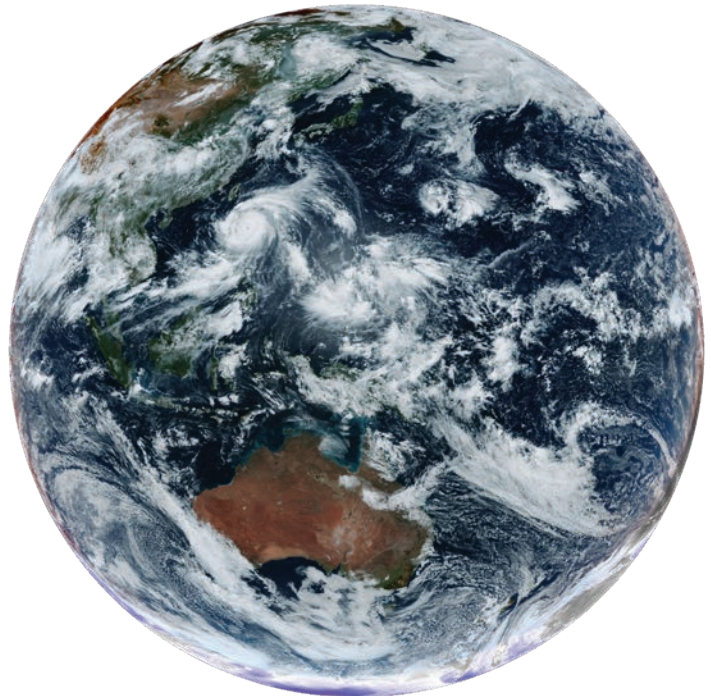
Interfaces to the European Centre for Medium-Range Weather Forecasts (ECMWF), MetService New Zealand and the Fiji Meteorological Service were commissioned and made operational on the EIP. Services required to connect to over 20 partner national meteorological and hydrological agencies – including the UK Met Office and the US National Oceanic and Atmospheric Administration – were also delivered.

Collaborating with Japan on Earth observations from space

The National Space Mission for Earth Observation (NSMEO) was established in 2022 to address Australia's civilian satellite data supply risks and gaps by enabling Australia to develop and have control over its own Earth observation satellites. This program concluded in June 2023.

A key outcome of the program is the commitment by the Australian Government to collaborate with Japan on the next Himawari satellite which will be launched in 2029. Prime Minister Anthony Albanese and Prime Minister of Japan, Fumio Kishida made the announcement at the Japan–Australia annual leaders' meeting on 22 October 2022.

This partnership will enhance Australia's extreme weather and multi-hazard monitoring capability and deepen the Bureau and Japan Meteorological Agency's decades-long relationship and cooperation in the use of geostationary meteorological satellites.



**Himawari-9 full disk, true colour
image from the 2023/07/25
03:00 UTC observation, with
tropical cyclone Doksuri to the
north of the Philippines.**

Developing a data centre for the future

Development of the Bureau's Future Data Centre (FDC) commenced in September with the new centre to provide updated, non-production and Disaster Recovery (DR) capability to enhance the future security and resilience of the Bureau's services to its customers.

The FDC Establishment Project was mobilised as part of the Data Centre Consolidation Program to manage the relocation of target infrastructure into FDC. The new data centre design and fit out to house the new DR High Performance Computer (HPC) was completed in March.

Establishing a mobile radar capability

Following the successful deployment of a mobile X-band radar as part of a research project by Monash University and the Bureau in 2021–22, establishment of an ongoing Bureau mobile radar capability commenced in 2022–23. An X-band radar was procured to be used as a prototype system, enabling the Bureau to identify and resolve issues related to mobility, manoeuvrability, durability, storage, road safety, siting, electrical power and sustained operations. The lessons learned will significantly contribute to improving mobile radar product development, and deployment during severe weather events.

Upgrading radars across Australia to improve quality and reliability

During 2022–23, new radars were installed to replace existing radars at Serpentine in Western Australia and at Gove in the Northern Territory. A temporary radar was installed at Brisbane airport while the Marburg radar was offline undergoing an upgrade. Work to replace the radar at Mackay in Queensland has commenced with the radar to be offline from June – December 2023.

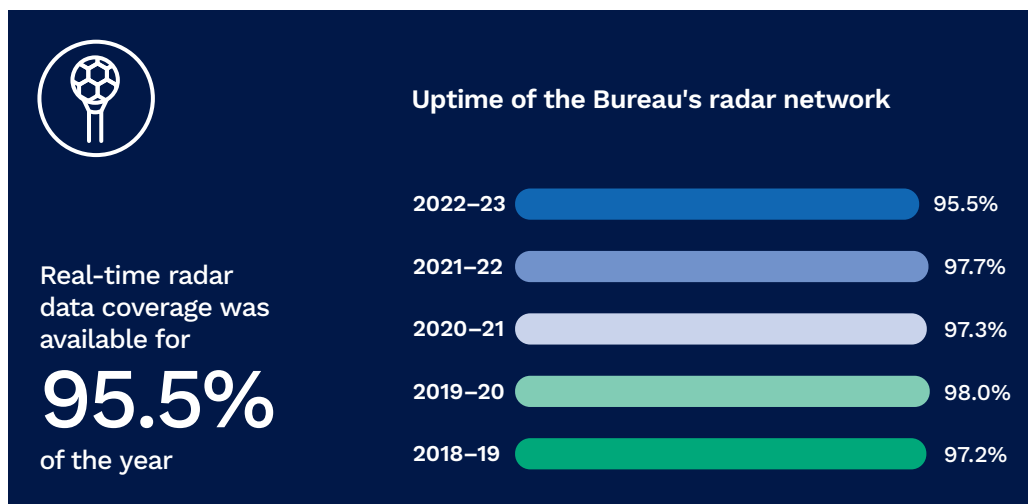
Older model radars at Warruwi and Berrimah in the Northern Territory, Cairns and Willis Island in Queensland and Mount Koonya in Tasmania were offline for approximately 8 weeks each while undergoing an upgrade. These upgraded radar systems will improve the tracking of winds, quality of rainfall images and predictions for severe storms, and will improve radar reliability and resilience.



Dome scaffolding at Serpentine (left) and completed Serpentine dome (right).

In addition to upgrades, the Bureau further expanded its radar network with the delivery of the Richmond (Flinders Catchment) radar in Queensland in September.

Works to improve radar reliability in the long term impacted network availability over 2022–23 compared to previous years, with 60% of radar downtime due to planned outages, including upgrades (40%) and planned maintenance (20%), and 40% due to faults. However, overall radar availability remained above the target level of 95% for the network.



Automating ozone observations

In August and March, Brewer spectrophotometers were installed to replace the Dobson spectrophotometers at Darwin and Perth airports respectively. These installations completed the rollout of this technology and automation of the network. Instruments already installed at Brisbane and Melbourne airports and Macquarie Island are improving the operational efficiency of the network.



Calibration of Brewer spectrophotometers at the Bureau of Meteorology Training Centre in Broadmeadows, Victoria prior to deployment using the reference instrument from International Ozone Services in Canada (the small instrument on top of the Brewer on the left).

The Brewer is a fully automated alternative to the manual Dobson, both of which measure 'total column ozone'. The Bureau's first Dobson was ordered as long ago as 1936 and Dobsons have formed the backbone of the long-term ozone record maintained by the Bureau, to fulfil Australia's commitments under the Vienna Convention for the Protection of the Ozone Layer (1985), to which Australia is a signatory.

The Brewers will be run side-by-side with the Dobson for an extended period, enabling a careful comparison of the difference between ozone measurements from the 2 instruments.

Testing weather station capabilities

The Bureau's automatic weather stations (AWS) need to operate effectively in a broad range of climates – from the tropical north to Antarctica – and withstand extreme weather conditions. To assess their capabilities, the Bureau tested 39 ALMOS AWS data acquisition cards over an environmental temperature range from -30 °C to +60 °C and completed initial acceptance testing for future AWS equipment.

The design of a comprehensive parallel observations field test setup for new AWS has been completed. Prototype testing of the additional sensors commenced and the first test sites at Darwin and Cape Grim have been installed and are operational.

Deploying new field reference equipment to verify temperature and humidity observations

Weather observations form an important part of Australia's climate record, providing information for current and future generations. As such, there needs to be confidence that measurements are accurate, and the information is reliable. To ensure the veracity of its temperature and humidity observations, the Bureau deployed new temperature and humidity observations field reference equipment, processes and training to all Observing Operations Hubs replacing the obsolete DOSTMANN fleet for AWS verifications. This completed Recommendation A1 of the 2011 Australian Climate Observations Reference Network – Surface Air Temperature (ACORN-SAT) dataset Independent Peer Review. The new equipment ensures the temperature probes are accurate to ± 0.2 °C.

Continuously improving the Bureau's physical security across Australia

The Bureau further improved the physical security of its observing sites around Australia building on the Access Control System (electromechanical locking system) implemented in 2021–22. Works this year have included implementation of additional physical security measures at field station buildings and installation of new security fencing around observing instrumentation. Implementation of a CCTV monitoring solution at prioritised sites has commenced, enabling detection of unauthorised access to Bureau facilities and providing the Bureau with more options to monitor and manage site access.

Improving our meteorological balloon launching capability

To improve its meteorological balloon launching capability in 2022–23, the Bureau implemented 4 new automatic meteorological balloon launching systems (AMBLS) at existing sites to provide improved operational service, increased reliability and efficient remote support options.

New AMBLS were implemented in Lord Howe Island, at Ceduna in South Australia, Cocos Islands and at Port Headland in Western Australia. The replacement AMBLS have an increased capacity allowing for the efficient release of a greater number of balloons, making a significant contribution to the sustainability of the Bureau's upper air program. The new systems also present a simplified maintenance regime and are fully supported by the system vendor.



The new AMBLS at Lord Howe Island.

Piloting new space weather ionosondes

Data from the ionosonde network is critical to the Bureau's space weather capability, providing space weather forecasts, alerts and warnings to customers. Following on from the new ionosonde proof of concept in 2021–22, the pilot site for the new ionosonde equipment was completed at Townsville in August 2022, followed by new ionosondes at Perth in March 2023 and Casey in June 2023.

Achieving certification of operational technology and engineering functions

In November, the Bureau's Operational Technology and Engineering (OTE) team was successful in achieving certification of its Quality Management System (QMS) in compliance with the internationally recognised ISO 9001:2015 Quality Management Standard. The QMS ensures efficient and effective delivery of products and services, while meeting the needs of customers.

A particular highlight was OTE's comprehensive technical authority framework, which enables the recognition of staff qualifications, experience and skills. It is used to define and empower engineering and technical actions and decisions and ensures that only competent and appropriate staff make critical technical decisions that impact Bureau-managed equipment and the related services to customers.

Under the International Organisation for Standardization (ISO) and the International Electrotechnical Commission (IEC), the Bureau also conducted over 420 accredited temperature instrument calibrations and more than 120 accredited barometer calibrations, ensuring the Bureau can provide trusted observations all day, every day.

Highlights and significant events

Celebrating Centennial Stations

In June, five long-term observing stations located across Australia were recognised by the World Meteorological Organization (WMO) for providing valuable weather, hydrological and climate observations for over a century.

Four of those recognised were meteorological observing stations at Adelaide (West Terrace/ Ngayirdapira) in South Australia, Low Head in Tasmania, Marble Bar in Western Australia and Palmerville in Queensland. The fifth was a marine station at Fort Denison in New South Wales.

West Terrace/Ngayirdapira has been recognised as Australia's earliest observing station, operating since 1839. Fort Denison is the first Marine Centennial Observing Station recognised in Australia, and one of only 10 world-wide. It has been recording sea level and tidal patterns since 1914.



Louise Wicks, International Relations Manager, accepting Australia's certificates from WMO President Professor Gerhard Adrian in a ceremony during the 19th World Meteorological Congress (Image courtesy of the World Meteorological Organization).

Next steps

Key activities to be delivered in 2023–24 to help achieve Outcome 2 include:

- completing the Data Centre Consolidation Program including implementing the new IT DR Framework and Policy
- continuing the uplift in lifecycle asset management
- improving operational asset management with the rollout of the enterprise asset management (EAMS) Mobility App for field staff
- continuing the implementation of the Australian Capital City Airport project
- completing the Observing System Strategy and automation of field stations with installation of AMBLS at Gove and Alice Springs.

Outcome 3: Cultivate our partner ecosystem to optimise resource utilisation for Information and Observations Technology delivery.

Achieving the outcome

Establishing a vendor partnership capability

The Bureau is engaged with a significant number of third parties to build and deliver the technology services required to support the delivery of essential products and services to its customers. During 2022–23, the Bureau established a vendor partnership capability and supporting vendor frameworks to ensure compliance with our obligations and to achieve efficiencies in service delivery, sourcing and value for money arrangements.

Calibrating instruments for international consistency of weather observations

As part of its responsibility as a WMO Regional Instrument Centre and Regional Radiation Centre, the Bureau has calibrated 4 instruments for Fiji, 2 for Indonesia and 2 for New Zealand. Having reference instruments that measure pressure, temperature, humidity and solar irradiance calibrated by regional (South West Pacific Region of WMO) standards is important for global sharing of data, ensuring that data shared every hour across the region are comparable and can be trusted for providing warnings and forecasts.

The Bureau also collaborated with Japan Meteorological Agency to hold a joint Regional Pyrheliometer Comparison at Mt Tsukuba, Japan in January. The event involved participants from 2 WMO Regional Associations (RA-II / RA-V). Staff from the World Radiation Centre Switzerland participated, bringing global irradiance standard equipment, so that national standards in the Asia Pacific region could be calibrated to them. As a result, the Bureau's RA-V Regional standard and that of several member state national standards were restored to the World Radiometric Reference.

Highlights and significant events

Contributing to the Global Basic Observing Network

The Bureau meets WMO global basic observing network requirements for the automatic weather station network across Australia and benefits from receiving the observations of other nations for use its Numerical Weather Prediction models.

In January, the Global Basic Observing Network (GBON) was launched as a standard for land, upper air and marine-based weather stations reporting internationally in real-time. GBON data is used to deliver high-quality global weather forecasts by meteorological agencies using numerical weather prediction models.

Australia contributes approximately 550 surface stations, 50 marine stations and 38 upper air (weather balloon) stations. The Bureau was nominated to be a peer advisor for 6 Pacific Island nations, to uplift their weather networks to meet GBON requirements under the WMO Systematic Observations Financing Facility (SOFF). Work commenced in partnership with these countries in April 2023.



Staff from the Bureau and the Solomon Islands Meteorological Services (SIMS) inspecting an automatic weather station at Honiara in June as part of the Bureau's role as a SOFF Peer Advisor to the SIMS. Together the 2 national meteorological services are assessing the level of compliance of the SIMS network to GBON standards and preparing an investment report on how their network should be upgraded to meet GBON standards and, in turn, benefit from improved global forecasting products prepared by the international meteorological community.

Next steps

Key activities to be delivered in 2023–24 to help achieve Outcome 3 include:

- refining the Bureau's Service Delivery Management capability through more structured governance processes and stronger partnerships with vendors to improve efficiencies
- uplifting vendor management, risk management and inventory management capability in the Observing Systems and Operations Program to manage supply risk and improve service levels
- strengthening cyber defence capability and cyber hygiene foundations through Australian Cyber Security Centre (ACSC) government uplift program partnership activities.

Outcome 4: Build and sustain distinctive capabilities and a workforce for the future.

Achieving the outcome

Future proofing data and digital operations

A detailed DDG Workforce Plan was delivered by a dedicated people and capability focused team to support the future operating of DDG's Operating Model and 2023 Ambition. The plan informs future resourcing and training needs to support staff to deliver and sustain data, IT and OT functions to help deliver services to customers. An early element of the plan that was implemented was the establishment of an IT testing capability focussed on people, processes and tools to mature testing capability across the Bureau.

Partnering APS-wide to enable and extend capacity

The Bureau is an active member in several APS-wide data forums, including the Data Professions and the Data Champions Network, through which data uplift projects are underway. The Bureau participated in a pilot project to build out the data asset management capability (starting with a data asset inventory and governance playbook) to manage assets more effectively. This project was facilitated by the Office of the National Data Commissioner.

Raising awareness of the importance of data and information management

In May, the Bureau organised and celebrated Data and Information awareness month. The event contributes to the collaboration between Australia's data and information management, archives, library, information security and knowledge communities, building on National Information Awareness Month and Privacy Awareness Week.

This year, a dynamic and engaging program of events were held to assist Bureau staff to learn about all the important ways that they could use data to make a difference for themselves and for customers. Presentations and training sessions demonstrated ways to ensure the Bureau is trusted by its customers and follows good privacy and data practices.



Poster for the Bureau's Data and Information Awareness Month activities.

Next steps

Key activities to be delivered in 2023–24 to help achieve Outcome 4 include:

- implementing the DDG Workforce Plan
- establishing and implementing an enterprise test framework
- uplifting digital skills through a digital workforce plan
- developing OT and IT asset plans for sustainment.

Science and Innovation

Goal: World-class partnerships in research and development, enabling the Bureau to deliver better weather, climate, water, oceans, space weather and Earth system information and insights to our customers, and to create shared value with our partners.

The Science and Innovation Group is responsible for research and innovation supporting Bureau services and delivering shared value for our partners. The group’s focus is on world class science and development that enables the Bureau to deliver better weather, water, climate, ocean, space weather and Earth system information and insights. The group also has stewardship of the Bureau’s Innovation Framework.

For 2022–23 the group consisted of 2 programs: Research, which undertakes research and development to support the Bureau’s scientific systems, customers and partners; and Research to Operations, which transfers the Bureau’s operational prediction systems from research to operations.

The 2 programs have the following areas of responsibility:

Program	Responsibilities
Research	<ul style="list-style-type: none">• Earth system modelling• Observations and data science• Applications science• Seamless prediction science• Hydrology science• Information technology
Research to Operations	<ul style="list-style-type: none">• Transfer of research outputs to operations• Validation and verification of models and model output• Data assimilation and post processing

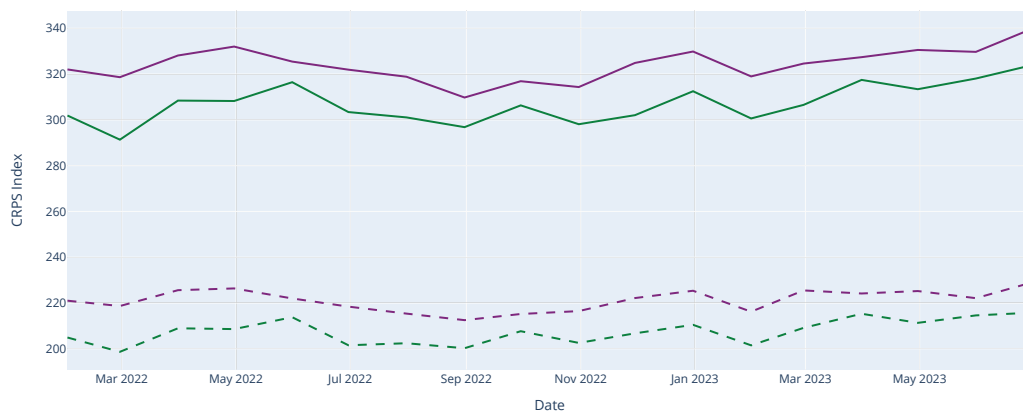
Throughout 2022–23, the Science and Innovation Group focused on delivering 2 outcomes that support the achievement of the Bureau’s Strategy and purpose. The group’s achievement in delivering each of these outcomes is discussed below.

Outcome 1: Deliver on the four objectives within the Bureau's decadal Research and Development Plan 2020–2030.

Achieving the outcome

Enhancing our Global Numerical Weather Prediction capability

In October, the Bureau commenced trials of new global deterministic (ACCESS-G4) and ensemble (ACCESS-GE4) weather prediction models on its Australis supercomputer. Although not operational, the models have been running in real-time and have produced weather forecasts from January 2021. The models, together with the data assimilation system that ingests observations into them, are based on the latest operational weather forecast system at the UK Met Office. Trials have shown that these new models provide a significant increase in forecast accuracy compared to the previous versions. The models are scheduled to be used operationally on the Bureau's new Australis 2 supercomputer in 2024. Their implementation will provide all customers with more accurate forecasts out to 10 days ahead, in addition to improvements in other forecasts relying on accurate atmospheric prediction, such as ocean currents and waves.

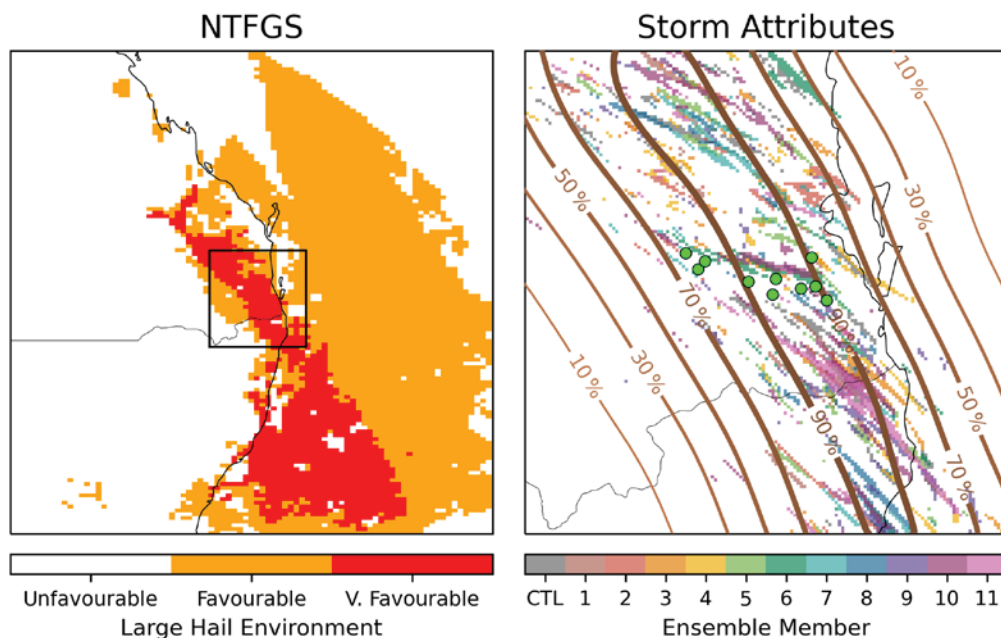


The Continuous Ranked Probability Score (CRPS) for ACCESS-GE4 (green) shows increased skill compared to the current operational version (purple). The CRPS is global index for accuracy of mean sea level pressure (MSLP), geopotential height (GPH), 250hPa wind and 850hPa wind predictions. The dashed line is the ensemble mean and the solid line is the control member. A lower CRPS is better.

Improving our thunderstorm prediction capability

During 2022–23, a very significant upgrade to the Bureau's thunderstorm prediction system – Calibrated Thunder – was undertaken as one component of a 3-year project. The project will formally conclude in early 2023–24. The new system delivers improved probabilistic thunderstorm predictions across all of Australia and adjacent coastal waters out to 8 days and provides predicted storm tracks of severe thunderstorms out to 2 days. The system is based on both the Bureau's global ensemble model ACCESS-GE3 and city ensemble model ACCESS-CE3, with the lightning prediction component calibrated against lightning observations from the Weatherzone Total Lightning Network.

The completion of the Calibrated Thunder project marks a significant leap forward in the Bureau's predictive and technological capabilities for thunderstorms, especially for the prediction of severe thunderstorms. Outputs from Calibrated Thunder flow into the Bureau's operational data visualisation system that is used by meteorologists across the country for incorporation into forecasts and warnings.



Left: Large hail guidance generated by the 20 year-old National Thunderstorm Forecast Guidance System (NTFGS). The system distinguished between large hail being favourable and very favourable only, and grossly over-forecast unobserved large hail off the coast of New South Wales and Queensland. Right: Severe thunderstorm tracks on 31 October 2020, the day of the Brisbane ‘Halloween Hailstorm’. The storm tracks are generated from the ACCESS-City ensemble model with individual model solutions (members) displayed through individual colours. The brown contours mark the probability of severe convective weather. The green dots denote reports of golf ball sized hail or larger.

Forecasting ember transport for better bushfire management

Working with fire agencies and Natural Hazards Research Australia, the Science and Innovation Group has been developing a model for ember transport and spotting. Spotting – the generation of new fires by embers transported in the bushfire plume – can cause fires to break control lines and is often implicated in property loss. The Bureau has developed a new method for predicting the area in which embers will land, which represents the complex interaction between the atmosphere, plume and embers, but is simple enough for rapid calculation. The method has been implemented in an operational fire prediction system, Spark, and tested on historical fires with results consistent with observed ember movements. These results allow fire managers to have greater confidence in spotting predictions going forward.

Enhancing the use of satellite observations for more accurate forecasts

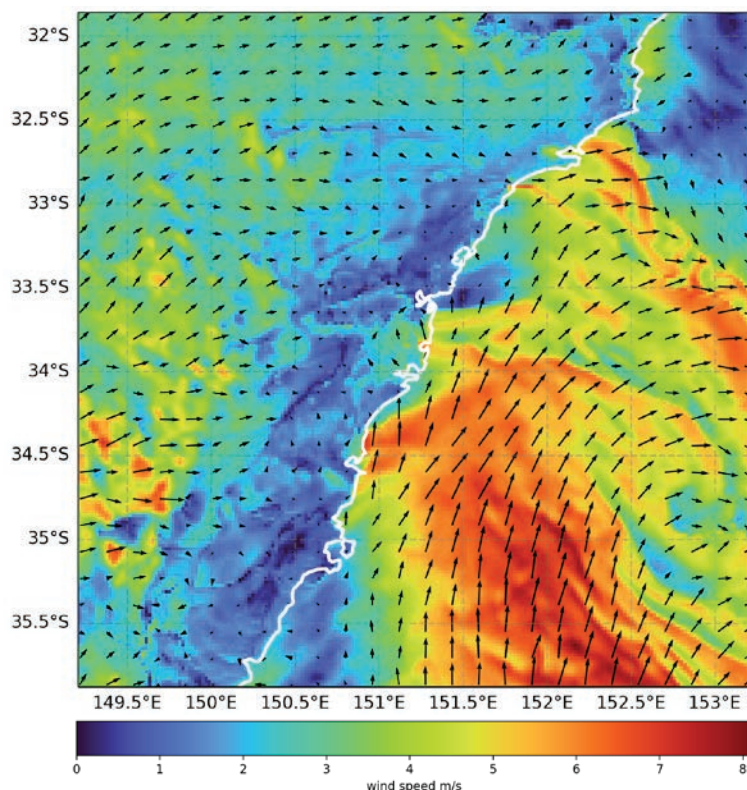
The forecast skill scores of the Bureau’s suite of numerical environmental and weather prediction models are greatly reliant on observations from satellites. As new satellites become available, they need to be added to the models to maintain or improve forecasting skill. In 2022–23, the Bureau’s ACCESS-G4 weather model was modified to ingest new global satellite sources of upper atmosphere temperature, humidity and wind (such as from the COSMIC-2 mission, for which the Bureau provides telemetry tracking and command support). The new data reinforce and enhance the observing network that supports model performance and improves the skill of temperature and humidity forecasts. In December 2022, the Japan Meteorological Agency replaced the geostationary meteorological satellite Himawari-8 with Himawari-9, and many operational processes were successfully transitioned to allow ingestion of the new data ensuring continuity of service. New high-resolution Himawari-9 observations have been tested and the satellite data assimilation has been optimised for use in the Bureau’s higher-resolution (convective scale) regional models.

National Analysis System for enabling situational awareness and alerting

After significant development and testing, a new National Analysis System has been assessed as being ready for transition to operations. The system will provide reference grids for automated forecasting and support both the situational awareness of forecasters, and the automation of meteorological alerts. The system provides frequent, high-quality national analyses of the full atmosphere, using a wide range of direct and indirect observations.

A broad variety of test periods were examined by forecasting experts who were impressed by the fidelity of representations of wind changes and temperature gradients – not only in the analysis, but also in the first 6-hour forecast period. The system is scheduled to be installed on the Bureau’s new Australis 2 supercomputer in early 2023–24.

An example of the National Analysis System’s accurate detection of a wind change passing Sydney in May 2021 with 10m-wind direction (arrows) and wind speed (colours).



New long-range forecasts of extremes to support decision-making

New forecasts of the likelihood of rainfall and temperature extremes on multi-week and seasonal timescales are now available to the public on the Bureau's 'Long-range forecasts and drivers' webpage. These were delivered under the Forewarned is Forearmed project, funded by the Australian Government as part of its Rural R&D for Profit program. Using a co-design approach, this multi-institution project used the latest science and technology, together with insights from agricultural producers and advisors to develop these new forecasts for the benefit of the agriculture sector. Prior to the project there were no warnings of these extremes beyond the 7-day weather forecast. This responds to the growing need for information around unseasonal and extreme weather and climate events to build climate resilience and support decision-making.

Highlights and significant events

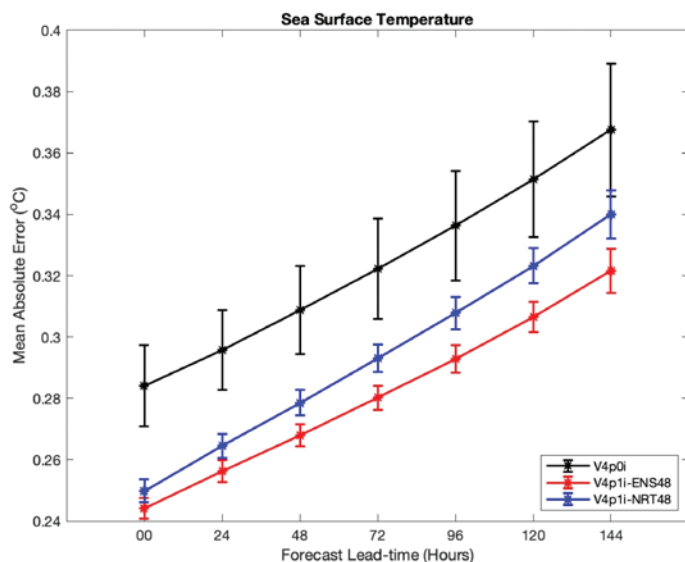
Upgrading ocean modelling for the Department of Defence

A new version of the Bureau's ocean forecasting system – OceanMAPS-4.1i – was developed and trialled during the year. The OceanMAPS system supports a range of Defence applications including navigation, anti-submarine warfare, amphibious operations, and search and rescue.

The update includes a shift from a 3-day data assimilation cycle to a 1 day-cycle that streamlines operational processes, uses more up-to-date observations and enables ensemble forecasts to be run more easily.

Trials show that the system delivers a significant increase in accuracy for all forecast variables. This is most notably the case for sea surface temperature, with a reduction in forecast errors of approximately 14% compared with the current operational system, as well as more consistent accuracy from forecast to forecast. A 9% gain is obtained for temperature compared with in-situ Argo profiles offering benefits to defence applications. A 7% gain in forecast ocean currents against observed drift currents offers benefits for maritime safety.

The system is scheduled to become operational on the Bureau's new Australis 2 supercomputer in the latter half of 2024. The system will incorporate the new global deterministic ACCESS-G4 atmospheric fields which will enable better forecasting of key ocean characteristics including temperature, salinity, currents and sea level anomalies.

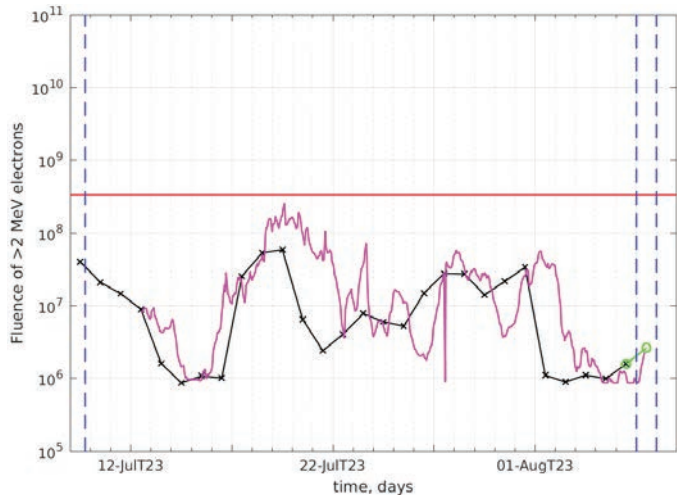


Mean absolute error of sea surface temperature forecasts compared against available in situ observations from drifting buoys for each 24hr period (noting lower errors represent more accurate forecasts). The median and +/-1 standard deviation of mean absolute error is shown for OceanMAPSv4.0i (black), OceanMAPSv4.1i (blue) and OceanMAPSv4.1i ensemble forecast mean (red) for one month of daily forecasts during January 2023.

Forecasting hazardous radiation environments to support satellite operations

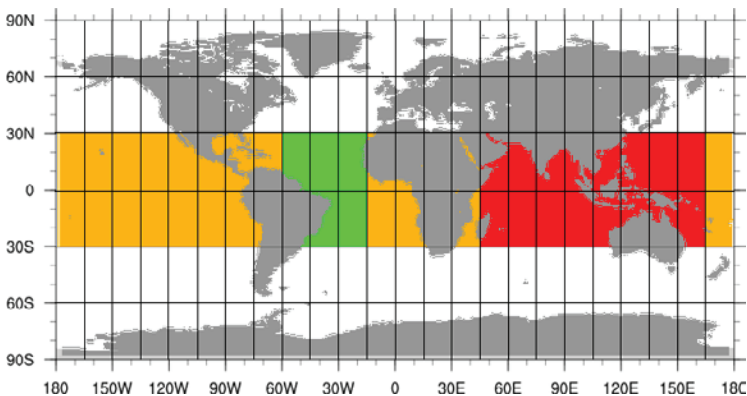
In the early days of the Space Age, it was observed that the Earth was surrounded by ‘doughnut-shaped’ regions of trapped energetic particles referred to as the Earth’s radiation belts. These radiation belts are separated into the electron and proton radiation belts and can be hazardous to satellite infrastructure and operations. The electron radiation belt extends to altitudes where geostationary satellites orbit and operate. The number of energetic particles, and their energy levels, are modulated by space weather.

Sample predictions of the daily fluence of energetic electrons for a given geostationary satellite location. The last green circle shows the last prediction for the next 24 hours. The 2 vertical blue lines show the boundaries for the next 24-hour time interval. The magenta line shows previous hourly predictions. The black line shows the observed daily fluence at 00 UT of the respective day. The horizontal red line shows the predefined hazard threshold.



The Bureau has developed a model to forecast the flux (number of particles passing through a given area every second) of energetic electrons at geostationary orbit to provide situational awareness for satellite operators to mitigate the impact on their satellite infrastructure. This empirical model utilises measurements of the solar wind (stream of ionised gas flowing out from the sun at thousands of kilometres per second) being continually monitored approximately 1.5 million kilometres upstream towards the sun.

These solar wind speed observations are used to predict the fluxes and fluence (accumulated flux over 24 hours) for the coming 24 hours. The model predictions are updated hourly and referenced to predefined thresholds to deliver forecasts of hazardous flux levels for satellite operators. The model is running in test mode and planned to be used operationally in 2024.



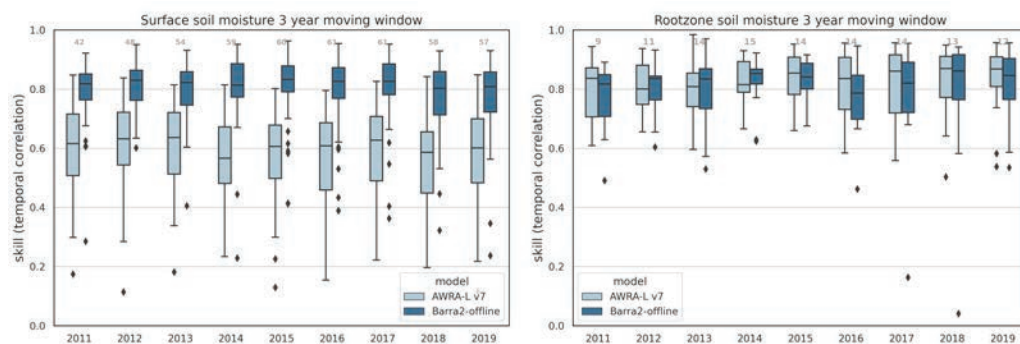
Sample global map of forecast energetic electron fluxes for the coming hour at geosynchronous orbit for different longitude sectors. The fluxes are colour coded using predefined hazardous thresholds to produce ‘traffic-light’ representations for satellite operators. Green, orange, and red are low, medium, and high energetic electron fluence levels respectively.

Uplifting the Bureau’s land surface model to improve water products

The land surface is a crucial part of Numerical Weather Prediction (NWP) models, as it regulates the water and energy exchange between the land and the atmosphere, closing the water cycle. Work has recently commenced to augment the performance of the Bureau’s operational NWP land surface model (JULES) for Australia, thereby enhancing NWP forecasts. This multiyear project contributes to Australia’s Earth System Model prediction capability, building on the UK Met Office model and introducing a consistent modelling framework across all Bureau services.

The uplift to JULES will not only positively impact the Bureau’s weather prediction, but also the modelling of land surface hydrology. This will lead to more reliable flood warnings as well as providing enhanced forecasting and hindcast capabilities for land-based features such as soil moisture, which are vital for agricultural applications and emergency management.

To provide an initial benchmark, data from 2 soil moisture products (JULES and the current operational offline model AWRA-L) were compared to assess their skill in modelled soil moisture against in situ soil moisture observations. The figure below shows that JULES consistently outperforms AWRA-L for surface soil moisture and that both are comparable across the root-zone.



Comparison of surface and rootzone soil moisture from JULES (Barra2-offline) and the current operational offline hydrological model (AWRA-L).

Trials are underway to test model enhancements to JULES land surface data assimilation, as well as the use of observed precipitation data. Results so far suggest that a combination of improved model physics, forcings and data assimilation will lead to a significantly improved product with significant temporal skill. This is a good indication that the higher-resolution ACCESS-C will also benefit from JULES improvements.

Other enhancements to JULES carried out this year focused on improving streamflow prediction with initial steps demonstrating that a hydrologically-improved version of JULES is achievable and will benefit current Bureau services.

Next steps

Key activities to be delivered in 2023–24 to help achieve Outcome 1 include:

- transferring the APS4 suite of models onto the Bureau’s new Australis 2 supercomputer and making them operational as the Bureau’s primary forecasting models
- completing production of the next version of the modern-satellite era regional atmospheric reanalysis (BARRA-R2) and BARPA-R regional climate projections for the Australian Climate Service

- developing prototype coupled (atmosphere-ocean) global weather forecast and seasonal prediction systems based on the latest global model configuration (GC5) from the UK Met Office
- developing a pre-operational prototype of the ACCESS-A model and assimilation system with 1.5km resolution, the first kilometre scale regional weather forecast model covering the whole of Australia
- developing an operational blended radar – satellite hourly rainfall analysis at regional scale.

Outcome 2: Facilitate and coordinate delivery of the objectives as outlined in the Bureau’s Innovation Framework and the Innovation Roadmap.

Achieving the outcome

Bureau Science Advisory Committee commends our performance

In November, the Bureau Science Advisory Committee (BSAC) met for the second time. The committee was established to provide a mechanism for peer review and international benchmarking of the Bureau’s scientific progress, aligned with delivery of its Research and Development Plan 2020–2030.

The Committee strongly commended the Bureau for its achievements over the past year, including the delivery of a national rainfall nowcasting system, progress on gender diversity goals and the excellent performance of the ACCESS-CE and -C model configurations in providing timely and accurate forecasts of high rainfall events, bringing more certain flood and weather warnings for flood-affected regions.

They also made recommendations around ensuring availability of high-performance computing infrastructure for research, clarifying the Bureau’s mandate and responsibilities regarding coastal flooding and hazards services, developing an Antarctic and Southern Oceans research and investment plan, defining a national modelling strategy and developing a joint research and development plan between the UK Met Office and the Bureau.

The next BSAC meeting is scheduled for December 2023.



Three of the 6 BSAC members (from left) Professor Matthew England (Scientia Professor, Climate Change Research Centre, UNSW), Dr Natacha Bernier (Director, Meteorological Research Division at Environment and Climate Change, Canada and Director Earth System Science Research and Innovation, WMO) and Independent Chair Dr Helen Cleugh (Honorary Professor, Australian National University) with the Bureau’s Chief Scientist Dr Gilbert Brunet.



Peer-reviewed scientific journal articles

139

peer-reviewed
scientific journal
articles published



Continuing our innovation uplift, with a focus on customer impact

Throughout 2022-23 the Bureau continued to embed a customer-focussed approach to innovation, with a particular emphasis on the use of customer insights to shape products and services that deliver maximum impact and value.

As an organisation, the Bureau is also focussed on uplifting the capability of its current and future leaders to support collaboration, agility and creativity, and on strengthening a range of communication channels to support innovation sharing and learning. Recognising that partnerships are vital to a good innovation system, the Bureau has started work to develop an academic partnerships framework that will harness the combined expertise of the Bureau and the academic sector to deliver transformative impact for the benefit of our customers.

Highlights and significant events

Growing innovation for a gender equal future

Each year the Bureau recognises International Women's Day, aiming to foster new social, economic and cultural codes for a gender-equal future, accelerating gender equality within the Bureau and in our community.

International Women's Day is celebrated globally on 8 March to bring attention to issues such as gender equality, reproductive rights and violence and abuse against women. This year we covered the theme 'Cracking the Code: Innovation for a Gender Equal Future'.

More than 700 people attended an internal online discussion with the Bureau's Gender Equality Champion, Nichole Brinsmead and 4 panellists from a range of disciplines, including a representative of the United States National Oceanic and Atmosphere Administration (NOAA).

The discussion began by acknowledging many of the challenges women face, particularly in being recognised for their professional skills and experience. It was clear that while a lot of progress has been made, there is still a long way to go to enable all women to fully participate in innovation and STEM roles.

The panel offered practical actions that we can all take, such as including and championing all people who identify as women, and calling out behaviour that makes others feel uncomfortable. Diversity of all sorts is vital to successful innovation and this event was a wonderful opportunity to learn some successful strategies from both the panel and the audience.

Reaching out to students through our STEM Ambassadors

Science, technology, engineering and maths (STEM) impacts every aspect of our lives. At the Bureau, approximately 71% of jobs are linked to STEM. From early education and learning, to shaping critical thinkers, STEM helps future generations to be creative innovators and problem solvers. One of the global challenges is the lack of diversity in STEM fields. This is reflected in the Bureau with STEM roles comprised of approximately 73% men and 27% women.

To promote STEM participation, the Bureau has more than 100 STEM Ambassadors, (around 70% female) who form part of the Bureau's STEM outreach. The ambassadors encourage students at all levels, from primary school to university, to consider studying STEM subjects and the many potential career opportunities to which they can lead. By inspiring the next generation of STEM professionals, the passion and expertise of our people serves as our strongest tool in contributing to a more robust and diverse STEM workforce.

In 2022–23, the Bureau's STEM Ambassadors visited schools and universities around the country and online. They spoke to large groups such as the Australian Research Council's ASTRO 3D Centre of Excellence, showcasing various science roles to an audience of PhD astrophysicists about how science research skills connect to desired roles and capabilities. Staff also attended the Monash Tech School's Career Launchpad World Changers event, which focused on partnering students with industry professionals through 2-minute speed interviews about careers and pathways.

A particular highlight was the STEM Day at the Avalon Air Show, where visiting schools learned about meteorology and space weather. The Bureau received very positive feedback from teachers in attendance. Many universities also took the opportunity to create connections for future research collaborations.



Connor Rate and Rebecca Kuster speaking to a group of school students at the Avalon Air Show.

Next steps

Key activities to be delivered in 2023–24 to help achieve Outcome 2 include:

- further developing the Bureau's innovation management system
- developing an Academic Partnerships Framework to maximise engagement with academia.

Enterprise Services

Goal: A trusted strategic partner that best positions the Bureau to execute its Strategy and deliver for Australia – all day, every day.

The Enterprise Services Group is responsible for designing and delivering integrated enterprise-wide solutions to support the delivery of the Bureau's Strategy 2022–2027. As trusted strategic partners, the group develops the Bureau's strategic, people, change, governance, product management, customer engagement, communications, project, financial, and risk management capabilities including workforce planning and development to enable our people to work in a safe and secure environment.

The group ensures effective controls are in place and that corporate services, systems and processes are accessible, fit for purpose, and enable the Bureau to govern and manage its business well.

For 2022–23 the group consisted of 6 programs with the following responsibilities:

Program	Responsibilities
Strategy and Performance	<ul style="list-style-type: none"> • Strategy integration • Strategic policy • Enterprise transformation • Planning and performance
Portfolio Management	<ul style="list-style-type: none"> • Enterprise portfolio and project management • Procurement, contract and vendor management • Protective security
Communications	<ul style="list-style-type: none"> • External communications • Internal communications • Government relations • Strategic content and media • Creative
Business Management	<ul style="list-style-type: none"> • Finance • Customer engagement • Product management • Property services
Organisational Resilience	<ul style="list-style-type: none"> • Meteorological Authority Office • Legal services • Freedom of information and privacy • Risk management and organisational resilience • Quality assurance and internal audit • Health and safety • Environment

Program	Responsibilities
Organisational Development	<ul style="list-style-type: none"> • Workforce strategy and workforce planning • Talent management and recruitment • Employee engagement and retention • Employee relations • Diversity and inclusion • Compensation and Rehabilitation Employee Services • Training, leadership and team development • Meteorological technical training • Payroll

Throughout 2022–23, the Enterprise Services Group focused on delivering 3 outcomes that support the achievement of the Bureau’s Strategy and purpose. The group’s achievement in delivering each of these outcomes is discussed below.

Outcome 1: Enterprise strategy, transformation and investments ensure the Bureau delivers outcomes to its customers and stakeholders.

Achieving the outcome

Launching the Bureau’s Strategy 2022–2027

The Bureau released its Strategy 2022–2027 (the Strategy) in September. The Strategy speaks to who we are as an organisation, our expectations and ambitions, and provides a foundation to drive everything we do over the next five years.

The Strategy is the Bureau’s commitment to Australian communities, industries and governments it serves. It builds on the considerable achievements made through the Strategy 2017–2022 and seeks to amplify and accelerate the Bureau’s impact and value.

The Strategy streamlined the Bureau’s success measures and includes several new strategic actions. For example, based on customer feedback the Bureau introduced a strategic action to *Grow products and services to support renewable energy systems and assist in greenhouse gas emissions reduction.*

The Bureau’s senior leaders came together at ‘Strategy in Action’ (SIA) workshops during the year to drive implementation of the Strategy across the Bureau. SIA workshops will continue in 2023–24 as we continue to monitor our progress against the strategic actions and performance against the success measures.

Cover of the Bureau’s Strategy 2022–2027 which was launched in September.



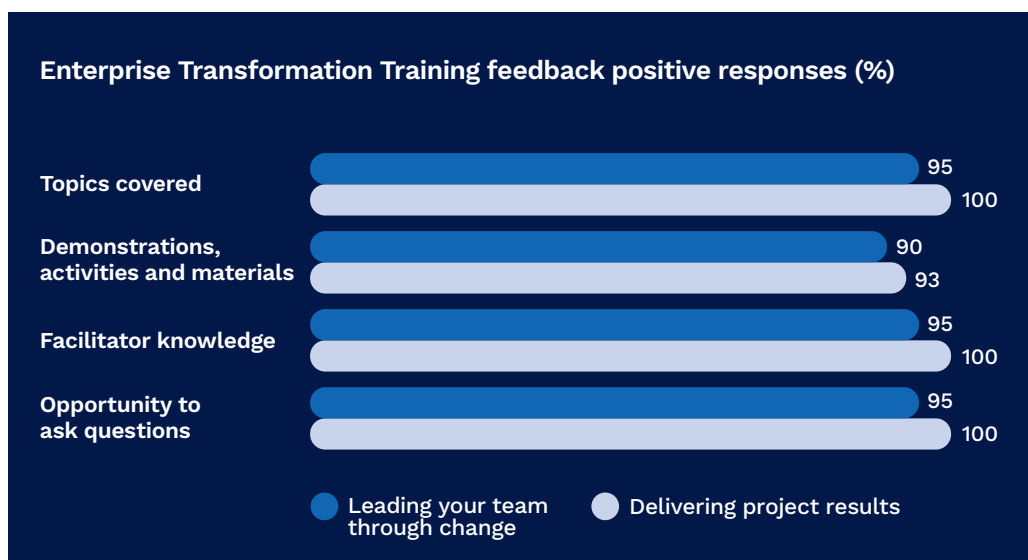
Maturing the Bureau's transformation capability

In 2022–23, the Bureau continued to mature its transformation capability to support the implementation of change and transformation across the organisation, enhancing business outcomes in accordance with the Bureau's Strategy.

The Bureau's transformation resourcing delivered change management support for the ROBUST, Public Services Transformation (PST), Business Systems Transformation (BST) and Projectisation programs, as well as several standalone projects across the Bureau. Transformation Business Partners were established for the Data and Digital Group and the Enterprise Services Group, to support change management planning and delivery. Uplift in the Bureau's transformation maturity continued through skill and capability development delivered including targeted training programs including:

- Leading your team through change, aimed at people leaders
- Sponsor Briefings for senior leaders
- Delivering Project Results to support project leaders across the Bureau.

Feedback on the training was very positive with leaders reporting they felt empowered to support teams through change processes.



Listening and responding to our people

The Bureau's Employee Perceptions Quarterly Playback provides staff visibility of the enterprise response to insights and actions from its cultural diagnostic tools – the Culture Survey and Australian Public Service (APS) Census.

Key themes identified in the Playback during 2022–23 included:

- perceptions of communication channels and quality of communication
- opportunities for intelligent risk-taking and innovative practice
- opportunities for capability development beyond formal training
- focus on wellbeing, particularly when working in isolation, and finding balance

- workforce relationship with change and transformation
- improving staff perceptions around senior leader collaboration and teamwork
- strengthening connections to the Bureau through our Strategy.

Each quarter, the Playback highlighted initiatives related to uplifting the Bureau's employee experience and its ability to deliver on the Strategy against the key themes. Targeted initiatives continued to be implemented by groups and programs as outlined in their Culture Action Plans.

Reviewing our product portfolio for enhanced product management

The Bureau issues approximately 500 different products to customers, over a variety of timescales, through several digital and non-digital channels. To understand each product, individual items are catalogued by type and aligned to weather phenomenon. These products are undergoing a detailed review of attributes, relevance, impact and sustainability.

Product reviews have progressed at pace and will inform future product roadmaps to ensure the Bureau continues to provide accessible, relevant and high value products. To date, over 70% of products have been reviewed, with an expected completion date of December 2023.

Highlights and significant events

Managing our capital investment in new capabilities

Managing a large portfolio of projects requires close integration between long-term asset planning, a flexible delivery framework, skilled project and program delivery teams and mature financial management.

The Bureau's Enterprise Portfolio Management Office monitors and reports on the Bureau's active projects and coordinates development of the Bureau's pipeline of future work.

The majority of Bureau projects are designed to manage the lifecycles of its large and geographically dispersed asset base. The Bureau is investing in its portfolio management capabilities to ensure that the projects to replace, sustain, and improve its assets are delivering efficiently.

In 2022–23, the Enterprise Portfolio Management Office implemented an approach to refine the way investment proposals are made and the frameworks through which the Investment Committee considers those investments, in support of the Bureau's Strategy.

Next steps

Key activities to be delivered in 2023–24 to help achieve Outcome 1 include:

- continuing to embed and evaluate progress against the Bureau's Strategy
- implementing the enterprise customer experience measures framework
- integrating people partner and transformation capability practices to drive improved people outcomes across the Bureau.

Outcome 2: The Bureau's people are customer-focused, capable, and engaged, and contribute to the Bureau's outcomes in a safe, secure, productive, diverse and inclusive and sustainable environment.

Achieving the outcome

Updating our Customer Service Charter

The Bureau of Meteorology Customer Service Charter forms a critical component of the organisation's Customer Engagement Framework and was updated in 2022–23 to align with the Bureau's Strategy. The Bureau recognises that the customer service it provides is integral to customer needs and may impact upon their ability to achieve outcomes.

The Bureau's customers – Australian communities, governments, and industries – are at the heart of its Strategy, and the Charter is one of the ways the organisation communicates its values to customers. The Charter is a statement of what the organisation does and the standards of service that customers can expect. It also gives information on how customers can provide feedback to help improve the products and services that they receive.

The Charter outlines the Bureau's commitment to its customers, including accurate and timely services, clear and accessible information, continuous service improvements, transparency and disclosure, and responsiveness and respect.

The Charter supports the Bureau's mission to provide trusted, reliable and responsive weather, water, climate, ocean and space weather services for Australia – all day, every day.



The cover of the Bureau's updated Customer Service Charter.

Investing in our Meteorologists

The Bureau's Graduate Diploma in Meteorology course – the major pipeline of STEM talent into the organisation – saw a record number of graduates commence the 2023 program, with 39 new Bureau graduates joining a further 12 external students from the Royal Australian Navy and overseas meteorological services. Along with the 23 Bureau people who graduated from the 2022 program, the 2023 graduates will increase the resilience of Business Solutions and Community Services groups to deliver trusted, reliable and responsive weather and climate services for Australia. For more information on training see p.181.

Promoting diversity and inclusion

During 2022–23 the Bureau undertook a range of activities to cultivate a workplace culture of inclusion and diversity. The Bureau celebrated International Women's Day (see p.113), Harmony Week, International Day of People with Disability, and International Day Against Homophobia, Biphobia, Interphobia and Transphobia (IDAHOBIT), bringing awareness to gender equality, LGBTQIA+, disability and multiculturalism.

The Bureau continued to implement the actions from its Innovate Reconciliation Action Plan (RAP) 2021–2023 to strengthen our relationship between First Nations peoples and non-Indigenous peoples, for the benefit of all Australians.

A priority of the RAP is to build the Bureau’s cultural learning, so a pilot Yarning Circles program was delivered in December, focused on CORE Cultural Training module ‘Thinking About Cultures and Identities’. The Bureau has partnered with an Indigenous company to deliver the Yarning Circles with the aim of providing our people a safe environment to listen, learn, and lead their cultural learning journey. Yarning Circles in March and June focused on CORE modules ‘My Country, Our Country, History Lives in Us, Engaging with Aboriginal and Torres Strait Islander people’.

A National Reconciliation Week event was held in May, to celebrate the theme ‘Be a Voice for Generations’.

The Bureau’s NAIDOC event included a showcase of activities to celebrate the role Elders play in informing and guiding our work. A key highlight from this event included reflections on the connection between groundwater and the land and how the survival of First Nations people in Australia wouldn’t have been possible without knowledge of how to find and manage water. The Bureau also recognised the Elders and First Nations communities who partner with us and share their traditional knowledge on seasonal weather to develop digital Indigenous Weather Knowledge seasonal calendars that are available to the public.

The Bureau also participated in the Indigenous Apprenticeships Program in 2022–23 with 2 candidates accepting positions.

For more on the Bureau’s commitment to diversity and inclusion see p.170.



Poster for the Bureau’s National Reconciliation Week celebrations.

Embedding a strategic approach to learning

The Bureau established the Enterprise Learning Committee in March, as part of its Learning Framework. The Committee guides decision-making on the Bureau's mandatory, required-for-role and recommended-for-role learning to support future workforce capability requirements. The Committee implemented procedures to support transparent decision-making on learning priorities, investment, and reporting to ensure delivery of ongoing strategic and tactical learning programs.

Managing fatigue during high stress periods

The Bureau commenced a 3-month pilot program in May to support staff involved in managing extreme weather events, particularly ones that have major impacts on the safety of lives, property, and the livelihoods of Australians and their communities.

The program included 2 training sessions related to fatigue, burnout and self-care strategies, and the provision of on-site psychologists in Melbourne, Sydney, and Brisbane. Staff in other states were able to access the service through a virtual option.

The pilot will continue through to August 2023 and will be reviewed to explore opportunities to continue the program in future years.

Building leaders for an uncertain and complex environment

The Bureau Way Manager Program was delivered to 3 cohorts of approximately 20 leaders in each, in 2022–23. The program invests in the Bureau's Executive Level 2 (EL2) leaders and helps them sustain high-performing teams through a focus on individual leadership development and everyday management practice aligned to the Bureau's Integrated Leadership Capability Framework.

The topics and activities covered in the program, coupled with the individual leadership journeys, support leaders to practice, develop, and embed the leadership capabilities that the Bureau needs to deliver on current and future objectives.

The Bureau Way Manager Program delivers 5 topics over a six-month period:

- emotionally intelligent leadership
- manager as coach
- effective teams
- leading change
- managing complexity.

Highlights and significant events

Strengthening our management of psychosocial risk

The Bureau is developing and making available information and guidance to support its people in dealing with psychosocial risks, and is working to understand its responsibilities and meet its obligations to staff in managing psychosocial hazards.

A draft psychosocial risk assessment was developed in August, incorporating principles from the Safe Work Australia model Code of Practice for managing psychosocial hazards at work.

Next steps

Key activities to be delivered in 2023–24 to help achieve Outcome 2 include:

- continuing to implement risk control measures and education to support managers in the mitigation of psychosocial hazards
- continuing the Safety Essentials campaign
- developing the Bureau's Reconciliation Action Plan 2024–2026 and the Diversity and Inclusion Plan
- developing the Enterprise Workforce Plan.

Outcome 3: The advice and services provided by the Enterprise Services Group are accessible, fit-for-purpose, and enable the Bureau to govern and manage its business well.

Achieving the outcome

Uplifting business process management capability

The Bureau increased its maturity in business process management (BPM) during the year by embedding the capability in the organisation and progressively uplifting documentation and management of process design and implementation.

BPM supports managers, staff and project teams from across the Bureau to design, implement, manage and improve processes in alignment with the Bureau's approved process frameworks, standards and tools. Ongoing engagement and collaboration on BPM across the enterprise increased the awareness and ownership of processes that drive the Bureau's business and laid the foundation for future efficiency improvements. These activities also led to the establishment of more consistent enterprise processes. Business functions like service delivery, customer engagement, technology and data management processes have benefited from achievements in BPM in 2022–23.

Embedding a new Risk Management Framework

The Bureau continued to implement its Risk Management Framework, building on foundational knowledge to uplift risk maturity across the organisation. During the year, the Risk, Resilience and Audit team conducted the process of identifying, assessing, treating, monitoring, and reporting risks in accordance with the framework. This has provided a clearer understanding of the Bureau's risk profile and assurance around its system of internal controls.

The implementation of the risk framework has driven a significant increase in the Bureau's risk management maturity as identified in Comcover's Risk Benchmarking Program. The results show improvements across all areas of focus between 2021 and 2023.

Transforming our corporate business systems

The Business Systems Transformation Program reflects the Bureau's commitment to uplift enterprise systems, processes, and technologies, ultimately enabling an improved customer and staff experience. During the year, the program:

- went live with a new Enterprise Scheduling Tool, replacing multiple spreadsheets and other media being used to create and communicate staff rosters
- automated payroll processes including single touch payroll – an initiative of the Australian Tax Office to streamline reporting with government agencies
- implemented an additional payroll module to compute the various type of payments due to or payable by an employee at time of resignation
- delivered an integrated solution that streamlined and enhanced the ease and effectiveness of completing probation for new hires.

The program will extend into 2023–24 incorporating additional automation in business functions and finalising a strategic roadmap for a next generation upgrade of the Bureau's business systems.

Strengthening our security

Strengthening the Bureau's security capability is critical to meet the demands of a challenging and evolving threat environment.

In 2022–23 the Bureau developed a comprehensive plan of work to improve its security maturity and capability. This plan:

- provides context and detail regarding the need for security uplift
- explains the Protective Security Policy Framework policies and Government maturity frameworks
- positions the Bureau's current state against whole of Government security maturity requirements and Bureau target maturity states
- identifies specific gaps the Bureau needs to address to improve its security maturity.

The plan is complemented by improved security governance, assurance practices, and awareness campaigns which focus on the Bureau's people as an integral component of staying secure.

Achieving business excellence through quality management

A well-documented and implemented Quality Management System (QMS) enables business units to continually meet their defined objectives and achieve business excellence through demonstrated organisational and operational resilience.

There are currently 6 business areas of the Bureau that are certified in compliance with the international ISO 9001:2015 Quality Management Standard and adoption of a quality management approach is expanding to new functions across the Bureau, where there is a recognition of, and desire to establish, mature and resilient business practices. In 2022–23, the Bureau's Quality Assurance Unit continued to support the ongoing compliance of existing QMSs and support the development of a QMS for the Australian Space Weather Forecasting Centre, and the automatic weather station (AWS) Observing Network. The latter is the most complex QMS developed to date as it involves a large stakeholder base.

Highlights and significant events

Uplifting our Business Continuity arrangements

During the year the Bureau conducted a significant uplift of its business continuity and incident management arrangements. A new Business Continuity Management System was introduced in May including policies, procedures and guidance, to enable programs to undertake robust and fit-for-purpose business continuity planning for their critical business functions.

An updated Incident Management Plan was also released in December drawing on lessons learned from the Bureau's response during multiple severe weather events across 2022. The updated plan provides clear communication and escalation pathways and ensures appropriate command-and-control is in place to manage disruptive events.

These updated business continuity and incident management arrangements will ensure the Bureau can effectively respond to, and recover from, disruptive incidents, regardless of the incident's cause, size, location or complexity. This will enable secure, stable and resilient ways of working to support sustained delivery of the Bureau's trusted products and services.



Flooding at Forrest Creek in Castlemaine, Victoria during October.

Next steps

Key activities to be delivered in 2023–24 to help achieve Outcome 3 include:

- developing an implementation plan for the 6 Environmental Sustainability principles with a priority focus on reducing greenhouse gas emissions to achieve the Government's APS Net Zero 2030 target
- identifying cultural heritage and native title considerations with regards to new leases
- upgrading business systems to support the continued automation of finance and HR functions.

Australian Climate Service

Goal: To support a safer, adaptive and prosperous Australia, resilient and prepared for the climate challenges and natural disasters.

The Australian Climate Service (ACS) is responsible for providing data, intelligence and expert advice on climate and natural hazard risks and their impacts to inform decision-making. The ACS vision is to advance information and knowledge that is used to support a safer, adaptive and prosperous Australia, resilient and prepared for climate challenges and natural hazards.

The ACS is made up of world-leading expertise from the Bureau, CSIRO, the Australian Bureau of Statistics and Geoscience Australia. The partnership draws together the national data, systems and expertise needed to inform climate and natural disaster decision-making. Each of the partners brings knowledge and expertise to the partnership and collectively this knowledge and expertise provides better information for decision makers.

The Bureau of Meteorology	CSIRO	Australian Bureau of Statistics	Geoscience Australia
<p>The Bureau of Meteorology is the national weather, climate and water agency. It provides observational, meteorological, hydrological, oceanographic and space weather services.</p>	<p>CSIRO, as Australia’s national science agency, brings its world leading research, science and innovation with a focus on climate observations and modelling, projections, resilience, adaption and transformation science and practice.</p>	<p>The Australian Bureau of Statistics brings critical social and economic information to the partnership, enabling an improved picture of the vulnerability of communities and how these are changing across Australia.</p>	<p>Geoscience Australia, a trusted advisor on national geology and geography, brings national hazard and exposure information, and geospatial and location services.</p>

The Australian Climate Service partners

The ACS is included in this Annual Report as the Bureau of Meteorology hosts the ACS. The Bureau’s CEO and Director of Meteorology is the Accountable Authority and Senior Responsible Officer for the ACS.

The ACS seeks to achieve 2 main outcomes. The achievements in delivering these are discussed below.

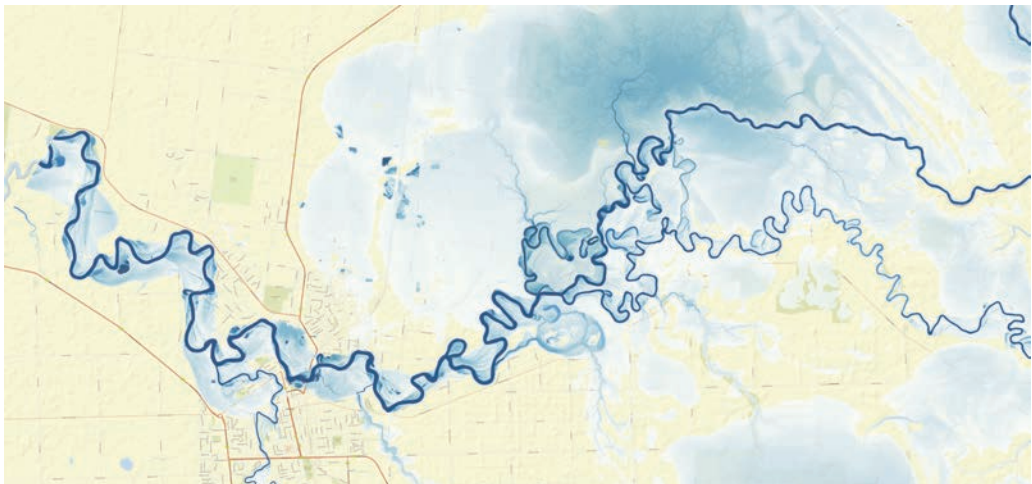
Outcome 1: Enhanced national climate and natural hazard intelligence capability.

Achieving the outcome

New and enhanced data for decision-making

During the year the ACS developed and trialled several new intelligence sources to support National Emergency Management Agency (NEMA) decision-making. Flood extent intelligence was delivered to NEMA in several ways. The first was through the trial of satellite detected flood extents, led by Geoscience Australia. This trial successfully provided near real-time flood extent information across all jurisdictions during the high-risk weather season and received positive feedback from both NEMA and state and territory governments.

A proof of concept, dynamic flood inundation modelling system was also developed. Modelling impacts on supply routes using current hazard extent information from CSIRO's Transport logistics (TraNSIT) team provided NEMA an indication of how an unfolding flood was likely to affect the movement of commodities to communities and markets. This work provided valuable insights throughout the many flood events in 2022–23, in both remote and urban locations.



Map of the October 2022 Murray River flood event at Echuca produced using the ICEYE Flood Insights Product procured by Geoscience Australia, on behalf of the ACS as a trial to support the 2022–23 high-risk weather season. ICEYE Flood Insights were shared with Commonwealth and state and territory agencies to support decision-making across the disaster continuum and provide a nationally consistent picture of flood extends and depths. Image provided by Geoscience Australia. Sources: ICEYE Flood Insights © 2022 ICEYE Oy. Copyright in all ICEYE Products and Derivatives is and will remain held by ICEYE Oy. World Street Map: Esri, DeLorme, HERE, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, Tomtom.

Building understanding of climate risks and impacts

As Australia's climate becomes more challenging with more extremes, our understanding of the risks posed by these extremes and their potential impacts requires greater use of earth system models of the ocean, atmosphere and hydrology. Many hazards including heatwaves, dangerous fire weather, and coastal inundation are increasing in frequency and peak intensity.

In 2022–23, the ACS worked to define priorities for its hazard work and is developing long-range forecasts and projections for each of these hazards. Future outputs will include practical and accessible information on the characteristics of natural hazards, including past occurrence and impacts, and how they will change under a range of climate scenarios into the future.

Highlights and significant events

Harnessing spatial tools to map hazard impacts

The ACS has built several analytical tools that were implemented in 2022–23, enabling data to be visualised and communicated to key users.

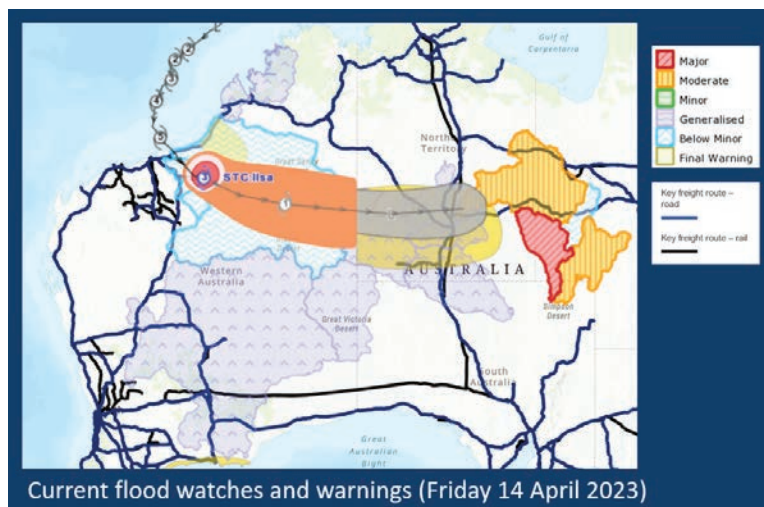
Information on potential on-ground exposure and vulnerability to upcoming natural hazard threats such as flooding is now more easily accessible thanks to these visualisation tools. These tools can streamline and automate previously manual processes, making it easier to obtain data from the ACS and enable quicker insight development. This is achieved by combining and synthesising data from across the ACS partnership, including advanced satellite imagery.

Images are included in Australian Climate Service Impact Briefs that are provided as resources for NEMA. These are detailed briefings to provide situational awareness on natural hazards, along with their extent, types of vulnerabilities and impacts they could generate.

A community profile dashboard helps to provide a visual overview of the key socio-economic and built characteristics at the local government scale for Australia. This enables planning and response during a hazard event including information on:

- hazard warning locations
- population and demographics
- income and housing
- indicative reconstruction costs and impacts.

The information can be used to identify the broader characteristics of the exposed population and community, as well as to identify if specific at-risk populations and groups are present. The ACS used the new tools during the 2022–23 high-risk weather season to support the Australian Government’s National Situation Room and briefings facilitated by NEMA.



An extract from an ACS Impact Brief for the National Situation Room. This map depicts flood watches and warnings overlaid with key freight routes which may be affected by severe tropical cyclone Ilsa on 14 April 2023.

Using downscaled projections and modelling to prepare for the future

Australia's changing climate means that past data, which has typically been the basis for planning and decision-making, is no longer a reliable guide on its own for what to expect in the future. Almost every aspect of how we live is affected by these changes – whether it be the intensity, duration and increased frequency of heatwaves which mean that our health plans and infrastructure must prepare for harsher conditions, or rainfall intensity changes which impact on design standards for houses, roads and dams.

Given the scale and challenges of natural disaster risk reduction and climate change adaptation, it is vital that our future hazard information is as accurate as possible at scales which readily support decision-making.

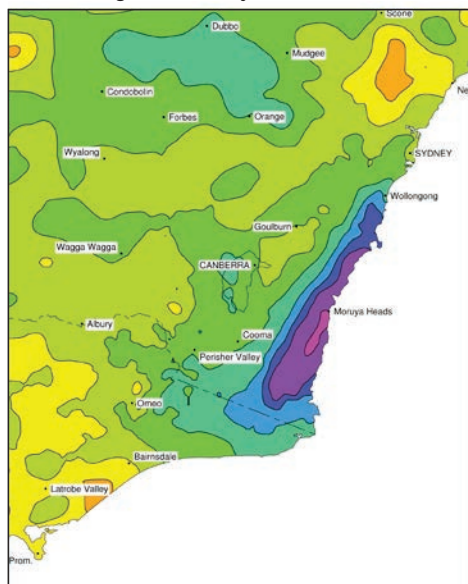
This is where climate and hazard projections are vital – they can:

- demonstrate how hazards are likely to change
- demonstrate where those changes might be most significant
- assist in targeting regions where associated risks are largest and actions are most beneficial.

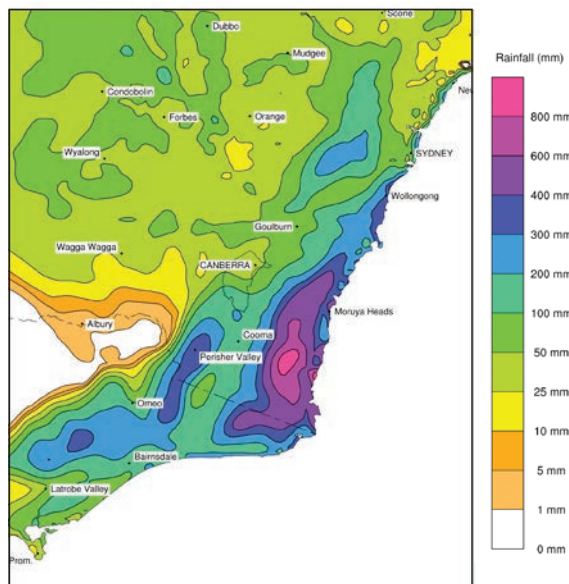
Developing the best hazard projections is a multi-step process, which draws on both Australian and international modelling. This starts with state-of-the-art global climate models provided by the International Panel on Climate Change (IPCC) Coupled Model Intercomparison Program Phase 6 (Eyring et al 2016) which are typically at scales of 50 –100 kilometres. These global models provide intelligence about broad patterns of change, such as shift in rainfall patterns and rising sea levels.

Australian rainfall analysis (mm)

Week ending 9th February 1971



18th to 25th June 2038



The maps above compare a 1971 rainfall event in Bega with a hypothetical future rainfall event in the same region. The future rainfall map depicts a hypothetical rainfall event in the future (~ 2050s) based on business-as-usual emissions from a downscaled climate model. This is a plausible future event, it is not a forecast, but a physical rendering of the types of extreme events we might anticipate in the coming decades in a warming world.

The ACS has been downscaling these models for Australia, which means translating global climate model output to scales of around 5 –10 kilometres through high resolution regional models. This is done using the:

- Bureau of Meteorology Atmospheric Regional Projections for Australia
- CSIRO Conformal Cubic Atmospheric Model climate models.

High resolution regional models can then be used to derive hazard information, for example, projections of intense rainfall can be used as an input for flood modelling. ACS results to date reveal the new projections provide greatly improved representation of Australia’s climate – for example, better capturing climate patterns in coastal zones and in the vicinity of topographic features. This information helps decision makers prepare for and adapt to climate and natural hazard risks and impacts.

Establishing a National Climate Risk Assessment Methodology

During 2022–23 the ACS collaborated with the Department of Climate Change, Energy, the Environment and Water (DCCEEW) to develop a methodology for delivering the first National Climate Risk Assessment (Risk Assessment).

The purpose of the Risk Assessment is to provide an understanding of nationally significant climate risks to Australia from climate change impacts. It will provide a shared national framework to inform Australia’s national priorities for climate adaptation and will enable consistent monitoring of climate risk across all Australian jurisdictions. This will be a collaborative effort which integrates expertise across the ACS partnership with other Australian Government resources.

The ACS and DCCEEW engaged with stakeholders from across all levels of government, the private sector and non-government organisations to develop a robust and repeatable methodology for the National Climate Risk Assessment. Consistent with international expertise, the method and assessment of risks will be improved into the future.

As well as integrating best practice across a range of disciplines, the most recent approaches to climate risk assessment from the IPCC and International Standards Organization (ISO) have been incorporated into the methodology. In particular, the latest thinking on how to effectively address systemic, cascading and compounding risks has been included.

The approach for Australia integrates climate hazards with exposure and vulnerability to identify and prioritise risks to the social, built, economic, and natural environments.



The ACS is assessing climate risks on health and electricity systems.

To test the method, the ACS led a deep dive analysis of the interaction of heatwaves with health and electricity systems to illustrate the sort of practical outputs that will be developed during the final risk assessment process.

This work will support decision-making for Australian Government adaptation planning processes. The assessment of priority risks will be used by many Australian Government agencies, including the National Emergency Management Agency. The national assessment will also inform other governments, industries and communities.

Understanding current and changing heat risk to human health in Australia

To support development of the National Climate Risk Assessment methodology, the ACS conducted a case study analysis of extreme heat impacts on human health. This work provides a theoretical, methodological and practical framework for understanding historical and future heat-health impacts and provides insights on how other complex climate risks could be understood and analysed.

Heatwaves are an enduring feature of Australia's climate and have significant social, health (physical and mental) and economic impacts. Extreme heat leads to more deaths and hospital admissions than any other hazard in Australia, can cause significant disruptions to infrastructure and business, and impacts everyday quality of life.

The latest understanding of climate risk from the IPCC was used to develop a conceptual framework that was applied to a novel, integrated, cross-domain dataset. This included data on the heatwave hazard, on exposure, vulnerability, impacts and consequences. This data asset was then used for in-depth analysis of social and spatial variation in heat-health risk factors and the likelihood of heat related deaths and illness.

Heatwaves are projected to become longer and more intense with a changing climate, however, as impacts vary between populations and locations, evidence concerning vulnerable people and places is critical for effective policy interventions. This activity provides a nationally consistent approach for understanding how the risk varies geographically so warnings, targeted response plans, and other outreach methods can be customised for specific places and segments of the population.



Trigg Beach in Western Australia during a summer heatwave.

Next steps

Key activities to be delivered in 2023–24 to help achieve Outcome 1 include:

- delivering stage 1 of the National Climate Risk Assessment for the Australian Government
- informing national understanding of climate and natural hazard risks in the context of broader socio-economic information through a series of national assessments
- fill critical information gaps to support the decision-making needs of the National Emergency Management Agency
- engaging state and territory governments to contribute to a national capability that can better inform how we plan and respond to natural hazards and broader climate risks.

Outcome 2: Improved access to trusted climate and natural hazard data, information and expert advice.

Achieving the outcome

Maturing our support to the Australian Government's National Situation Room

The Australian Government significantly upgraded its National Situation Room in December 2022. The ACS has played a key role in improving access to technical and expert information and advice to the National Situation Room. This has improved the Australian Government's responses to a range of natural disaster events in 2022–23.

When there is a natural hazard event, one of the roles of the ACS is to provide detailed briefings to NEMA and the Australian Government's National Situation Room. These briefings are delivered daily when requested and include available information customised to the needs of decision makers. Through the support of the ACS, weather and hazard services and expertise from the Bureau are embedded in the National Situation Room, enabling access to direct support to help preparedness for and response to natural disaster situations.

ACS Impact Briefs serve as a comprehensive synthesis of data, insights and intelligence from various sources, presenting all impact-related information in a practical and accessible format. The ACS Impact Briefs are delivered directly to decision-makers within NEMA. Notable projects like the National Bushfire Intelligence Capability and supply chain analysis through CSIRO Transport Network Strategic Investment Tool (TraNSIT) continually enhance their outputs. Geoscience Australia, through uplift of its situational awareness products, has also contributed to the ongoing improvement of Impact Briefs by leveraging the best available inputs from across the ACS.

Throughout 2022–23 the ACS provided more than 800 briefings to the National Situation Room, including 229 Daily All Hazards Weather Briefs, 236 ACS Impacts Briefs and 21 Australian Government Crisis and Recovery Committee Briefings.



Prime Minister the Hon Anthony Albanese MP opening the new National Situation Room. The National Joint Common Operating Picture behind Prime Minister Albanese demonstrates some of the data provided by the ACS partnership (Credit: National Emergency Management Agency).

Making climate information more accessible

The ACS is providing data and information from across the partnership to NEMA, through direct feeds into the National Joint Common Operating Picture, analysis products and on-ground expertise.

In May 2023, the ACS completed a refresh of its public facing website with additional information about natural hazards, the changing climate, and climate risks added to better inform the public about these important topics. More broadly, the ACS has contributed to climate science and natural disaster risk and resilience conferences, sharing its expertise and commitment to supporting natural disaster risk reduction efforts. This has included ACS participating in a session on data at the Asia-Pacific Ministerial Conference on Disaster Risk Reduction, with representatives across the partnership contributing to the event held by the Australian Government with the United Nations Office for Disaster Risk Reduction.

The ACS has also been planning the development of a more comprehensive data and analytics platform which will provide users with a single access portal to curated information and insights on climate, hazards, exposure and vulnerabilities across 4 domains (social, economic, built and natural).



Dr. Andrew Johnson, CEO and Director of Meteorology and the Senior Responsible Officer of the ACS with the ACS's Martin Brady and Maxine Kerr at the Asia-Pacific Ministerial Conference on Disaster Risk Reduction hosted by the Australian Government and the United Nations Office for Disaster Risk Reduction.

Highlights and significant events

Combining capabilities and expertise for effective flood response in the Kimberley

On 8 January 2023, major flooding in northern Western Australia caused by ex-tropical cyclone Ellie, resulted in extensive road closures and damage impacting access to supplies for communities in the region. Drawing on the diverse expertise of the partnership, the ACS assisted the Australian Government's National Situation Room in responding to the event, providing a profile of the communities affected by the floods to help in planning the evacuation of vulnerable residents and the delivery of essential supplies.

The Kimberley region affected by the flood is large and sparsely populated with isolated cattle stations and small rural towns. There are also significant numbers of First Nations communities, some with fewer than 50 people. This made it very challenging to know who was likely to be affected by the flooding and where they were.

To meet the needs of the National Situation Room, the ACS drew on the capabilities of its partnership to respond. Geoscience Australia provided satellite images of the flooded area which were overlaid with data from the 2021 Census by the Australian Bureau of Statistics to provide an estimate of the number of people within the flood footprint, and those likely to be directly affected (for example the number of people cut off from supplies or telecommunications).

Based on this intelligence, NEMA was able to plan and coordinate the highly resource intensive and time-critical response involving helicopter, aircraft and Australian Defence Force personnel to provide relief and support to affected communities.



Members of the Yungngora people exit an Australian Army CH-47 Chinook helicopter that was tasked with repatriating 22 members of the Yungngora people to their homes in Noonkanbah on the Fitzroy River after they were evacuated due to flooding in the area (Image courtesy of the Department of Defence).

Informing scenario planning for the 2022–23 high-risk weather season

Every year NEMA requires a long-range forecast and advice on potential impacts to help plan and prepare for the high-risk weather season from October to April.

For the last 2 years, the ACS has provided detailed national scenarios, integrating climate and hazard information with data on possible exposure and vulnerability, to illustrate how plausible extreme weather for the season ahead may impact individuals and communities. These scenarios are shared with emergency response agencies, community groups, charities and government agencies across the country to assist in preparing for the season ahead.

The national scenarios build on the Bureau's long-range forecasting capabilities bringing data across social, built, economic and natural environments into the scenarios, as well as impact and consequence narratives, to support seasonal preparedness and exercising.

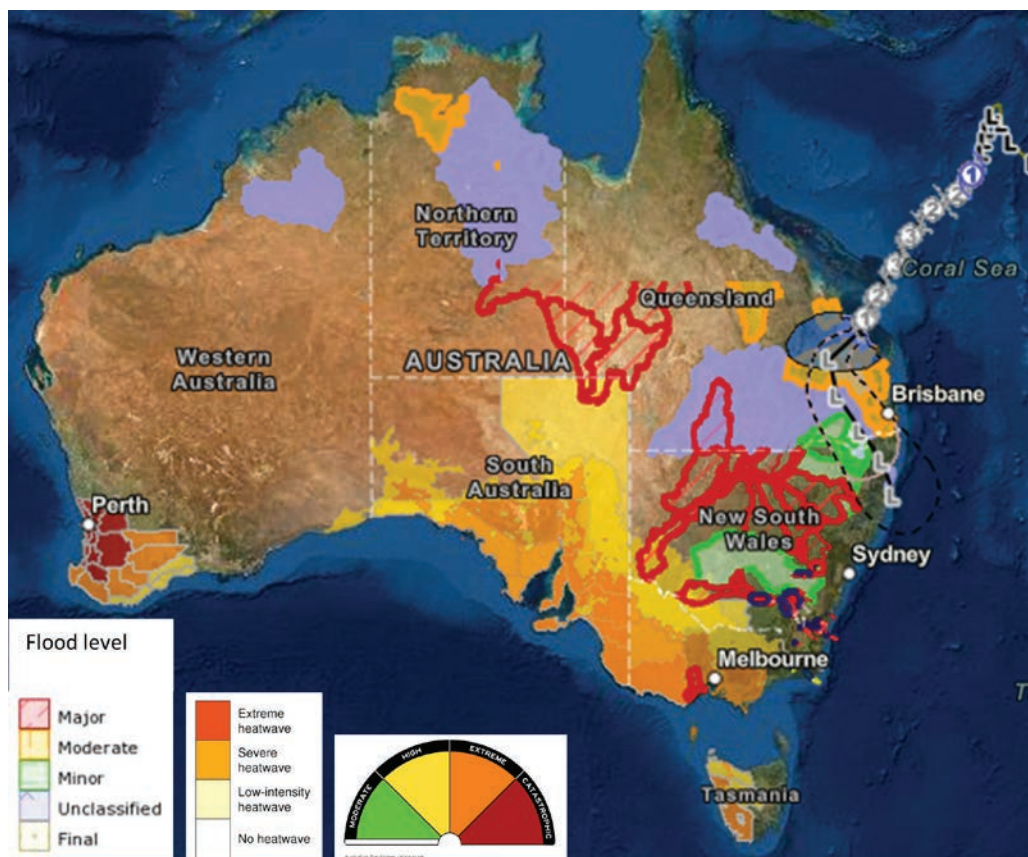
Each element of the scenarios includes:

- hazards – such as flooding, bushfires and heatwaves
- locations – regions and towns impacted
- timing – of the hazards including concurrent hazards and impacts.

This is then used to build a:

- demographic and economic profile (Australian Bureau of Statistics)
- damage profile (Geoscience Australia)
- impact analysis, including analysis from CSIRO such as supply chain impacts
- narrative impact and consequence information based on expert advice from all the partners.

The whole scenario has a national focus while also incorporating at least one case study in each state and territory using plausible extreme hazards from the forecast.



Hazard mapping on the National Joint Common Operating Picture as part of scenario planning for the high-risk weather season. To support hazard preparedness activities in the National Emergency Management Agency, the ACS builds national scenarios of multiple concurrent high-impact natural hazards across Australia. The scenario incorporates catastrophic fire danger, flood across major catchments, heatwave and tropical cyclone. This image does not depict data from an actual event.

Next steps

Key activities to be delivered in 2023–24 to help achieve Outcome 2 include:

- contributing to national crisis management exercises and briefing emergency services authorities to assist with seasonal preparations
- supplying additional data feeds into NEMA's National Joint Common Operating Picture
- continue to upgrade the ACS Platform to provide efficient data sharing and visualisation.

Recognition of performance

Throughout 2022–23, the Bureau continued to recognise the excellent work of individual staff, volunteers and teams who contribute to the delivery of trusted, reliable and responsive weather, water, climate, ocean and space weather services to all Australians.

Recognising and celebrating our people is an important part of our workplace culture. Through our Recognition and Rewards Framework, the Bureau recognises staff formally or informally, ranging from ‘cause for applause’ moments in team meetings to formal awards.

Bureau Excellence Awards

In November, we recognised and celebrated outstanding achievements by teams and individuals across the organisation at the 2022 Bureau Excellence Awards. Established in 1987, the Awards are an opportunity to highlight excellence across the Bureau through successful projects, initiatives or delivering our services during extreme weather.

The Bureau’s CEO and Director of Meteorology, Dr Andrew Johnson presented awards across 5 categories: the Director’s Choice Award and awards representing achievements aligned with the Bureau’s 4 pillars of success – Impact and value, Operational excellence, Insight and innovation and the Bureau way.

2022 award	Recipient(s)
Director’s Choice	Greenvale Radar team (Data and Digital) For successfully delivering the Greenvale Radar ahead of the wet season, providing vital information to the community during severe weather events in early 2022.
Impact and value	Meteorologists Ken Burgess, Bronwyn Duncan and Krystelle Venn (Business Solutions) For supporting Army Aviation rescue operations during the 2022 Southern Queensland and northern New South Wales floods – which enabled Army aircrew to safely carry out rescue operations to assist flood victim.
Impact and value	Forewarned is Forearmed project team (Science and Innovation) For leading improvements to the Bureau’s climate outlooks service, providing users with critical information to support decision-making.
Impact and value	National Situation Room (cross-group and multi-agency) For their crucial role in keeping the community safe by leading the operational service and providing advice and data to support the National Emergency Management Australia.

2022 award	Recipient(s)
Impact and value	<p>Multiple teams:</p> <ul style="list-style-type: none"> • Flood Team (Community Services) • Climate Analysis and Specialist Services (Community Services) • Thunderstorm and Heavy Rainfall (Community Services) • National Production Operations (Community Services) • Hazard Preparedness Response (Community Services) • Community Engagement (Community Services) • Media and Government Relations (Enterprise Services) • National Observing Operations (Data and Digital) <p>For the ongoing dedication and resilience of these teams to deliver expert and timely forecasts across consecutive flood and severe weather events to support decision-making by emergency services and impacted communities.</p>
Operational excellence	<p>Data Centre Consolidation team (Data and Digital)</p> <p>For the successful delivery of a large complex project to consolidate the Bureau's data centre.</p>
Operational excellence	<p>Legal Services team (Enterprise Services)</p> <p>For sustained focus and excellence in testing and refining the Intellectual Property Hub.</p>
Operational excellence	<p>Tiffany Day (Business Solutions)</p> <p>For developing a comprehensive and high-quality training package and establishing competencies for new space weather forecasters to ensure continuity of service in space weather forecasting.</p>
Operational excellence	<p>Planning and Performance team (Enterprise Services)</p> <p>For their sustained excellence in delivering planning and reporting, and the Bureau's Strategy 2022–2027.</p>
Insight and innovation	<p>P20 (Jive) Verification team (Science and Innovation)</p> <p>For sustained excellence in improving the Jive forecast verification system which has enabled the Bureau to streamline public weather forecasting through greater trust and reliance on automated guidance.</p>
Insight and innovation	<p>RF Spectrum and Radiation Safety team (Data and Digital)</p> <p>For excellence in developing software to calculate the impact of new windfarms on radar sites that enabled the Bureau to manage complex risks between the radar network and renewable energy outcomes.</p>
The Bureau way	<p>National Graphical Forecasting Editor Design, Implementation and Engagement team (Public Services Transformation Program)</p> <p>For delivering a single unified operational system which is deeply focused on customer outcomes and impact, made possible through collaboration and engagement across people, science, systems, and infrastructure.</p>

Australia Day Achievement Awards

Every year the Bureau recognises the achievements of our people through the Australia Day Achievement Awards for outstanding performance on a project that has made a significant contribution to the nation, or for outstanding performance of core duties.

The Bureau's CEO and Director of Meteorology, Dr Andrew Johnson, presented the first 2023 Australia Day Achievement Award to Matt Tully for his outstanding contributions in Stratospheric Ozone science. The second Achievement Award was awarded to the ROBUST Capability Sustainment Team for its outstanding leadership in designing and advising government on requirements for sustaining ROBUST Program benefits. The ROBUST and sustainment programs represent the single largest investment in Bureau financial, technical and people capability in the organisation's history.

Public Service Medal

Bryan Hodge, General Manager of Observing Systems and Operations, was awarded a Public Service Medal in the 2023 Australia Day Honours.

The Public Service Medal recognises those who have consistently performed demanding jobs to the highest standards and have made a major contribution to the Australian community.

The Public Service Medal recognises that Bryan has conceived, designed and implemented world leading and innovative meteorological science, technology and engineering solutions that have profoundly increased the safety, security and prosperity of Australia and its Pacific neighbours.



Bryan Hodge, General Manager of Observing Systems and Operations receiving his award from the then Governor of Victoria, Her Excellency the Honourable Linda Dessau AC CVO.

Australian Academy of Technological Sciences & Engineering (ATSE) Fellow

In October Dr Beth Ebert was elected to the ranks of Fellow at the Australian Academy of Technological Sciences and Engineering (ATSE). Dr Ebert was recognised for her contributions and enhancements to the development of probabilistic forecasts to support risk-based decision making. Dr Ebert pioneered the use of output from multiple numerical weather models to create a “poor man’s ensemble” of rainfall forecasts, enabling the Bureau to issue, for the first time, gridded national forecasts of the probability of precipitation.



ATSE Fellow Dr Beth Ebert.

Australian Meteorological and Oceanographic Society Awards

In October, Dr Andrew Watkins was awarded the Australian Meteorological and Oceanographic Society’s 2022 Gibbs Medal. Named in honour of former Director of the Bureau of Meteorology, WJ (Bill) Gibbs, the award recognises long and distinguished service to operational forecasting.

Andrew was Head of Long-Range Forecasts in Climate Services from 2010 to 2020 and the public face of the Bureau’s seasonal climate outlooks. At the forefront of educating and communicating science to the primary industries sector of the Australian economy, Andrew has also provided targeted strategic advice to support emergency service partners and the federal Government.



Dr Andrew Watkins, awarded the 2022 AMOS Gibbs Medal for services to operational meteorology.

World Meteorological Organization’s IMO Prize

In June the Bureau’s former Chief Scientist, Dr Sue Barrell AO accepted the IMO Prize the World Meteorological Organization’s (WMO) 19th Congress in Geneva. The IMO Prize originates from the International Meteorological Organization, the predecessor to WMO.

Sue was the 67th recipient of the prize for her leadership in the development of the WMO’s Unified Data Policy, commitment to the cryosphere and her long and storied contribution to the WMO. Sue was also influential in the development of the WMO’s Gender Action Plan. Sue dedicated her award lecture to the causes of equity, diversity and inclusion.



Dr Sue Barrell AO, IMO Prize Recipient, delivering her lecture to the WMO Plenary (Image courtesy of the WMO).

World Meteorological Day – Long Service Awards

In March, the Bureau celebrated World Meteorological Day 2023, which commemorates the Convention establishing the World Meteorological Organization (WMO) coming into force in 1950. 2023 is also the 150th anniversary of WMO, highlighting the importance and longevity of the world’s meteorological community.

As part of World Meteorological Day celebrations, the Bureau recognised 8 staff members who have contributed more than 30 years of service to the Bureau and our customers.

Volunteer Rainfall Observer Excellence Awards

Manual rainfall observations are collected from across Australia and transmitted to the Bureau by around 4,600 volunteers who form an integral part of the Bureau's composite observations systems. The Bureau recognises the dedicated and sustained commitment of its long-serving volunteer rainfall observers by presenting them with excellence awards for 50 and 100 years of service.

In 2022–23, the following awards were presented:

- Mr R J Baines for 50 years of continual rainfall observations at West Haldon, Queensland (station 40424).
- Mrs Eileen Douglas for 50 years of continual rainfall observations at Benambra, Victoria (station 83064).



Mr R J Baines with his award for 50 years of continual rainfall observations.

Emergency Media and Public Affairs Awards

In June, the Bureau received a Highly Commended for Excellence in Emergency Communication (Community Engagement category) at the Emergency Media and Public Affairs (EMPA) Awards.

This award recognised the work undertaken by the Bureau to strengthen community safety through ties with Northern Territory (NT) Police Fire and Emergency Services and the NT Aboriginal Interpreter Service, and build capacity among interpreters to participate in media conferences in emergencies. This work came to fruition in March when floods hit the NT and, for the first time, emergency press conferences involving the Bureau included live interpreting in Gurindji, the Indigenous language spoken by the communities impacted by the flooding (see p.60).

Australasian Reporting Awards

The Bureau received a gold award for its Annual Report 2021–22 at the Australasian Reporting Awards in June and was shortlisted for the report of the year in the 'Public Administration – National' sector.

This award recognises the clarity, transparency and commitment of the Bureau's reporting and confirms that it continues to benchmark well against the annual reports of businesses and governments across Australia, New Zealand and beyond.



The cover of the Bureau's Annual Report 2021–22 with the Australasian Reporting Awards Gold Award Certificate.





Section 4: Organisational Management

Organisational chart

As at 30 June 2023





Business Solutions

Peter Stone

Agriculture and Water

Matthew Coulton

Aviation, Land and Maritime Transport

James Lannan A/g

Energy and Resources

Stephen Duggan

International Development

Andrew Jones

National Security and Space

Kristen Reeson A/g

Community Services

Piero Chessa

Decision Support Services

Chantal Donnelly

Environmental Prediction Services

Matthew Collopy

National Production Services

Michael Logan

CEO and Director of Meteorology

Andrew Johnson

Office of the CEO

Enterprise Services

Paula Goodwin

Business Management

Kate Dalton

Communications

Timothy McLean

Organisational Development

Tim Abrahams

Organisational Resilience

Astrid Heward

Portfolio Management

Ben Haydon

Strategy and Performance

Bronwyn Ray

Science & Innovation

Gilbert Brunet

Research

Bertrand Timbal

Research to Operations

Robert Argent

ROBUST

Nichole Brinsmead

Competency Centre & Transition

Stephen Furey

Program Integration

Richard McNulty

ROBUST Delivery Office

Peter Fattoush

Corporate governance

Corporate governance framework

The Bureau's corporate governance framework provides a sound basis for decision-making, defines mechanisms for accountability and stewardship, and supports the Bureau's strategic direction and leadership.

The framework is based on:

- the legislative foundation provided by the *Meteorology Act 1955*, the *Water Act 2007*, the *Public Service Act 1999*, and the *Public Governance, Performance and Accountability Act 2013* (PGPA Act)
- a clearly defined executive and management structure
- a comprehensive planning, performance and reporting framework
- various mechanisms for stakeholder input and review
- detailed financial and asset management policies, procedures and guidelines
- thorough risk management and fraud control strategies
- an Audit Committee and internal audit function to provide independent advice and assurance on the Bureau's activities.

Accountable Authority

The Bureau's Accountable Authority during the report period 2022–23 was as follows:

Name	Position title/ Position held	Period as the Accountable Authority or member within the reporting period	
		Start date	End date
Dr Andrew Johnson	Chief Executive Officer and Director of Meteorology	1 July 2022	30 June 2023

Executive and management structure

At 30 June, the Bureau comprised:

- the Executive Team (CEO and Director of Meteorology and 6 Group Executives)
- 5 Groups, comprising 22 programs, that are collectively responsible for delivering the Bureau's Strategy 2022–2027
- the Australian Climate Service
- the Public Services Transformation Program and the ROBUST Program
- 8 state and territory offices, located in the capital cities
- 28 field observing technical hubs across Australia, the offshore islands, and Antarctic Territory, as well as other specialist facilities.

In addition to the general group and program structure, several specialist roles are attached to senior positions, including:

- Chief Customer Officer, performed by the Group Executive, Business Solutions
- Chief Operating Officer and Chief Security Officer, performed by the Group Executive, Enterprise Services
- Chief Information and Technology Officer and ROBUST Program Director, performed by the Group Executive, Data and Digital
- Chief Scientist, performed by the Group Executive, Science and Innovation
- Public Services Transformation Program Director, performed by the Group Executive, Community Services
- Chief Engineer, performed by the General Manager, Observing Systems and Operations
- Chief Data Officer, performed by the General Manager, Data
- Chief Architect, performed by the General Manager, Planning and Architecture
- General Counsel and Chief Risk Officer, performed by the General Manager Organisational Resilience
- Chief Financial Officer
- Chief Information Security Officer
- Chief Statistician.

The Executive

The Bureau's Executive Team (the Executive) comprises the CEO and Director of Meteorology (Director) and 6 Group Executives. The role of the Executive is to consider and promulgate decisions on program, policy, financial and people management issues across the Bureau and to provide leadership under the authority of the Director as the Accountable Authority for the agency (under the PGPA Act). The Executive has responsibility for setting the Bureau's strategic policies and priorities and for optimising the use of its resources.



Dr Andrew Johnson

Chief Executive Officer and Director of Meteorology

Andrew was appointed Director and CEO of the Bureau of Meteorology in September 2016. He is Australia's Permanent Representative to the World Meteorological Organization in Geneva where he is also a member of the Executive Council. Andrew is also the accountable authority for the Australian Climate Service.

Andrew joined the Bureau from Johnson & Associates Consulting, a firm he founded to provide environmental and agricultural knowledge services nationally and internationally. For nearly a decade, Andrew was a member of the CSIRO Executive Team where he led the organisation's water, land, atmospheric, marine, biodiversity and urban research.

Andrew is a former Councillor of the Queensland Futures Institute, Non-Executive Director of Planet Ark Environmental Foundation, the Rural Industries Research & Development Corporation, Reef & Rainforest Research Pty Ltd and CSIRO Chile, where he was Deputy Chairman and Vice President. He served on the Australian Government's Independent Expert Scientific Committee on Coal Seam Gas & Large Coal Mining Development (IESC) from 2012 to 2017.

Andrew has a PhD from the University of Queensland and a master's degree from the Kennedy School at Harvard University. He is a Fellow of the Australian Academy of Technical Sciences and Engineering and the Australian Institute of Company Directors.



Mr Piero Chessa

Public Services Transformation Program Director and Group Executive, Community Services

Piero joined the Bureau in March 2020 after spending 13 years at the Boeing Company, where he held senior positions in operations and data science activities.

A physicist, Piero moved from theoretical physics to atmospheric dynamics and accepted the challenge to build a Regional Meteorological Service in Italy. He then moved to the European Centre for Medium-Range Weather Forecasts in the United Kingdom as a Senior Scientist and later joined the Boeing Company where he covered various senior management roles in the Digital Aviation Business division.

Piero combines a strong domain competence and an established experience in public services, with a deep and varied knowledge of operations in multinational corporations. Piero is the Bureau's Multicultural Access and Equity Champion.



Dr Peter Stone

Chief Customer Officer and Group Executive, Business Solutions

Peter joined the Bureau in July 2017. Peter's work in industry and government, in Australia and abroad, has focused on understanding customer needs and creating science-based partnerships and programs that meet them.

He has contributed to advances in policy, planning and practice in the fields of infrastructure, regional development, natural resource management and food processing. He has a master's degree in agriculture and a PhD from the University of Melbourne. Peter has a decade-long commitment to Scientists in Schools and is the Bureau's Indigenous Champion.



Ms Nichole Brinsmead

Chief Information and Technology Officer; Group Executive, Data and Digital; and ROBUST Program Director

Nichole commenced with the Bureau in February 2018 as Group Executive Data and Digital, and Chief Information and Technology Officer. In this position, Nichole is accountable for delivering the data, infrastructure and systems to underpin the Bureau's operations, from measurement and collection through to production and delivery.

In 2021, Nichole adopted responsibilities as ROBUST Program Director overseeing the comprehensive redesign of the Bureau's ICT systems and observing network focused on addressing security, stability and resilience risks. Nichole has had over 20 years' experience in a diverse range of roles across several business and technology domains in the financial services, higher education, professional services, emergency services and government sectors. This has included senior roles at PwC, ANZ and RMIT where she has had very significant leadership and management responsibilities in operational, solution delivery and engagement environments.

Nichole is the Australian National Representative to UNESCO IOC. Ms Brinsmead has an outstanding track record of delivery in complex operating environments both in Australia and overseas. She has led a number of successful enterprise-wide transformations that have resulted in significant uplifts in the Bureau's performance. Nichole is also the Bureau's Gender Equality Champion.



Dr Gilbert Brunet

Chief Scientist and Group Executive, Science and Innovation

Gilbert joined the Bureau in December 2018 after 12 years as Director of the Meteorological Research Division (MRD) of Environment and Climate Change Canada, which included a secondment as Director Weather Science at the UK Met Office (2012–15). Gilbert is responsible for the delivery of the Bureau's decadal Research and Development Plan 2020–2030 and has stewardship for the implementation of the Bureau's Innovation Framework.

Gilbert is recognised as an expert in weather and climate dynamics with a PhD in meteorology from McGill University (1989). Gilbert has also previously led the Numerical Prediction Research Section of Environment and Climate Change Canada. Gilbert is currently Chair of the WMO Scientific Advisory Panel and Chair of the UK Met Office's Scientific Advisory Committee. Gilbert previously chaired the Scientific Steering Committee of the WMO World Weather Research Program. Gilbert is the Bureau's Accessibility Champion and STEM Champion.



Ms Paula Goodwin

Chief Operating Officer, Chief Security Officer and Group Executive, Enterprise Services

Paula joined the Bureau in March 2020 and is responsible for human resources/organisational development, finance, health, safety, environment, government relations, corporate communications, strategy and performance, legal and commercial, product management and customer engagement, protective security and cyber security assurance, portfolio management, procurement, risk, assurance and audit. Paula is also the Chief Security Officer.

Paula has experience in leading corporate teams and supporting organisations through strategic and organisational transformations. She has previously worked with the Department of Agriculture, Water and the Environment and its predecessor the Department of Environment and Energy, as well as the Department of Immigration and Border Protection, the Australian Customs and Border Protection Service and the Australian Crime Commission.

Paula is a Fellow of the Australian Institute of Human Resources and has a Master of National Security Policy from the Australian National University, as well as a Master of Human Resource Management, a Graduate Certificate in Employment Relations, and Bachelor of Arts Information Management and Human Resource Management from the University of Canberra.



Ms Vicki Woodburn

Group Executive, Australian Climate Service

Vicki joined the Bureau in 2021 and leads the Australian Climate Service. She has had a distinguished track record of leadership in both the public and private sector. Her work has focused on improving resilience and profitability in Australian industries, communities and natural resources.

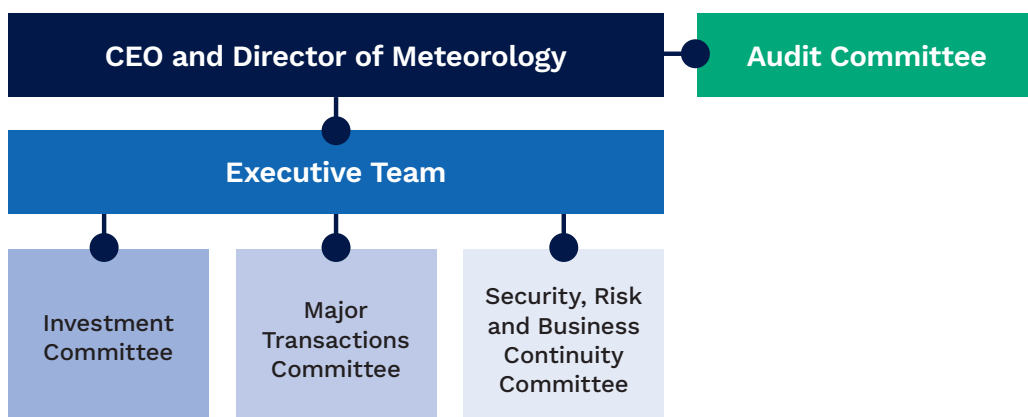
Vicki was previously part of the executive leadership team at the Murray-Darling Basin Authority (MDBA). She was instrumental in implementing complex water reforms and transforming its engagement, science and policy functions. Before joining MDBA, Vicki held technical and leadership roles with the Rural Industries Research and Development Corporation, private sector consulting businesses and the Australian Government's Department of Agriculture, Fisheries and Forestry. In these roles she led a range of cross-sector partnerships. These were in the areas of soils, climate change, rural policy, agricultural extension, digital innovation, and primary industry health and safety. Vicki has a Bachelor's Degree in Applied Science from the Australian National University. Vicki is the Bureau's LGBTQIA+ Champion.

Committees

The Bureau Executive is the highest-level decision-making body within the organisation. Executive meetings are chaired by the Director and held once per month.

The Executive is supported by 3 sub-committees: the Investment Committee, the Major Transactions Committee and the Security, Risk and Business Continuity Committee. Each committee is governed by a Charter of Responsibilities and is chaired by a member of the Executive. The Bureau's Audit Committee provides independent assurance on the Bureau's risks, controls and compliance.

In addition to the subcommittees, the Bureau's senior managers meet monthly to discuss key issues and progress. These Senior Leadership Team meetings involve the Director, Group Executives and General Managers.



The Investment Committee

The Investment Committee supports the Bureau Executive to develop organisational plans and translate strategic priorities into investment decisions. The Committee makes recommendations regarding the allocation of resources in alignment with the Bureau's Strategy, customer needs, statutory responsibilities and international and treaty obligations. The Committee also advises the Executive on performance against Group Plans and associated resource allocations. In 2022–23, the Investment Committee was chaired by the Chief Operating Officer.

The Major Transactions Committee

The Major Transactions Committee supports the Bureau Executive to direct and control the Bureau's involvement in major transactions and related matters to ensure alignment with the Strategy and to ensure value for money is achieved from Bureau investments. In 2022–23, the Major Transactions Committee was chaired by the Chief Customer Officer.

The Security, Risk and Business Continuity Committee

The Security, Risk and Business Continuity Committee supports the Bureau Executive to effectively manage strategic and operational risk, and advises on the effectiveness of security, business continuity and resilience arrangements. The Committee also ensures that security and business continuity activities are well planned and executed and that Bureau investments support organisational resilience. In 2022–23, the Security, Risk and Business Continuity Committee was chaired by the Chief Information and Technology Officer.

The Audit Committee

The Director of Meteorology convenes the Bureau of Meteorology’s Audit Committee in compliance with section 45 of the PGPA Act. The Audit Committee is governed by its charter (www.bom.gov.au/inside/BMAC_Charter_2019.pdf), which requires the Committee to review and provide independent assurance on the appropriateness of the Bureau’s financial reporting, performance reporting, system of risk oversight and management and system of internal control in accordance with section 17 of the *Public Governance, Performance and Accountability Rule 2014* (PGPA rule).

Collectively, Committee members possess the knowledge, skills and experience required to ensure these functions are appropriately performed. Throughout 2022–23, the Committee was chaired by Mr Matt Cahill.

The Audit Committee held 4 meetings in 2022–23. The Audit Committee considered financial and performance statements, provided advice on the Bureau’s assurance activities, reviewed the Bureau’s Internal Audit Plan and associated audit reports.

Audit Committee membership and meeting attendance

Member name	Qualifications, knowledge, skills or experience	Number of meetings attended/ total number of meetings	Total annual remuneration (GST inc.)	Additional Information
Mr Matt Cahill	Matt is a former Australian Public Service Deputy Secretary, with over 20 years’ experience as a senior executive in multiple Commonwealth public service portfolios. Matt has diverse experience in operational, program, regulatory, policy, corporate and assurance roles. Matt has held Chief Operating Officer and Chief Information Officer positions, as well as senior executive positions focused on financial capability and agency funding. He has deep audit experience, having overseen the performance audit program at the Australian National Audit Office. Matt is a Certified Practising Accountant with fellow status (FCPA), an Australian Institute of Company Directors graduate and a winner of the Chartered Accountants Australia and New Zealand leadership in government ‘Outstanding Contribution to Public Administration’ Award. He has a Master of Business Administration and undergraduate degrees in Economics and Science.	4/4	\$35,200	Nil

Member name	Qualifications, knowledge, skills or experience	Number of meetings attended/ total number of meetings	Total annual remuneration (GST inc.)	Additional Information
Ms Susan Friend	Sue is a Chartered Accountant with experience in business valuations, risk assessment and financial analysis. Sue provides consulting services to corporate, legal and regulatory clients through Sapere Research Group. She is also an experienced board director with board and audit committee roles in the public sector. Sue is currently a director of the Melbourne Market Authority and a member of Courts Council, the governing body of Court Services Victoria. She chairs the audit and risk committees of both organisations. Sue is a graduate of the Australian Institute of Company Directors.	4/4	\$26,400	Nil
Ms Paula Allen	Paula has over 25 years' experience across services, finance, technology, governance and strategy for business, government and international organisations. Paula is a Fellow Chartered Accountant, Chartered Financial Analyst, a Graduate Member of the AICD as well as holding their Advanced Diploma in Mastering the Boardroom. She has studied more broadly including across leadership, new technology, big data and ethics. She maintains various private clients.	4/4	\$20,000	Nil
Mr Mark Tucker	Mark is a former Australian Public Service Deputy Secretary. He worked in the portfolios of Agriculture, the Environment, Communication and the Arts, and Prime Minister and Cabinet. Mark has been involved in most of Australia's natural resource management priorities over the past 30 years, providing policy advice to governments and implementing significant funding programs and legislation. He has a Bachelor of Science (Hons) majoring in marine zoology, and early in his career conducted research in Antarctic coastal marine ecosystems.	2/2	\$12,000	Term concluded 31 December 2022

Member name	Qualifications, knowledge, skills or experience	Number of meetings attended/ total number of meetings	Total annual remuneration (GST inc.)	Additional Information
Mr Daniel McCabe	Daniel is First Assistant Secretary at the Australian Government Department of Health. Daniel leads the policy platform for Australia's national digital health agenda and works with the Australian Digital Health Agency to implement digital health solutions for individuals and clinicians. In his role, Daniel is also responsible for protecting the integrity of Australia's Medicare payments to health providers through prevention, identification and treatment of incorrect claiming, inappropriate practice and fraud by providers, corporates and their employees and approved suppliers. Daniel has previously held the role of Chief Information Officer for Health. Daniel has a Bachelor of Information Technology and majored in media studies.	2/2	Nil	Term concluded 31 December 2022
Mr Peter Qui	Peter is the Chief Information Officer at the Department of Finance. He has been delivering ICT systems and solutions for over 30 years, primarily in the Social Services portfolio of the Australian Government. This has featured roles in design, implementation, assessment, development and risk management of nationally significant programs of work. His experience includes administering the core ICT systems underpinning Centrelink, Medicare, Child Support and Aged Care (including their delivery of disaster support payments across COVID-19, bushfires and flood events); managing Machinery of Government integration of departments; leading the development of the Whole-of-Government grants capability; and managing the ICT solution implemented for the Aged Care Gateway.	1/1	Nil	Term commenced 1 May 2023

Partnerships

The Bureau partners with Australian Government agencies to deliver common outcomes. At 30 June 2023, these partnership arrangements include:

- the Australian Climate Service partnership with the CSIRO, the Australian Bureau of Statistics and Geoscience Australia (established through a head agreement between the 4 parties)
- a strategic partnering agreement for the provision of meteorological and oceanographic services to support the Department of Defence

- memorandums of understanding with a range of Defence stakeholders, including: the Navy, Army and Air Force, Headquarters Joint Operations Command, Defence Estate and Infrastructure Group and the Defence Science and Technology Group
- a memorandum of understanding and agency agreement with Airservices Australia
- strategic relationship agreements with keystone energy sector organisations including the Australian Energy Market Operator, Powerlink Queensland and Hydro Tasmania
- a strategic agreement with the Climate Change Authority
- a memorandum of understanding with the Australian Antarctic Division
- a memorandum of understanding with CSIRO and the Australian Nuclear Science and Technology Organisation in the context of the Australian Antarctic Program
- a collaborative relationship understanding with CSIRO
- a collaborative head agreement with Geosciences Australia
- a strategic relationship agreement with the Queensland Department of Transport and Main Roads
- an unincorporated joint venture with the University of Tasmania as Lead Agent for the Integrated Marine Observing System (IMOS)
- an Intergovernmental Agreement between the Bureau and all state and territory emergency services agencies.

Corporate planning and evaluation

At the highest level, the Bureau's future direction is guided by the Strategy 2022–2027. The Strategy is a blueprint for the future direction of the Bureau and guides all other planning and performance activities. The Strategy outlines the Bureau's strategic objectives, actions and success measures.

The Corporate Plan 2022–23 was published on the Bureau's website in August. Prepared in accordance with requirements of the PGPA Act, the Plan set out the Bureau's priorities, planned achievements and success measures for 2022–23 and the outlook to 2025–26.

Operational planning within the Bureau is undertaken at group and program levels. The evaluation of performance against plans is an important component of the annual planning cycle. Progress against the Bureau's success measures is regularly monitored through reports to the Bureau Executive. Overall performance against the success measures for 2022–23 is presented in the Annual Performance Statement (see p.33).

Risk management approach

Effective risk management plays a key role in shaping the Bureau's strategic direction and successfully delivering on its purpose: To provide trusted, reliable and responsive weather, water, climate, ocean and space weather services for Australia – all day, every day. Failure to effectively identify, assess, treat and monitor risk may adversely impact customer experience and outcomes, the Bureau's reputation and financial position.

During 2022–23, the Bureau achieved a significant increase in risk management maturity, evidenced by improved Comcover Risk Benchmarking Program results across all areas of focus between 2021 and 2023.

This was achieved through implementing the Bureau's Risk Management Framework, which sets out the Bureau's consistent, standardised approach to risk assessment and management, supported by policies, procedures and tools. Risks are identified, assessed, treated, monitored and reported in accordance with the framework.

The Bureau manages 15 enterprise risks across 8 risk categories. Enterprise risks are owned and managed by the Executive and are defined as those risks with the greatest potential to affect the Bureau's achievement of its mission and strategic objectives.

Risk category	Key risks
Customer impact and value	Quality and reliability of products and services risk Product and service innovation risk
Health and safety	Staff safety and wellbeing risk
Security	Cyber security risk Physical security risk Personnel security risk
Legal and regulatory	Legal and regulatory non-compliance risk
Financial	Fraud risk External budget allocation risk Internal budget management risk
Reputation	Reputational damage risk
Systems and assets	Systems and asset disruption risk Technological innovation risk
Workforce	Workforce availability risk Workforce attraction and retention risk

Oversight of the Bureau's risks, associated controls and treatment strategies is managed through regular reporting to the Executive, the Security, Risk and Business Continuity Committee, and the Audit Committee.

Climate risk management

The Bureau is responsive to the threat of climate change and is engaged with organisational and whole-of-government initiatives to manage climate risks and opportunities.

Under the Bureau's Risk Management Framework, climate change is considered in relation to the following:

- risks from changes to our customers' appetite for products and services (forecasts, warnings, water, climate)
- increased risks to our operations and infrastructure from severe weather (for example, property damage, impact on instrument tolerance)
- increased risks to staff safety (for example, heat exposure and fatigue)
- risks associated with our contribution to carbon emissions.

The Bureau will continue to consider its climate risk disclosure obligations as part of the implementation of the Australian Government's Climate Risk and Opportunity Management Program.

Resilience

Through delivery of its Strategy, the Bureau contributes to a safe, prosperous, secure and healthy Australia. As part of the Bureau's mission statement – to provide services all day, every day – the organisation must be able to continue to provide critical products and services, and protect our people and assets, in the face of any disruption.

During a business disruption, effective and timely action and communication, both within the Bureau and to external customers, helps to protect lives, service the community and uphold the Bureau's long-term integrity and reputation.

Continuing to strengthen, mature and expand the Bureau's resilience and business continuity capacity is a key focus for the organisation. Continued efforts to uplift Bureau business continuity maturity are improving the organisation's overall capability to effectively respond to, and recover from a disruptive incident, regardless of its cause, size, location or complexity. Business continuity and incident management arrangements were updated during the year and have been established to support the Bureau's response to any disruptive event, ensure continual improvement, and embed lessons learned across the organisation.

Fraud control

The Bureau's Fraud Control Plan provides the basis for its fraud prevention, detection and investigation activities in compliance with the Commonwealth Fraud Control Framework and section 10 of the PGPA Rule. The Bureau conducts fraud risk assessments annually in order to inform appropriate responses.

The Bureau uses various strategies and mechanisms to prevent fraud including:

- independent assurance from the Audit Committee to the Director of Meteorology about fraud control
- mandatory online induction training modules for staff including on accountable and ethical decision-making; ICT Security; and APS Values, Code of Conduct and employment principles
- financial delegations requiring co-authorisation of spending and assurance that spending is within the approved budget
- involvement in Commonwealth fraud prevention and anti-corruption activities including information sharing, education and training through the Commonwealth Fraud Prevention Centre.

The Bureau has several mechanisms in place to detect any potential fraud incidents, including:

- the Bureau's internal auditors undertaking historical financial ledger audits to identify and report any concerns in transactional behaviour by employees or contractors
- scrutinising a vendor master listing and ledger and verifying listed or disclosed business registrations with the Australian Taxation Office and the Australian Securities and Investment Commission
- an audit tool within the Bureau's expense management system to highlight outliers and enable the investigation of items of concern
- the Australian National Audit Office auditing the Bureau's financial statements
- periodic audits of purchasing cards, expense management and other sources of fraud risk
- regular financial compliance monitoring and reporting.

Where the Bureau determines that an allegation of potentially fraudulent activity needs to be investigated, it will:

- follow the Australian Government Investigations Standards 2022 for all fraud investigation activities
- investigate the allegation using an internal (or outsourced) investigation officer or through referral of serious or complex fraud matters to the Australian Federal Police
- maintain a fraud register for the purposes of registering possible fraud incidents. All known incidents are investigated, and any material matters are formally reported to the Bureau's Audit Committee.

External scrutiny

The following matters were dealt with in 2022–23, with the Bureau providing submissions and/or evidence to the:

- New South Wales Government's 2022 NSW Flood Inquiry
- Parliament of New South Wales Select Committee on the Response to Major Flooding across NSW in 2022
- South East Queensland Rainfall and Flooding Event February to March 2022 Review
- Parliament of Victoria's Inquiry into the 2022 Flood Event in Victoria
- Joint Select Committee on Northern Australia – Cyclone Reinsurance Pool Inquiry
- Senate Select Committee on Australia's Disaster Resilience
- Standing Committee on Regional Development, Infrastructure and Transport – Inquiry into the implications of severe weather events on the national regional, rural, and remote road network.

The Bureau also provided assistance and evidence to several law enforcement and regulatory agencies in respect of investigations and prosecutions.

Freedom of information

Entities subject to the *Freedom of Information Act 1982* (FOI Act) are required to publish information to the public as part of the Information Publication Scheme (IPS). Part II of the FOI Act requires each agency to display on its website a plan showing what information it publishes in accordance with the IPS requirements. The information provided by the Bureau in response to the IPS is available at: www.bom.gov.au/foi/ips.shtml.

In 2022–23, the Bureau received 51 requests under FOI and carried over 5 requests from 2021–22. Of these, 54 were completed by 30 June 2022 and 2 remained in progress.

Corrections

From its prior year financial statements, the Bureau recognised errors related to the incorrect application of accounting standards. The financial statements (p.228) provide more detail on the prior period errors.

In its 2021–22 Annual Report, the Bureau stated its employee turnover rate of 14.1% was 2.5% lower than in 2020–21 (p. 163). The correct rate of change is 2.5% higher.

In its 2020–21 Annual Report – under Organisations receiving a share of reportable consultancy contracts – the expenditure reported for Elm Communications should have been listed as \$88,861, not \$937,095 (p.151).

Corporate responsibility

Responsibility to the Australian community

Inherent in its vision and mission, the Bureau has a responsibility to the Australian community to support a safe, prosperous, secure and healthy Australia. The Bureau's focus is on providing trusted, reliable and responsive weather, water, climate, ocean and space weather services that benefit the Australian community and drive competitive advantage for business and industry.

The Bureau is accountable to the Australian Government for fulfilling its legislative mandate with the resources invested in it but is ultimately answerable to the Australian community. Under the *Meteorology Act 1955*, the Bureau performs its functions largely in the public interest as well as for sectors such as defence, shipping and aviation, and in support of primary production, industry, trade and commerce.

Throughout 2022–23, the Bureau continued to provide warnings, forecasts, information and advice on which Australians depend – providing round-the-clock services to support informed decision-making by governments, emergency services, industry and the community. The value of these services is expanding as Australians become increasingly vulnerable to a range of severe weather events due to changes in climate, population, settlement patterns and the growth of infrastructure.

The Bureau's services are particularly crucial when conditions are extreme. The organisation continues to assist Australians to better manage the impacts of their natural environment, including drought, floods, fires, storms, tsunamis and tropical cyclones. The Bureau's warnings and advice to the emergency services support essential decision-making when people and property are under threat.

In fulfilling its duties, the Bureau remains committed to:

- providing the best possible information about Australia's weather, climate, water, oceans and space weather
- providing timely information to allow planning and response to impending critical events
- presenting information clearly, using plain English and easy-to-understand graphics, and making it accessible to vulnerable communities
- meeting increasing user expectations by incorporating relevant advances in science and technology, and enhancing its products and services in line with community needs
- identifying any limitations in its products and services, and providing information regarding the source, reliability, completeness and currency of any data supplied
- notifying users of service changes and interruptions at the earliest opportunity.

National outreach

The Bureau has continued to improve its delivery of weather, water, climate, ocean and space weather services to the Australian community. 2022–23 was the second year of the Bureau's new operating model, created under the Public Services Transformation Program to produce a more responsive and resilient organisation that can more flexibly mobilise its full capabilities to respond to weather threats and community needs. The Bureau's presence and capability within Australia's states and territories remains vital to how services are delivered, integrating local knowledge into Bureau services and focusing on local and regional needs. This is especially crucial given the variation in climate patterns across Australia (see map on p.162).

The Bureau's Decision Support Services Program leads national, regional and local community engagement in hazard preparedness and response, with a focus on the emergency management sector and key Australian Government stakeholders. The program has staff deployed across 3 regions: East (New South Wales, the Australian Capital Territory and Queensland), South (Tasmania, Victoria and South Australia) and North and West (Western Australia and the Northern Territory). Staff work alongside state and local governments and emergency service agencies as part of the emergency management and disaster mitigation networks within their respective jurisdictions. This includes outposted decision support staff within several combat agencies and emergency management centres providing direct access to the Bureau's expertise and specialisation.

At the national level, the Hazard Preparedness and Response (HPR) National Operations Support unit embedded in the National Situation Room delivers tailored services encompassing weather, climate and hydrology supporting the National Emergency Management Agency to deliver services to the Australian Government and the wider community. Routine services such as presentations and briefings are supplemented by on-request services when severe or extreme hazardous events occur. The HPR National Operations Support unit works as part of the Australian Climate Service delivering integrated impact services to the Australian Government's National Situation Room (see p.132).



Northern Territory

The Top End of Australia has a tropical climate characterised by a wet season from October to April and a dry season from May to September. At different times of the year, parts of the Northern Territory experience severe thunderstorms, wildfires and widespread flooding. All coastal areas are subject to tropical cyclone landfall.



Western Australia

Western Australia is susceptible to a wide range of severe weather events all year round. The warmer months are characterised by heavy rain, tropical lows and cyclones in the north, and extreme heat and bushfires in the south. During the cooler months, bushfires occur in the north while cold fronts with destructive winds and heavy rain are common in the south.



South Australia

South Australia's climate is characterised by relatively hot and dry summers featuring heatwaves, bushfires and thunderstorms with damaging winds, large hail and flash flooding. In the south of the state, cold fronts and low pressure systems in the winter months bring cold, wet and windy conditions. Across the inland north of the state winters are mild but often dry. Rainfall in these parts is usually sporadic and can be driven by tropical systems in the summer and northwest cloud bands in the winter.



Tasmania

Tasmania's location in the path of the 'roaring forties' westerly wind belt brings heavy and reliable rain to the western half of the island and much warmer and drier conditions to the sheltered east coast. Snow can fall any time of year in the highlands, but summer heatwaves and windy weather fronts bring dangerous fire conditions to the east and south.





Queensland

The meteorology of Queensland extends from the deep tropics through to temperate and arid regimes, and encompasses coastal waters that include the Great Barrier Reef, the Torres Strait Islands and the eastern Gulf of Carpentaria. The large and dispersed population is vulnerable to risks posed by tropical cyclones, flooding, severe thunderstorms and bushfires. The State's strong agricultural sector grapples with droughts and other broadscale impacts of climate.



New South Wales

The diversity of New South Wales' weather and climate reflects its many landscapes; from the highest alpine areas in Australia to some of the country's most productive agricultural areas to its offshore islands. New South Wales is often affected by heatwaves, drought, bushfires (and their smoke), intense coastal storm systems, severe thunderstorms and hailstorms. Weather on the coastal strip is influenced by the steep coastal escarpment and ranges, which accentuate heavy rains and bring major flooding to coastal rivers.



Victoria

Victoria is renowned for its very changeable and challenging weather events. These include heatwaves, extreme fire weather, and the effects of bushfire smoke in summer; damaging winds from winter storms; and rain, severe thunderstorms, and floods in all seasons. Victoria is also vulnerable to thunderstorm asthma events, when the right weather conditions and fine grass pollen can combine to cause acute asthma episodes.



Public education and community engagement

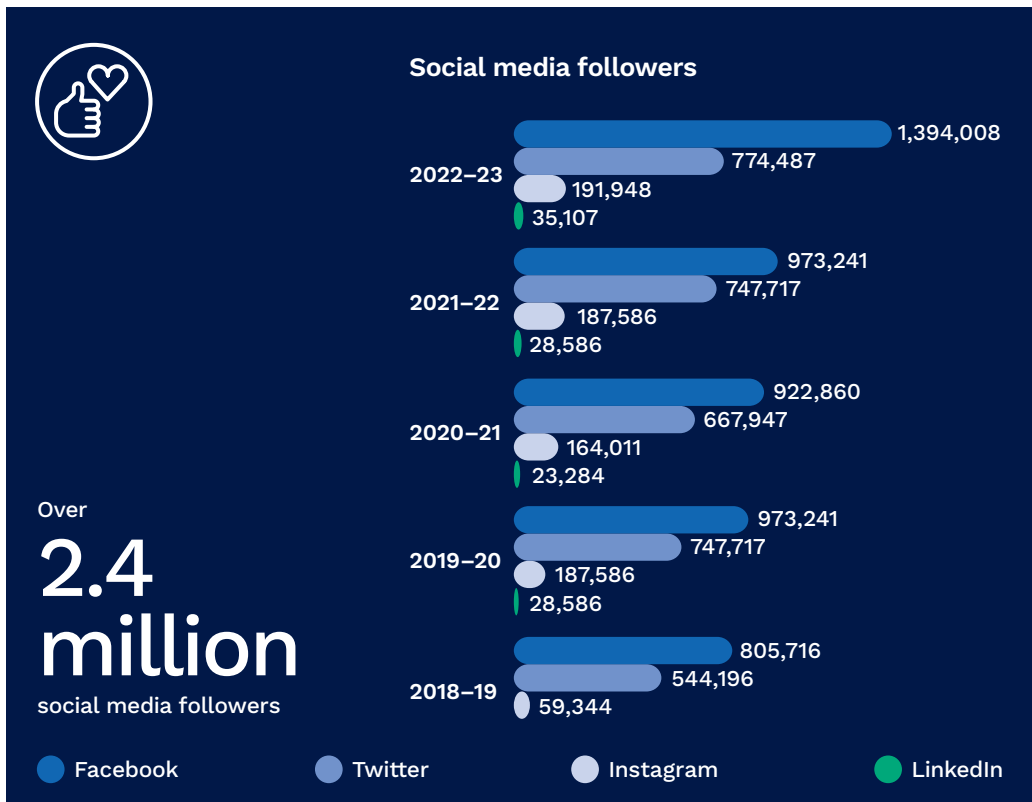
Helping Australians understand and use its products and services is one of the Bureau’s core responsibilities under the Meteorology Act. The aim is to give Australians timely weather, water, climate, ocean and space weather information, education and updates across a range of channels, particularly when conditions put lives and property in danger.

Through a prolonged severe weather season, the Bureau’s structured and agile approach to communicating with customers in impacted communities across multiple states was clear and timely. In collaboration with governments and key emergency services partners across states and territories, the Bureau’s advice was clear, informative and action oriented.

During 2022–23 the Bureau responded to over 5,450 media enquiries, issued more than 139 media releases and published over 5,500 posts, videos, and Instagram stories to keep the community informed on a range of topics and events. The Bureau also continued to engage with Indigenous media outlets to assist in communicating severe weather events to Indigenous communities.

Throughout the year, the Bureau’s social media channels proved especially effective for promoting public safety campaigns on the risks and impact of severe weather as well as building understanding of hazards and our forecasting and warning services. Messaging was amplified during severe weather events such as the floods in New South Wales, Victoria and Tasmania in October, tropical cyclones Ellie, Ilsa and Freddy during the summer months and the Lord Howe Island tsunami warning in May.

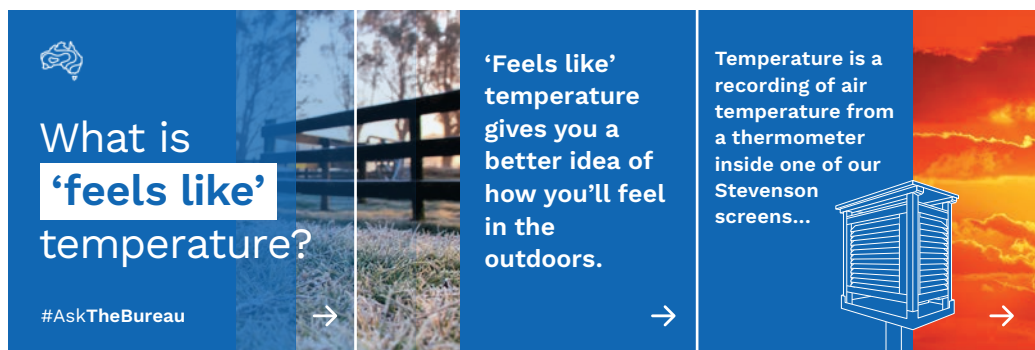
The steady growth in engagement across the Bureau’s social media platforms continued – as of 30 June 2023 the Bureau had over 2.45 million followers in total. Followers increased across all platforms, with LinkedIn up by more than 22.8%, Twitter by more than 3.6% and Facebook by 2.6%. For Instagram, a focus on using images with a human element to demonstrate the impact of weather on the lives of Australians saw numbers grow by more than 2.3%.



The Bureau works closely with traditional media and emergency partners to ensure that communication with the Australian community is timely and accurate and that forecasts and warnings are broadcast widely. Staff interact with a broad range of stakeholders and provide a focal point for the delivery of services to local industry and government customers, supporting the Bureau's sectoral leaders to engage with customers and provide high-quality and clear information.

The Bureau also supports the community in understanding and responding to weather and related phenomena through its Weather Connect customer service centre and through direct information emails to customers.

During 2022–23, the Bureau of Meteorology Training Centre continued its public education program in delivering 21 Introduction to Meteorology courses to members of the public and key stakeholders. The courses provide expert insight into weather fundamentals and weather information, helping to inform decision-making.



Instagram post explaining the 'feels like' temperature

Stakeholder participation

Third-party participation in the Bureau's policy formulation and service provision is facilitated through:

- the Australia–New Zealand Emergency Management Committee and its working subcommittees (Community Outcomes and Recovery, Mitigation and Risk) and related groups including the Australian Tsunami Advisory Group, the National Flood Risk Advisory Group, the Australian Tropical Cyclone Advisory Group, and the National Heatwave Working Group
- AFAC (the Australasian Fire and Emergency Services Authorities Council)
- the Bureau of Meteorology Hazards Services Forum
- the Jurisdictional Reference Group on Water Information
- state and territory consultative committees for flood, marine, and climate
- consultative meetings with private meteorological service providers, the aviation industry and Defence
- state, territory and local government emergency management and disaster mitigation committees
- Australian Government and regional international development programs
- intragovernmental forums on water and energy management
- national research and science forums and programs.

The Bureau's Hazards Services Forum continues to demonstrate the productive collaboration between the Bureau and our federal, state and territory emergency management partners. Co-chaired by the Bureau and the National Emergency Management Agency, the Hazards Services Forum provides the opportunity for senior emergency services representatives to provide forthright feedback on the current and future direction of the Bureau's hazards services.

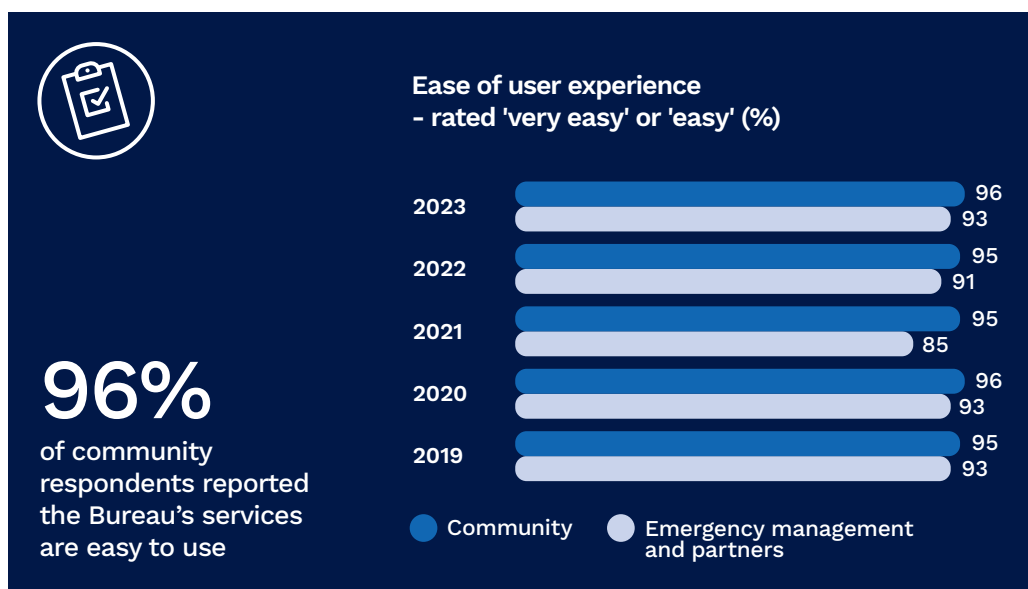
The forum did not physically meet within the 2022–23 period, however, out-of-session work drove several key projects that are critical in helping our partners provide essential preparedness, response and recovery services to the Australian public. These included the Australian Smoke Dispersion System, Australian Fire Danger Rating System and National Heatwave Warning Services. A highlight of the forum this year was the constructive feedback received from member agencies on tropical cyclone, storm tide and flood products. In 2022–23, the Bureau extensively consulted with Hazards Services Forum member agencies as well as other key stakeholders as part of the review of the *Intergovernmental Agreement on the provision of Bureau of Meteorology Hazard Services to the States and Territories* (see p.56).

Customer feedback and response

The Bureau uses a range of surveys and feedback mechanisms to ensure its products and services meet the growing needs of its customers. In 2022–23, the Bureau monitored and evaluated feedback from general community and emergency management customers and partners, focusing on the 4 performance areas of preference, experience, impact and reputation.

Four community surveys were undertaken in September, December, March and June, helping to identify areas for improvement and inform service development. Overall performance was largely consistent with the previous year's results. The surveys of more than 1,500 community users found that Bureau products and services are continuing to provide a positive experience, with the experience score of 81% in 2023 (compared with 79% in 2022). 96% of community users rated their most recent experience with the Bureau as 'easy' or 'very easy', compared with 95% in 2022.

Community users also reported high levels of satisfaction across all aspects of the Bureau's services, including with the convenience of getting information (79%), the clarity of information (78%) and speed of accessing information (78%).



A survey of more than 200 emergency management customers and partners was undertaken in May. When compared with 2022, performance in 2023 was largely consistent in the areas of experience and impact, with an increased rating reported for preference and a decreased rating for reputation. The 2023 survey found that 87% of emergency management customers and partners who used the Bureau's services in the past month said that service helped them do what they needed to do to a 'great' or 'very great' extent, compared with 86% the previous year. 93% of emergency management customers and partners rated their most recent experience as 'easy' or 'very easy', compared with 91% in 2022.

Emergency management customers and partners also reported high satisfaction with the services provided by Bureau staff, with 90% satisfied with their professionalism. These results continue to highlight the significance that Bureau products and services have in helping to facilitate the important roles of these customers.

The Bureau uses the net promoter score index (ranging from -100 to +100) as a way of gauging the willingness of its customers to recommend products or services to others. In 2023, the Bureau's forecast and warning service achieved an average net promoter score of +47 from community customers and +58 from emergency management customers and partners. These results are around the top quarter of the range of possible scores, indicating strong customer satisfaction and loyalty. For community customers, their belief that the Bureau acts in the best interest of all Australians was strongly linked to their likelihood to recommend its services. For emergency management customers and partners, this was linked to their trust in the Bureau's ability to provide accurate forecasts and its effectiveness in its role as Australia's national forecaster. More survey results are included in the Annual Performance Statement (see p.33).

As at 30 June 2023, the BOM Weather app was used by over 1.3 million users on average each day and recorded an average rating of 3.8 in the Google Play Store and 4.5 in the Apple App Store (compared with 4.4 and 4.5 respectively in 2021–22). Over 521,000 items of feedback on the app were provided to the Bureau in 2022–23 across 4 categories, including:

- technical issues
- customer experience
- data accuracy
- feature or enhancement requests.

This feedback enabled the Bureau to prioritise enhancements to the app, including features such as 'dark mode', warnings notifications, a 90-minute rain radar forecast and technical defect fixes (see p.94).

The Bureau continued to enhance its approach to gathering and reporting feedback from its digital channels in 2022–23, including through:

- triggering a customer satisfaction notification in the BOM Weather app for users to easily and seamlessly submit feedback
- refining the reporting of insights on customer feedback using natural language processing.

At 30 June 2023, the Bureau's online research community had 2,477 registered testers and BOMIdeas was used to invite customers to participate in online surveys and testing to provide feedback on potential service enhancements or ideas.

Employing user-centred design to ensure customer-centric services

The Bureau continues to utilise user-centred design (UCD) practices to ensure that new and enhanced products and services deliver maximum value and impact to customers. In 2022–23, UCD practices were successfully deployed in the Water and Agriculture Program to deliver key Australian Government investments.

The Murray-Darling Basin Water Information Portal (MDBWIP) is an output of 2 government investments – the northern Murray-Darling Basin Remote Sensing and Hydrometric Funding Program and a 2019 election commitment to improve understanding of water availability in the Murray-Darling Basin. The first version of the MDBWIP was released in 2021 and was designed to meet needs identified through the Murray-Darling Basin Authority (MDBA) and Bureau research. Four subsequent versions have been released, each of which responds to customer feedback and testing of features in a face-to-face format with a diverse group of users. This process has facilitated ongoing engagement with community representatives who can see their needs met through product enhancements.

Similarly, the Climate Services for Agriculture (CSA) program has seen enduring relationships formed with customers and the development of high-quality tools that directly meet customer needs. CSA is funded by the Future Drought Fund and has been delivered in partnership with the CSIRO. It provides climate and resilience information through an interactive, digital platform tailored to the needs of farmers, the broader agriculture sector and regional communities. Features have continuously been added and changed in response to user testing.

International engagement

International cooperation is an essential and integral part of the Bureau's operations. Through reciprocal relationships and knowledge-sharing with countries and agencies around the globe, the Bureau leverages scientific expertise and technological and operational developments and collects and exchanges information critical for monitoring and predicting the state of the atmosphere and hydrosphere.

The Bureau is deeply engaged in international activities that provide direct and indirect benefits to the organisation and to the broader Australian and international community. Through these activities, the Bureau continues to build its profile and reputation, foster goodwill with key partners and strengthen its skills, capabilities and knowledge base.

In 2022–23, the Bureau made important contributions on behalf of Australia to the activities of the World Meteorological Organization (WMO) including the development and adoption of a new Unified Data Policy that will strengthen the exchange of observations data and in turn enhance the quality of global weather, water and climate modelling. It also met its obligations under the Meteorology Act, international treaties and agreements including the provision of aeronautical meteorological services on behalf of Australia as the designated authority under the International Civil Aviation Organization. As Australia's representative to the United Nations Educational, Scientific and Cultural Organization's (UNESCO) Intergovernmental Oceanographic Commission (IOC), the Bureau continued to engage with and represent the interests of Australian marine science stakeholders in IOC activities including the UN Decade of Ocean Science for Sustainable Development (2021–2030).

The Bureau has several bilateral and multi-lateral agreements with overseas agencies and actively cooperated throughout 2022–23 with counterpart meteorological and hydrological agencies in the United States, United Kingdom, Japan, South Korea and New Zealand. These collaborations focus on mutual and complementary fields of technical and scientific expertise and included the

Bureau’s ongoing partnership with Japan Meteorological Agency to strengthen the capability of meteorological satellites to respond to severe weather events and bushfires (see p.96).

Australian aid-funded capacity development programs represent a significant component of the Bureau’s international activities and the Bureau has a long history of supporting counterpart meteorological and hydrological services in the Pacific. These engagements strengthen organisational capabilities and skills and contribute to broader whole-of-government objectives. In 2022–23, the Bureau has worked closely with its Pacific partners to devise the Weather Ready Pacific roadmap for strengthening the region’s weather and climate resilience (see p.82).

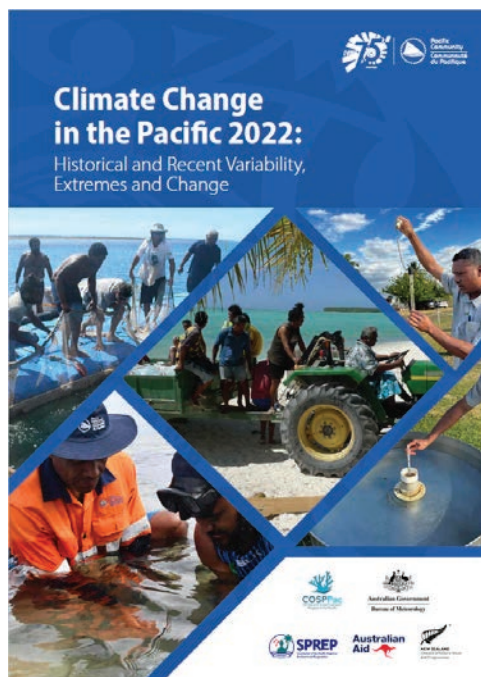
An important part of this work is the Bureau’s involvement in the Australia and New Zealand-Aid-funded Climate and Ocean Support Program in the Pacific Phase 2 (COSPPac2) – a foundational climate information services sub-program of the Australia Pacific Climate Partnership. Other aid-funded activities have included capacity building work with Papua New Guinea, Tonga and Samoa.

Understanding the extent of climate change in the Pacific

The Climate and Oceans Support Program in the Pacific (COSPPac) forms an important part of the Bureau’s work to grow national and international partnerships aligned with Australia’s national interest. It aims to enhance the capacity of Pacific Islands to manage and mitigate the impacts of climate variability and tidal events.

The Bureau’s Pacific Climate Services team took part in an online launch of the *COSPPac Climate Change in the Pacific 2022 Historical and Recent Variability, Extremes and Change Report* with Pacific partners in January. Over 200 people registered to attend from 21 different countries.

Pacific communities experience extreme events such as droughts, tropical cyclones, coastal and river flooding, and coral bleaching – which can have devastating impacts.



COSPPac Climate Change in the Pacific 2022 report

The report was produced in response to a request from leaders at the 15th Pacific Islands Forum in Funafuti in 2019 for increased support and assistance for Pacific-led, science-based initiatives intended to improve their understanding of risk and vulnerability.

The report provides country-specific historical climate change science information for 15 Pacific Island countries or territories. It focuses on average and extreme rainfall, air temperature, tropical cyclones, sea (ocean) surface temperature, sea level and ocean waves – aspects of Pacific climate most important to Pacific communities.

The Bureau and co-authors noted a significant decline in the availability of high-quality Pacific Island data and metadata. While this doesn’t compromise the quality of the 2022 report, it does mean the analysis is limited geographically and historically. Unless urgent action is taken, data availability will continue to decline limiting the region’s ability to understand Pacific-specific climate change.

Diversity and inclusion

The Bureau strives to be the model of an inclusive culture where diversity of thought and background is valued to provide better outcomes for staff, customers and the community. Success is based on creating an inclusive environment where people feel respected and valued, share a sense of fairness and of belonging, and are encouraged to make a unique and meaningful contribution.

The Bureau values the diversity of its staff, respecting differences that include – but are not limited to – gender, ethnicity, religion, age, ability or disability, sexual orientation, language, skills, experience, education, industry sector and thinking approaches.

The Bureau brings its commitment to life by:

- developing and promoting an equitable, respectful and inclusive workplace culture where staff are engaged, are valued for their uniqueness and feel like they belong
- bringing together people with different backgrounds and ways of thinking, which helps to drive better decision-making, innovation and overall performance
- ensuring recruitment from the broadest talent pool that reflects the Bureau’s customers and communities with which it works
- supporting the use of flexible work arrangements at all levels to enable staff to balance their personal and professional commitments.

During Harmony Week, the Bureau celebrated multiculturalism, inclusiveness, respect and belonging for all Australians, regardless of cultural or linguistic background. In offices across the country, staff gathered to hear stories from colleagues who have migrated from countries around the world to make Australia their home. Exploring the Harmony Week theme of ‘everyone belongs’, staff shared their own cultural and religious traditions and spoke of their experiences of being welcomed to Australia and the Bureau.

Several staff events were held throughout 2022–23 to foster diversity and inclusion within the Bureau (see p.119).



Wesam Al-Sudani, Technology Operations Manager (left) and Jayaram Pudashine, Precipitation Nowcast Scientist (right) with Piero Chessa, Group Executive of Community Services Group (centre) at a Harmony Week event in Melbourne.

Disability reporting

Australia's Disability Strategy 2022–2031 is the overarching framework for inclusive policies, programs and infrastructure that will support people with disability to participate in all areas of Australian life. The Disability Strategy sets out where practical changes will be made to improve the lives of people with disability in Australia. It acts to ensure the principles underpinning the United Nations Convention on the Rights of Persons with Disabilities are incorporated into Australia's policies and programs that affect people with disability, their families and carers. All levels of government have committed to deliver more comprehensive and visible reporting under this Strategy. A range of reports on progress of the Disability Strategy's actions and outcome areas will be published and available at: www.disabilitygateway.gov.au/ads.

Disability reporting is included the Australian Public Service Commission's State of the Service reports and the APS Statistical Bulletin. These reports are available at: www.apsc.gov.au.

Ethical standards

The Bureau supports a safe, inclusive and respectful work culture that reflects the diversity of the community it serves. It operates within the context of Australia being a signatory to the 7 key human rights treaties, with human rights being protected and promoted through domestic legislation, policies, practices and independent bodies. The Bureau undertakes a range of activities to meet this commitment, including:

- promoting APS Values, Code of Conduct and Employment Principles, and awareness of workplace discrimination, through communication with staff, training and induction packages for new employees
- endorsing the Public Interest Disclosure Framework, through communication with staff and supporting policy documents
- supporting the Commonwealth Child Safe Framework which sets the minimum standards for creating and maintaining a child safe culture and practice in Australian Government entities
- providing an online training course entitled APS Values and Code of Conduct at the Bureau, which covers topics such as accountable and ethical decision-making
- providing employees with access to information on ethical standards via the intranet, and through the APS Commission's website
- issuing APS Code of Conduct guidelines for Bureau staff, and providing guidance and policies with respect to duty of care, making public comment, conflicts of interests and the performance of outside work/employment
- developing a new Unacceptable Behaviours and Complaint Handling Procedure to complement the existing procedures that document the ethical standards expected of staff
- reviewing and refreshing the established internal Harassment Contact Officer network, ensuring that these Officers are appropriately trained with access to relevant support material
- initiating disciplinary processes, including counselling and investigations when allegations relating to breaches of the APS Code of Conduct were reported
- making available a review-of-action process, as provided for in section 33 of the *Public Service Act 1999*, to aggrieved employees
- initiating investigation processes into disclosures received under the *Public Interest Disclosure Act 2013*
- initiating a review and uplift of Bureau integrity arrangements, in support of the Government's integrity agenda and the establishment of the National Anti-Corruption Commission (NACC).

Supporting sustainable development

The Bureau recognises the opportunity and privilege it has to support sustainable development in Australia and beyond, contributing to prosperous, fair, healthy and sustainable communities. Both in the way it conducts its operations, and in the vast array of products and services it provides for the community, the Bureau's work supports Australia's commitment to the United Nation's 2030 Agenda for Sustainable Development, and the achievement of the Sustainable Development Goals (SDGs). Throughout 2022–23, the work of the Bureau has contributed to 15 of the 17 goals as follows.

Goal	Bureau contribution
 <p>2 ZERO HUNGER</p>	<ul style="list-style-type: none"> • help graziers and horticulturalists determine optimum crops, timing around planting and harvesting, fertilisation and chemical spraying • help meat and livestock farmers control stocking rates, and pre-empt health issues in livestock • alert farmers to conditions such as frost, hail, storms and floods • optimise agricultural water use productivity through regional-specific information on current and forecast water availability • support government drought assistance programs
 <p>3 GOOD HEALTH AND WELL-BEING</p>	<ul style="list-style-type: none"> • help Australians protect themselves from cyclones, floods, severe storms and bushfires • support authorities in making evacuation decisions to get people at risk to safety • help Australians avoid dangerous ultraviolet (UV) exposure, to protect against skin cancer • help protect vulnerable Australians against heat exhaustion and extreme cold • alert health authorities to periods of heightened demand • help Australians plan their sporting and outdoor activities • support management of biohazards, airborne allergens and diseases
 <p>4 QUALITY EDUCATION</p>	<ul style="list-style-type: none"> • provide quality education in meteorology including capacity building in neighbouring countries • help the community understand Australia's weather, ocean and climate-related risks • contribute to the global knowledge base in the meteorological sciences and contribute to cutting-edge developments • promote ongoing learning and development for Bureau staff
 <p>5 GENDER EQUALITY</p>	<ul style="list-style-type: none"> • promote gender equality through implementation of the Bureau's Gender Equality Action Plan • provide family-friendly working conditions including flexible working options for all staff • provide training and development to managers on inclusive leadership and unconscious bias

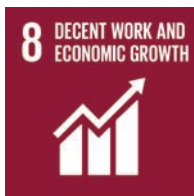
Goal	Bureau contribution
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- coordinate national water information standards, and collection and dissemination of Australia’s water information, including water quality information
- help governments and water authorities in planning and water management
- aid decision-making in water supply and the management of water allocations and rights
- support dam management and the protection of water and sanitation infrastructure, particularly during severe weather events
- inform the design of new water infrastructure



- enable the Australian energy market to forecast power demand, particularly during heat and cold extremes
- support renewable energy generation by informing production potential and energy output estimates
- support operations and efficiency in Australia’s offshore oil and gas industry
- support improved planning and mitigation of disrupted electricity supply due to severe weather events
- invest in energy efficiency and renewable energy projects within the Bureau’s property portfolio





- provide economic benefits in the order of 11.6:1 (for every dollar spent by the Bureau on delivering services, there is a return of \$11.60 to the Australian economy)
- support economic growth in key sectors (see Goal 9)
- provide good employment opportunities for Bureau staff



- support safe and efficient air travel in Australian airspace, inform routing and fuel load decisions and help protect aircraft from volcanic ash
- help businesses manage the impact of weather on their operations and minimise disruption from severe weather events
- provide valuable information to the financial and insurance services sector
- support the construction of climate-appropriate infrastructure and help protect infrastructure from weather and climate-related events
- provide information products as a basis for innovation and value-adding by industry

Goal	Bureau contribution
 <p>10 REDUCED INEQUALITIES</p>	<ul style="list-style-type: none"> • provide consistent, comprehensive services for all Australians, including in rural and remote areas • promote Australian Indigenous culture through the Indigenous Weather Knowledge website and support reconciliation through the Reconciliation Action Plan • implement initiatives that promote Diversity and Inclusion • support capacity building and development of Pacific Island nations to manage severe weather impacts and mitigate climate change • assist Pacific and Indian Ocean countries prepare for and respond to tsunamis
 <p>11 SUSTAINABLE CITIES AND COMMUNITIES</p>	<ul style="list-style-type: none"> • support the emergency services in carrying out effective emergency and disaster preparation, response and recovery • warn communities to prepare for hazardous weather events, to protect housing and community infrastructure, and to make timely evacuations • allow emergency services to pre-position personnel and equipment to minimise infrastructure damage and to restore essential services following an emergency • help individuals and communities to organise their activities and daily commute • support management of public and private green spaces
 <p>12 RESPONSIBLE CONSUMPTION AND PRODUCTION</p>	<ul style="list-style-type: none"> • implement a Bureau environmental framework to minimise the effect of operations on the environment • support responsible purchasing policies, efficient use of natural resources, and the management of chemicals and wastes through their lifecycle
 <p>13 CLIMATE ACTION</p>	<ul style="list-style-type: none"> • help Australians understand the nation's climate patterns, trends and variations in climate, and climate-related risks • provide climate research, modelling and forecasting to support policy decisions and mitigation strategies • help Pacific Island nations measure and respond to climate change impacts
 <p>14 LIFE BELOW WATER</p>	<ul style="list-style-type: none"> • support marine management including sustainable fishing and aquaculture • support safety at sea, and inform search and rescue operations • support response to ocean environmental incidents (such as oil spills) • implement changes to the Bureau's balloon program to reduce the likelihood of ingestion by marine birds and turtles

Goal	Bureau contribution
	<ul style="list-style-type: none"> • support the management of ecosystems • support bushfire mitigation including controlled burns • institute ecological protection measures for Bureau operations at environmentally sensitive sites
	<ul style="list-style-type: none"> • contribute to the activities of the World Meteorological Organization, the Intergovernmental Oceanographic Commission of UNESCO, and the International Civil Aviation Organization • collaborate with 10 overseas agencies through bilateral agreements • partner with local, regional, state and territory and national emergency management authorities

Environmental sustainability

The Bureau is committed to leadership in environmentally sustainable practices and managing potentially adverse impact from operations, with the pursuit of a high level of environmental sustainability a success measure of its Strategy 2022–2027. The Bureau’s environmental management system aligns with international standard ISO 14001:2015 and provides the framework for managing environmental risks and optimising opportunities to improve environmental performance.

The Bureau also supports the principles of ecological sustainable development as outlined in the *Environmental Protection and Biodiversity Conservation Act 1999*. The broad range of Bureau products, services and advice empower stakeholders to make informed decisions on matters of ecosystem and biodiversity conservation, both now and for the future.

Management of key impacts

The Bureau’s operations are diverse, encompassing land, water, atmosphere and oceans across Australia and its external territories. In 2022–23, Bureau activities addressed a diverse range of impacts associated with its property and operational footprint, including:

- consideration of environmental impacts for site works including equipment upgrades and the relocation of observational infrastructure
- participation in audits undertaken by Parks Australia on the Bureau’s activities in marine parks nationally
- hosting an all-staff event for World Environment Day with guest speaker Kate Lynch, Head of the Circular Economy Division for the Department of Climate Change, Energy, the Environment and Water who discussed the growing plastic problem and how Australian Environment Ministers are working with the private sector to design out waste and pollution, keep materials in use and foster markets to achieve a circular economy that protects the environment and human health
- in-house training sessions to ensure affected business groups understood the implications of new Victorian environmental legislation, with particular emphasis on waste disposal and the prevention and reporting of pollution events

- working with suppliers to develop and test more environmentally friendly weather balloon consumables
- collaboration with internal groups to uplift awareness and adherence to environmental sustainability obligations and due diligence processes
- progressing the ongoing audit program for a range of environmental aspects, including facets of the Bureau's environmental management system
- collaborating with international meteorological agencies to share environmental sustainability initiatives which the Bureau has successfully implemented in its upper air network.
- installing double glazing on all windows at the Kennaook / Cape Grim facility.

Improving sustainability

In 2022–23, the Bureau established 6 environmental sustainability principles to improve sustainability performance across carbon emissions, energy and resource use, estate management, operational impacts and heritage. Organisational demand on natural resource comes in many forms at the Bureau, from general office activities to waste generation, equipment and instrument use through to the transport of goods. The Bureau aims to incorporate sustainability into procurement practices to avoid unnecessary consumption and minimise the environmental impact of goods and services over whole of life.

Energy efficiency and carbon emission reduction was a key focus for the Bureau in 2022–23, with highlights being:

- the installation of hybrid solar power systems for 3 radars in New South Wales
- development of an off-grid power solution using solar and wind power for remote aviation automatic weather systems.

Australian Public Service Net Zero 2030

As part of the reporting requirements under section 516A of the *Environment Protection and Biodiversity Conservation Act 1999*, and in line with the Government's APS Net Zero 2030 policy, the Bureau is required to publicly report on the emissions from its operations.

The Bureau's greenhouse gas emissions reporting has been developed using a methodology that is consistent with the whole-of-Australian Government approach in accordance with the APS Net Zero 2030 policy.

The data in the table below was supplied by the APS Net Zero Unit as part of the new standardised carbon emissions reporting in the APS.

Greenhouse gas emissions inventory				
Emission source	Scope 1 kg CO ₂ -e	Scope 2 kg CO ₂ -e	Scope 3 kg CO ₂ -e	Total kg CO ₂ -e
Electricity	N/A	13,521,564	1,268,039	14,789,603
Natural Gas	243	N/A	19	262
Fleet vehicles	278,607	N/A	68,700	347,307
Domestic flights	N/A	N/A	1,358,610	1,358,610
Other energy	195,100	N/A	48,080	243,180
Total kg CO₂-e*	473,950	13,521,564	2,743,448	16,738,962

* CO₂-e = Carbon Dioxide Equivalent

Environmental performance indicator	2021–22	2022–23	Change
Energy use			
Total purchased electricity (kWh)	18,385,000	18,408,483	0.12%
Purchased electricity consumption offices (kWh)	2,649,000	2,449,000	-7.5%
Purchased electricity consumption data centres (kWh)	11,336,050	11,225,483	-0.9%
Purchased electricity consumption other sites (kWh)	4,399,950	4,734,000	7.5%
Vehicle fleet*			
Total number of fleet vehicles	81	78	-3.7%
Total distance travelled (km)	910,370	968,344	6.3%
Total fuel purchased (kL)	96.8	103.1	6.5%
Air travel			
Total number of flights	3,905	9,635	146%
Total distance travelled (km)	4,578 850	14,330,072	212%
Resource efficiency			
Planet-friendly stationery purchased	15%	10%	-5%

* the vehicle fleet data is for the Fringe Benefits Tax year period, 1 April 2022 to 31 March 2023

Note: This table is compiled using data sets from whole-of-government providers. Some values are estimated due to incomplete billing cycles at time of publication.

Untangling a tricky problem, one balloon at a time

Weather balloons are a critical component of the Bureau's observations program, providing a platform for capturing a detailed view of the atmosphere. The balloon train consists of the balloon and a radiosonde which measures temperature, humidity and pressure and derives wind direction and wind speed through GPS location. The radiosonde is attached to the balloon by a length of string. The string is important as it ensures the balloon's movement does not distort measurement, but with 55 metres of string per balloon, over 800km of string is released each year.

The Bureau has been working to find a biodegradable solution, strong enough to withstand the forces of launch and travelling through a thunderstorm, but not too strong so as to form a potential aviation hazard. To work effectively, the string needed to be roughly the same thickness as the original product.

These challenges were met with Biotwine meeting all requirements. Biotwine is made from the natural raw material cellulose, which is 100% biodegradable and does not contain microplastics. This biodegradable string has now been adopted across the Bureau's upper air balloon network.

The Bureau continues to drive positive environmental change through its procurement decisions and commitment to testing new prototypes. Over the last 10 years of weather balloons, the Bureau has reduced polystyrene waste with the introduction of cardboard targets and packaging, reduced the likelihood of marine animal ingestion by changing balloon colour from white to blue, and now adopted biodegradable string.



Cocos Islands automatic meteorological balloon launching system (left) and Biotwine (right).

Heritage

The Bureau has a demonstrated commitment to record and preserve significant parts of its own more than 100-year history in delivering meteorological services to Australia. The heritage values associated with sites owned or controlled by the Bureau is quite broad. Some sites have long-term associations with weather and meteorology, some sites are places of first use of significant technology such as radar, while others were key to major meteorological events. The Bureau continues to manage its heritage obligations in accordance with the *Environmental Protection and Biodiversity Conservation Regulations 2000*.

Cultural heritage is a key priority for the Bureau with particular focus on Aboriginal and Torres Strait Islander consultation and sensitive site protection. In 2022–23, activity focused on protecting Indigenous cultural heritage at sites associated with the Tennant Creek Radar project and the Toowoomba (Darling Downs) Radar project, the latter involving an Aboriginal Cultural Heritage Due Diligence Assessment.



People management

Effectiveness in managing and developing employees

The design, development and delivery of key initiatives from the Bureau’s People Framework were a priority focus in 2022–23.

Under its Leadership Development Plan, the Bureau has delivered a systematic approach to identifying, developing and retaining leadership capability through deploying the Senior Leader Talent Development Framework. Implementation of the Bureau’s Integrated Leadership Capability Framework continues with the delivery of a new Bureau Way Manager Program, supporting early and mid-level managers to develop their leadership capabilities. The first edition of the Employee Perceptions Playback was delivered to the workforce, highlighting the variety of actions undertaken across the enterprise in response to cultural diagnostics.

Performance management and development also remains critical to the Bureau’s strategic objectives. Participation rates for the miPDS performance development scheme continue to be high, with 96% of employees having an agreement in place at the end of June 2023.

The Bureau’s participation rate in the 2023 Australian Public Service (APS) Census was 67%, which is a decrease from 75% in 2022 but above 61% in 2021. Staff continue to be highly engaged with the agency and feel they can ‘suggest ideas to improve ways of doing things’. They are committed to the Bureau’s goals and believe the work they do contributes to the strategic direction of the Bureau. Results also indicated an increased understanding of how ‘customer centricity guides our strategy and operations’.

Strategy in Action workshops were held virtually in July and in-person in Melbourne in September, December, March and June for the Bureau’s extended leadership cohort. The workshops continue to play an important role in building leadership capability and cohesion, shared learning and experiences, culture and momentum around implementation and delivery of the Bureau’s Strategy 2022–2027.

The Bureau’s employee turnover rate was 13.5% in 2022–23, compared to 14.1% in 2021–22. Attracting and retaining high-calibre science, technology, engineering and maths (STEM) graduates continued to be a priority and was achieved through the Australian Government’s ICT entry level programs, the Graduate Meteorology Program, university forums, internships and work experience programs.

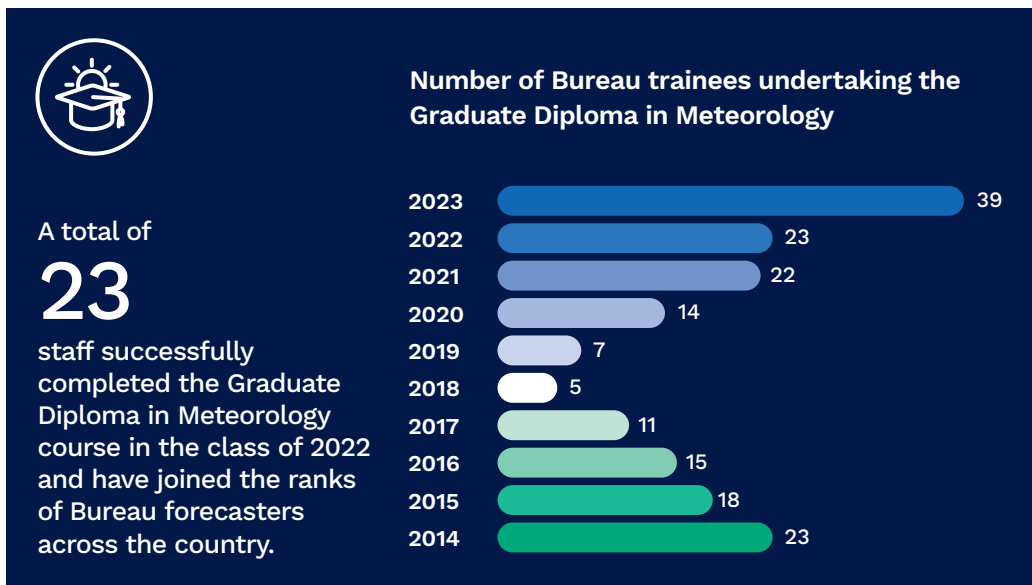
Employment	2021–22	2022–23	Difference
Number of staff employed	1,691	1,797	106
Total employee expenditure	\$201.356m	\$210.568m	\$9.212m
The diversity of our workforce			
Women (% of the total workforce)	36.7	37.1	0.4
People with a disability* (% of the total workforce)	2.5	2.4	-0.1

Employment	2021–22	2022–23	Difference
Aboriginal and Torres Strait Islander peoples (% of the total workforce)	1.3	1.2	-0.1
Staff with English as a second language (% of the total workforce)	15.7	15.8	0.1
Staff with English and another language (% of the total workforce)	9.0	9.2	0.2
Staff health and wellbeing			
Work health and safety incident reports	268	381	113
Number of Health and Safety Representatives	17	25	8
Training and education			
Staff undertaking support studies (% of the total workforce)	1.42	1.41	-0.01

* Note that disability is a voluntary disclosure. Some employees choose not to disclose disabilities.

Training and development

In 2022–23, the Bureau of Meteorology Training Centre continued to facilitate learning programs to support organisational capability, and licensing and compliance requirements. The Graduate Diploma in Meteorology course – the initial training program for meteorologists – saw 50 students commence the 2023 program (including 39 Bureau staff).



Continued development of online material provided all staff with greater access to training opportunities, particularly for those located in regional and remote locations, with staff undertaking more than 10,000 online courses. The expansion and refinement of internal learning offerings provided access to on-demand performance support tools and streamlined eLearning for security, safety, and ethics obligations. Supervisors and leaders were supported through blended learning offerings including the ‘management fundamentals’ series of facilitated learning, in-house leadership development programs, and individual 360 surveys, debriefs and coaching.

Specialist technical in-service training was also provided, with 207 meteorologist competencies awarded across fields such as fire weather, severe thunderstorms and aviation forecasting. In 2022–23, significant reviews of the fire weather and marine forecasting training packages were undertaken to re-align specialist qualifications with new ways of working implemented by recently concluded enterprise transformation programs such as the Public Services Transformation Program.



Graduate Diploma in Meteorology course trainees at the Bureau of Meteorology Training Centre in March

The Bureau’s Introduction to Meteorology course was delivered to 350 participants through facilitated courses run by Bureau meteorologist trainers, comprising 343 external customers and 7 internal stakeholders. To meet growing demand for weather intelligence that can aid critical decision-making, an on-demand online version of the course was launched in 2022–23 with 75 external customers and 367 internal stakeholders participating across the year. Training in meteorology and Bureau services remains highly valued by key partners, with 6 courses delivered to the National Emergency Management Agency and 8 courses delivered in partnership with the Australian Institute for Disaster Resilience.

In support of the Bureau’s Observing System Strategy, training was delivered to more than 332 staff on automatic weather station (AWS) operational support, AWS site inspection, remote stations observations and maintenance, aeronautical meteorological observations and dual polarisation radar maintenance.

Work health and safety (WHS)

The Bureau is committed to complying with the *Work Health and Safety Act 2011* by ensuring the health and safety of its staff through effective risk management and a positive safety culture with a focus on embedding health and safety practices in day-to-day operations and activities.

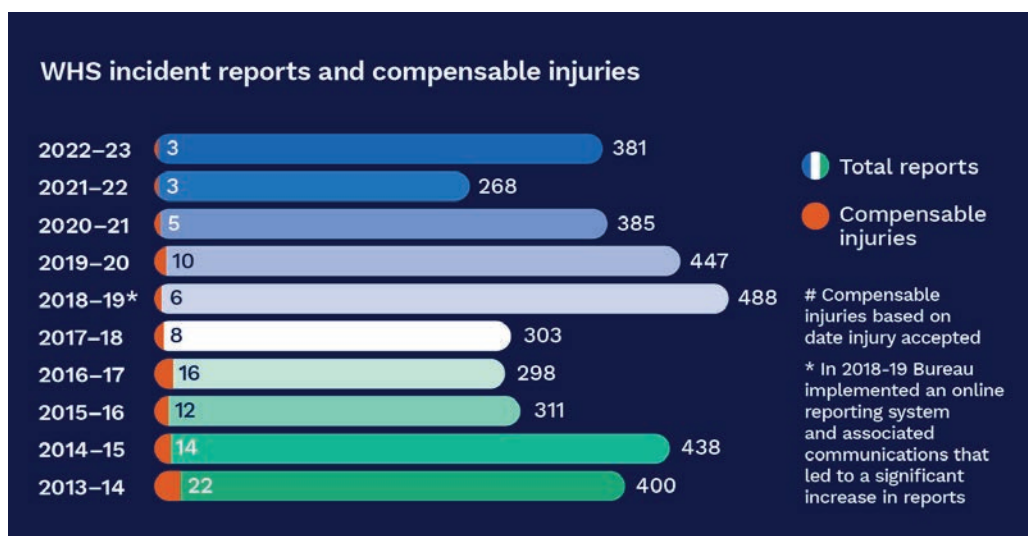
The COVID-19 pandemic remained an ongoing hazard and health issue throughout

2022–23, however the focus shifted from government-mandated public health measures, to ‘living with COVID-19’ and an emphasis on returning to the workplace. The Health Safety and Environment (HSE) team continued to provide health and safety advice to support COVID-safe work practices and updated the Bureau’s COVID-19 risk assessment. COVID-19 case reporting was maintained and the HSE team continue to coordinate a staff health monitoring response.

Highlights from 2022–23 included:

launch of the Safety Essentials campaign and delivery of 3 topics (hazard and incident reporting, emergency preparedness and ergonomics) to uplift safety culture and staff awareness of key health and safety risks and appropriate safety behaviours (see p.122)

- an Executive Team workshop on WHS legislation and due diligence obligations, with a specific focus on managing psychosocial hazards in the workplace
- alignment of the Health & Safety Leads with specific groups using a business partnering approach to develop greater engagement and effective WHS risk management
- organisational consultation on the risk assessment of psychosocial hazards within the Bureau (see p.121)
- nation-wide recruitment for health and safety representatives (HSRs) and deputies to fill multiple vacancies
- new and focused WHS reporting for groups to commence in 2023–24
- commencing a comprehensive update and expansion of the Bureau’s workplace health and safety management information system to enhance data capture and analysis for hazard and incident reporting and a range of WHS compliance related activities



Lead WHS indicators

- As at 30 June, 25 Health and Safety Representatives (HSRs) and 21 Deputy HSRs represented 27 work groups.
- Ongoing participation by the Senior Leadership Team has seen an average of 49 safety conversations recorded per month.
- Bureau Executive provided with bi-monthly comprehensive WHS briefs.

Lag WHS indicators

- Comcare was notified of one serious injury under section 36 of the *Work Health and Safety Act 2011* (Cth). No action from the regulator. Incident investigation completed with corrective actions implemented. Worker returned to pre-injury duties/hours.
- Hazard and incident reporting has increased, with 381 HSE hazard/incident reports lodged, compared with 268 in 2021–22.
- Proactive reporting of hazards and near miss incidents has remained steady at 76% of all reports recorded, compared to 78% in 2021–22.
- The timeliness of incident/hazard reporting was 4.3 days, compared to 3.1 days in 2021–22. The increase is due to 3 incidents reported in June, 5–7 months post-incident from Bureau workers on expedition to Antarctica. If not for these reports, the average days to report would be 3.0.
- The Bureau's annual lost time injury frequency rate (LTIFR) of 3.5 is fractionally above the Australian industry benchmark of 3.4 for Professional, Scientific and Technical Services (Safe Work Australia) LTIFR for 2021–22 was 2.0.
- Three workers' compensation claims were accepted for 2022–23 (0.177 claims per 100 staff).
- The Bureau had 2 lost-time workers' compensation claims.



On average

4.3 days

to register a
work health safety
(WHS) incident

Average number of days to register WHS incidents



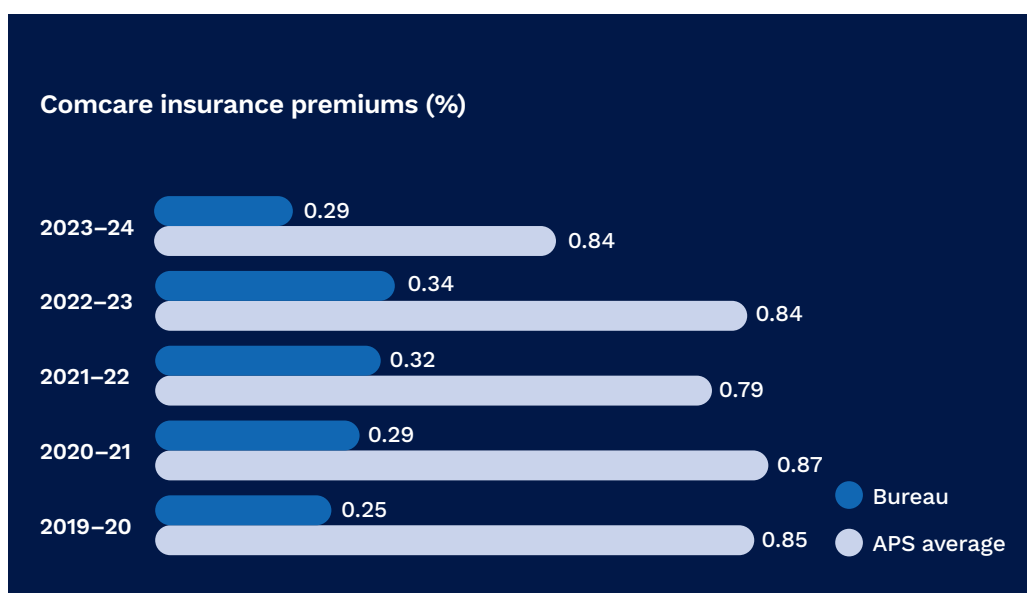
Consultation

The Bureau recognises that staff engagement and participation improve decision-making for health and safety matters, and help reduce work-related incidents, injuries and illness. The Bureau has formal health and safety consultative arrangements and circulates WHS procedures and risk assessments to staff for consultation prior to finalisation.

Rehabilitation and compensation

In 2022–23, 8 compensation claims were lodged with Comcare of which 3 were accepted. Of the accepted claims, one was related to muscular stress while lifting, carrying and putting down objects, one was related to a vehicle accident and one linked to work-related harassment and/or bullying. There were 2 claims with time loss and all staff returned to work. The Bureau achieved a return-to-work rate of 100%.

The Bureau's claim frequency rate continues to remain under the average rate for APS agencies. The Bureau's Comcare premium rate for 2022–23 of 0.34% was also below the overall scheme premium rate of 0.84%.



The Compensation and Rehabilitation Employee Services (CARES) team continued to see positive return to work outcomes for compensable claims through the engagement of effective rehabilitation providers, dedicated managers, CARES team support and the positive approach of injured staff. A proactive, early-intervention approach for injured or ill employees resulted in minimal lost time for non-compensable matters. This involved managers and supervisors establishing immediate supportive contact with employees who required further assistance. The CARES team worked with all parties to support the return-to-work process in a collaborative way.

The Bureau's Employee Assistance Program (EAP) utilisation rate for the 2022–23 period is 12.9%, which is 6.3% above industry average of 6.6%. The CARES team have been actively educating our staff on the services available to maintain awareness and increase use. The Bureau expects this trend to increase above industry average in the coming year.

Employment arrangements

As at 30 June, the Bureau had 1,583 ongoing and 213 non-ongoing staff employed under the *Public Service Act 1999*. These figures include 23 Senior Executive Service (SES) and equivalent staff but exclude the Head of Agency. With the exception of the SES and the Head of Agency, all staff are covered under the Bureau of Meteorology Enterprise Agreement (EA). The salary bands under the EA and non-salary benefits are outlined below. There were 82 staff with individual flexibility agreements pursuant to the EA, providing allowances and flexibility in working arrangements.

Non-salary benefits

Non-salary benefits for employees include:

- flexible working arrangements, such as flex time, executive-level time off in lieu, part-time and home-based work
- assistance to employees who are in, have left, or are preparing to leave situations which are affected by family and domestic violence
- provision for leave, including recreation leave, long service leave, personal/carer's leave, compassionate leave, war service, sick leave, pregnancy leave, maternity leave, adoption leave, supporting partner leave, study leave, employee-funded extra leave, ceremonial leave, defence leave, jury service leave, purchased leave and community leave (with and without pay)
- study assistance
- relocation support
- access to an employee assistance program
- access to the flexible remuneration packaging scheme
- provision of business-related equipment
- career guidance and development services.

Australian Public Service Act employment arrangements – Current report period (2022–23)

	SES	Non-SES	Total
Bureau of Meteorology Enterprise Agreement 2018	0	1,773	1,773
SES (and equivalent) Employment Contracts	23	0	23
Total	23	1,773	1,796

Note: Includes staff on leave without pay and excludes the Head of Agency.

Australian Public Service Act employment salary ranges by classification level (minimum/maximum) – Current report period (2022–23)

	Minimum salary \$	Maximum salary \$
SES 3	n/a	n/a
SES 2	258,564	288,557
SES 1	214,482	235,401
EL 2	125,428	193,459*
EL 1	103,085	116,115
APS 6	84,670	96,267
APS 5	76,783	83,683
APS 4	68,878	75,532
APS 3	61,449	71,917
APS 2	55,448	60,887
APS 1	28,813	53,438
Other	27,171^	59,442
Minimum/maximum range	27,171	288,557

* Includes Research Officers

^ Includes Graduate Cadet and Trainee staff

Australian Public Service Act employment performance pay by classification level – Current report period (2022–23)

No Bureau employees received performance pay during 2022–23.

Executive remuneration

The payment of salary and administration of conditions for the Head of Agency is derived from the relevant Remuneration Tribunal determination. The Bureau has an SES remuneration framework that applies to the SES (and equivalent) staff. At 30 June 2023 there were 23 common law contracts for SES (and equivalent) staff. These contracts also provided for non-salary benefits, such as business equipment (home computing facilities and mobile phone) and airline club membership. The Bureau has zero staff on Australian Workplace Agreements and is not subject to any determinations under subsection 24(3) of the Public Service Act.

Information about remuneration for key management personnel

The Bureau's key management personnel include the CEO as its Accountable Authority, and members of the Bureau Executive who report directly to the CEO. Remuneration information for key management personnel is provided below. Remuneration figures for Key Management Personnel, Senior Executives and other highly paid staff are comprised of base salary, other benefits and allowances, long service leave and superannuation contributions, and termination benefits where applicable. The figures include pro-rata amounts for personnel who were not employed at the Bureau for the full financial year.

Name	Position title	Short-term benefits			Post-employment benefits	Other long-term benefits			Termination benefits \$	Total remuneration \$
		Base salary \$	Bonuses \$	Other benefits and allowances \$		Long service leave \$	Other long-term benefits \$			
Andrew Johnson	CEO & Director of Meteorology	492,611	-	61	66,570	11,306	-	-	-	570,548
Vicki Woodburn	Group Executive Australian Climate Service	311,651	-	34,260	59,732	6,421	-	32,068	-	412,064
Gilbert Brunet	Group Executive Science and Innovation	311,765	-	33,288	48,330	4,923	-	-	-	398,306
Nichole Brinsmead	Chief Information and Technology Officer, Group Executive Data and Digital Group and ROBUST Program Director	313,625	-	74,390	54,805	5,351	-	-	-	448,171
Peter Stone	Group Executive Business Solutions	319,322	-	35,311	59,203	7,135	-	-	-	420,971
Piero Chessa	Group Executive Community Services	311,689	-	33,486	48,295	4,423	-	-	-	397,893
Paula Goodwin	Chief Operating Officer	317,147	-	31,013	48,226	7,135	-	-	-	403,521
Kirsten Garwood	Group Executive Public Service Transformation	103,311	-	12,033	16,138	2,322	-	-	-	133,804

Information about remuneration for senior executives

The average total remuneration of senior executives, excluding key management personnel, during the reporting period is provided below. The figures include pro-rata amounts for personnel who were not employed at the Bureau for the full financial year.

Total remuneration bands	Number of senior executives	Short-term benefits			Average other allowances \$	Post-employment benefits	Other long-term benefits		Termination benefits	Total remuneration
		Average base salary \$	Average bonuses \$	Average other benefits and allowances \$			Average superannuation contributions \$	Average long service leave \$		
\$0 – \$220,000	7	81,772	-	7,819	15,964	5,451	-	41,917	125,912	
\$220,001 – \$245,000	1	173,433	-	24,813	19,731	10,339	-	-	228,316	
\$245,001 – \$270,000	3	199,538	-	12,372	34,302	11,614	-	-	257,824	
\$270,001 – \$295,000	5	216,433	-	15,596	42,238	6,397	-	-	280,664	
\$295,001 – \$320,000	4	233,962	-	29,744	38,247	8,113	-	-	310,065	
\$320,001 – \$345,000	1	233,723	-	57,024	41,535	7,173	-	-	339,455	
\$345,001 – \$370,000	0	-	-	-	-	-	-	-	-	
\$370,001 – \$395,000	0	-	-	-	-	-	-	-	-	
\$395,001 – \$420,000	1	142,049	0	11,116	28,241	16,392	-	208,968	406,766	
\$420,001 – \$445,000	0	-	-	-	-	-	-	-	-	
\$445,001 – \$470,000	0	-	-	-	-	-	-	-	-	
\$470,001 – \$495,000	0	-	-	-	-	-	-	-	-	
\$495,001 – ...	0	-	-	-	-	-	-	-	-	

Information about remuneration for other highly paid staff

Remuneration of staff who are neither key management personnel nor senior executives, and whose total remuneration exceeds the threshold amount for the reporting period (\$240,000) is also provided below.

Total remuneration bands	Number of other highly paid staff	Short-term benefits			Post-employment benefits		Other long-term benefits		Termination benefits	Total remuneration
		Average base salary \$	Average bonuses \$	Average other benefits and allowances \$	Average superannuation contributions \$	Average long service leave \$	Average other long-term benefits \$	Average termination benefits \$	Average total remuneration \$	
\$240,000- \$245,000	1	139,357	0	64,913	33,963	5,211	0	0	243,445	
\$245,001- \$270,000	4	144,759	0	68,501	32,135	8,405	0	0	253,799	
\$270,001- \$295,000	3	156,751	0	78,828	37,379	4,228	0	0	277,187	
\$295,001- \$320,000	1	157,707	0	92,819	45,256	4,975	0	0	300,758	
\$320,001- \$345,000	0	233,962	-	29,744	38,247	8,113	-	-	310,065	
\$345,001- \$370,000	0	233,723	-	57,024	41,535	7,173	-	-	339,455	
\$370,001- \$395,000	0	-	-	-	-	-	-	-	-	
\$395,001- \$420,000	0	-	-	-	-	-	-	-	-	
\$420,001- \$445,000	0	-	-	-	-	-	-	-	-	
\$445,001- \$470,000	0	-	-	-	-	-	-	-	-	
\$470,001- \$495,000	0	-	-	-	-	-	-	-	-	
\$495,001-	0	-	-	-	-	-	-	-	-	
\$495,001 - ...	0	-	-	-	-	-	-	-	-	

Workforce profile (staffing statistics)

All statistics are as at 30 June 2023 unless otherwise stated.

External territories include Australian Antarctic Territory, Norfolk Island and Cocos Islands. Macquarie Island is included in Tasmania, Willis Island in Queensland and Lord Howe Island in New South Wales.

The Bureau did not collect data against all gender categories and has reported 'indeterminate' as 'uses a different term'.

All ongoing employees – Current report period (2022–23)

	Man/Male			Woman/Female			Non-binary			Prefers not to answer			Uses a different term			Total	
	Full time	Part time	Total	Full time	Part time	Total	Full time	Part time	Total	Full time	Part time	Total	Full time	Part time	Total		
NSW	63	5	68	22	8	30	0	0	0	0	0	0	0	0	0	0	98
Qld	139	6	145	73	10	83	0	0	0	0	0	0	0	0	0	0	228
SA	42	2	44	22	6	28	0	0	0	0	0	0	0	0	0	0	72
Tas	41	5	46	14	8	22	0	0	0	0	0	0	0	0	0	0	68
Vic	533	34	567	257	68	325	0	0	0	0	0	0	0	6	1	7	899
WA	50	5	55	20	8	28	0	0	0	0	0	0	0	0	0	0	83
ACT	40	4	44	47	5	52	0	0	0	0	0	0	0	0	1	1	97
NT	21	3	24	8	2	10	0	0	0	0	0	0	1	0	1	0	35
External Territories	3	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Overseas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	932	64	996	463	115	578	0	0	0	0	0	0	7	2	9	1,583	

All non-ongoing employees – Current report period (2022-23)

	Man/Male			Woman/Female			Non-binary			Prefers not to answer			Uses a different term			Total
	Full time	Part time	Total	Full time	Part time	Total	Full time	Part time	Total	Full time	Part time	Total	Full time	Part time	Total	
NSW	7	3	10	6	0	6	0	0	0	0	0	0	0	0	0	16
Qld	16	2	18	7	2	9	0	0	0	0	0	0	0	0	0	27
SA	6	4	10	3	0	3	0	0	0	0	0	0	0	0	0	13
Tas	1	2	3	2	1	3	0	0	0	0	0	0	0	0	0	6
Vic	46	18	64	41	13	54	0	0	0	0	0	0	2	1	3	121
WA	4	2	6	4	0	4	0	0	0	0	0	0	0	0	0	10
ACT	4	0	4	4	2	6	0	0	0	0	0	0	0	0	0	10
NT	1	2	3	2	0	2	0	0	0	0	0	0	0	0	0	5
External Territories	4	0	4	2	0	2	0	0	0	0	0	0	0	0	0	6
Overseas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	89	33	122	71	18	89	0	0	0	0	0	0	2	1	3	214

All ongoing employees – Previous report period (2021–22)

	Man/Male			Woman/Female			Non-binary			Prefers not to answer			Uses a different term			Total
	Full time	Part time	Total	Full time	Part time	Total	Full time	Part time	Total	Full time	Part time	Total	Full time	Part time	Total	
NSW	64	4	68	23	9	32	0	0	0	0	0	0	0	0	0	100
Qld	120	5	125	57	12	69	0	0	0	0	0	0	1	0	1	195
SA	46	1	47	21	4	25	0	0	0	0	0	0	0	0	0	72
Tas	40	6	46	13	11	24	0	0	0	0	0	0	0	0	0	70
Vic	483	30	513	241	60	301	0	0	0	0	0	0	2	0	2	816
WA	54	4	58	18	4	22	0	0	0	0	0	0	0	0	0	80
ACT	35	6	41	43	6	49	0	0	0	0	0	0	1	0	1	91
NT	21	0	21	10	0	10	0	0	0	0	0	0	0	0	0	31
External Territories	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1
Overseas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	863	56	919	427	106	533	0	0	0	0	0	0	4	0	4	1,456

All non-ongoing employees – Previous report period (2021–22)

	Man/Male			Woman/Female			Non-binary			Prefers not to answer			Uses a different term			Total
	Full time	Part time	Total	Full time	Part time	Total	Full time	Part time	Total	Full time	Part time	Total	Full time	Part time	Total	
NSW	5	1	6	4	0	4	0	0	0	0	0	0	0	0	0	10
Qld	13	2	15	11	1	12	0	0	0	0	0	0	0	0	0	27
SA	4	1	5	1	1	2	0	0	0	0	0	0	0	0	0	7
Tas	3	3	6	1	0	1	0	0	0	0	0	0	0	0	0	7
Vic	76	24	100	47	11	58	0	0	0	0	0	0	2	1	3	161
WA	3	0	3	3	0	3	0	0	0	0	0	0	0	0	0	6
ACT	2	0	2	3	1	4	0	0	0	0	0	0	0	0	0	6
NT	1	3	4	1	0	1	0	0	0	0	0	0	0	0	0	5
External Territories	4	0	4	2	0	2	0	0	0	0	0	0	0	0	0	6
Overseas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	111	34	145	73	14	87	0	0	0	0	0	0	2	1	3	235

Australian Public Service Act ongoing employees – Current report period (2022–23)

	Man/Male		Woman/Female		Non-binary		Prefers not to answer		Uses a different term		Total	
	Full time	Part time	Full time	Part time	Full time	Part time	Full time	Part time	Full time	Part time		
SES 3	0	0	0	0	0	0	0	0	0	0	0	
SES 2	3	0	3	0	0	0	0	0	0	0	6	
SES 1	14	0	3	0	3	0	0	0	0	0	17	
EL 2	182	10	113	18	131	0	0	0	0	2	325	
EL 1	331	31	362	48	201	0	0	0	0	2	565	
APS 6	215	15	230	38	134	0	0	0	0	2	367	
APS 5	87	4	91	7	44	0	0	0	0	0	135	
APS 4	21	0	21	35	36	0	0	0	0	0	58	
APS 3	46	4	50	15	17	0	0	0	0	1	68	
APS 2	0	0	0	0	0	0	0	0	0	0	0	
APS 1	1	0	1	1	2	0	0	0	0	0	3	
Other	32	0	32	7	7	0	0	0	0	0	39	
Total	932	64	996	463	578	0	0	0	0	7	2	9
												1,583

Australian Public Service Act non-ongoing employees – Current report period (2022–23)

	Man/Male			Woman/Female			Non-binary			Prefers not to answer			Uses a different term			Total
	Full time	Part time	Total	Full time	Part time	Total	Full time	Part time	Total	Full time	Part time	Total	Full time	Part time	Total	
SES 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SES 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SES 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EL 2	7	6	13	5	1	6	0	0	0	0	0	0	0	0	0	19
EL 1	40	9	49	25	7	32	0	0	0	0	0	0	0	0	0	81
APS 6	19	12	31	17	4	21	0	0	0	0	0	0	0	2	0	54
APS 5	6	2	8	12	1	13	0	0	0	0	0	0	0	0	0	21
APS 4	3	1	4	6	1	7	0	0	0	0	0	0	0	0	0	11
APS 3	13	2	15	6	3	9	0	0	0	0	0	0	0	1	0	25
APS 2	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1
APS 1	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	88	33	121	71	18	89	0	0	0	0	0	0	3	0	3	213

Australian Public Service Act ongoing employees – Previous report period (2021–22)

	Man/Male		Woman/Female		Non-binary		Prefers not to answer		Uses a different term		Total
	Full time	Part time	Full time	Part time	Full time	Part time	Full time	Part time	Full time	Part time	
SES 3	0	0	0	0	0	0	0	0	0	0	0
SES 2	3	0	4	0	0	0	0	0	0	0	7
SES 1	13	0	4	0	0	0	0	0	0	0	17
EL 2	155	8	95	14	109	0	0	0	0	0	272
EL 1	298	27	325	49	174	0	0	0	0	1	500
APS 6	240	13	253	31	133	0	0	0	0	0	386
APS 5	78	5	83	5	41	0	0	0	0	1	125
APS 4	16	0	16	3	34	0	0	0	0	0	50
APS 3	44	3	47	21	3	24	0	0	0	1	72
APS 2	0	0	0	0	0	0	0	0	0	0	0
APS 1	2	0	2	1	2	0	0	0	0	0	4
Other	14	0	14	8	8	0	0	0	0	1	23
Total	863	56	919	427	533	0	0	0	0	4	1,456

Australian Public Service Act non-ongoing employees – Previous report period (2021–22)

	Man/Male			Woman/Female			Non-binary			Prefers not to answer			Uses a different term			Total
	Full time	Part time	Total	Full time	Part time	Total	Full time	Part time	Total	Full time	Part time	Total	Full time	Part time	Total	
SES 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SES 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SES 1	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1
EL 2	10	6	16	6	0	6	0	0	0	0	0	0	0	0	0	22
EL 1	41	11	52	25	2	27	0	0	0	0	0	0	0	0	0	79
APS 6	24	12	36	20	5	25	0	0	0	0	0	0	2	1	3	64
APS 5	15	1	16	8	2	10	0	0	0	0	0	0	0	0	0	26
APS 4	8	0	8	5	1	6	0	0	0	0	0	0	0	0	0	14
APS 3	12	2	14	8	3	11	0	0	0	0	0	0	0	0	0	25
APS 2	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	1
APS 1	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	2
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	110	34	144	73	14	87	0	0	0	0	0	0	2	1	3	234

Australian Public Service Act employees by full-time and part-time status – Current report period (2022–23)

	Ongoing			Non-ongoing			Total
	Full time	Part time	Total	Full time	Part time	Total	
SES 3	0	0	0	0	0	0	0
SES 2	6	0	6	0	0	0	6
SES 1	17	0	17	0	0	0	17
EL 2	297	28	325	12	7	19	344
EL 1	486	79	565	65	16	81	646
APS 6	313	54	367	38	16	54	421
APS 5	124	11	135	18	3	21	156
APS 4	56	2	58	9	2	11	69
APS 3	62	6	68	20	5	25	93
APS 2	0	0	0	0	1	1	1
APS 1	2	1	3	0	1	1	4
Other	39	0	39	0	0	0	39
Total	1,402	181	1,583	162	51	213	1,796

Australian Public Service Act employees by full-time and part-time status – Previous report period (2021–22)

	Ongoing			Non-ongoing			Total
	Full time	Part time	Total	Full time	Part time	Total	
SES 3	0	0	0	0	0	0	0
SES 2	7	0	7	0	0	0	7
SES 1	17	0	17	1	0	1	18
EL 2	251	22	273	16	6	22	295
EL 1	423	76	499	66	13	79	578
APS 6	342	44	386	46	18	64	450
APS 5	115	10	125	23	3	26	151
APS 4	47	3	50	13	1	14	64
APS 3	66	6	72	20	5	25	97
APS 2	0	0	0	0	1	1	1
APS 1	3	1	4	0	2	2	6
Other	23	0	23	0	0	0	23
Total	1,294	162	1,456	185	49	234	1,690

Australian Public Service Act employment type by location – Current report period (2022–23)

	Ongoing	Non-ongoing	Total
NSW	98	16	114
Qld	228	26	254
SA	72	13	85
Tas	68	6	74
Vic	899	121	1,020
WA	83	10	93
ACT	97	10	107
NT	35	5	40
External Territories	3	6	9
Overseas	0	0	0
Total	1,583	213	1,796

Australian Public Service Act employment type by location – Previous report period (2021–22)

	Ongoing	Non-ongoing	Total
NSW	100	10	110
Qld	195	26	221
SA	72	7	79
Tas	70	7	77
Vic	816	161	977
WA	80	6	86
ACT	91	6	97
NT	31	5	36
External Territories	1	6	7
Overseas	0	0	0
Total	1,456	234	1,690

Australian Public Service Act Indigenous employment – Current report period (2022–23)

	Total
Ongoing	19
Non-ongoing	3
Total	22

Australian Public Service Act Indigenous employment – Previous report period (2021–22)

	Total
Ongoing	19
Non-ongoing	4
Total	23

All employees by office location and occupational stream
 – Current report period (2022–23)

	HOA	SES	ASO	PO	TO	GSO	ITO	RS	TR	Total
NSW	0	1	14	56	28	0	5	10	0	114
Qld	1	3	42	138	57	0	10	2	2	255
SA	0	0	8	38	29	0	7	3	0	85
Tas	0	1	18	22	26	0	4	3	0	74
Vic	0	22	227	371	80	0	190	90	40	1,020
WA	0	0	11	51	27	0	4	0	0	93
ACT	0	8	43	39	1	0	11	5	0	107
NT	0	0	5	14	20	0	1	0	0	40
External Territories	0	0	0	0	9	0	0	0	0	9
Overseas	0	0	0	0	0	0	0	0	0	0
Total	1	35	368	729	277	0	232	113	42	1,797

HOA: Head of Agency; SES: Senior Executive Service; ASO: Administrative Service Officer; PO: Professional Officer; TO: Technical Officer; GSO: General Service Officer; ITO: Information Technology Officer; RS: Research Scientist; TR: Trainee.

All employees age profile – Current report period (2022–23)

	16–20	21–25	26–30	31–35	36–40	41–45	46–50	51–55	56–60	61–65	66–70	>71
Female	1	30	54	75	117	107	99	96	54	30	4	0
Male	0	54	68	98	163	160	156	175	140	69	30	5
Non-binary	0	0	0	0	0	0	0	0	0	0	0	0
Prefers not to answer	0	0	0	0	0	0	0	0	0	0	0	0
Uses a different term	0	2	4	0	1	3	1	1	0	0	0	0
Total	1	86	126	173	281	270	256	272	194	99	34	5

Financial resource management

Financial performance

The Bureau reported an operating surplus of \$40.7 million (excluding depreciation, write down and impairment of assets and asset revaluation changes) for 2022–23. This surplus is largely due to externally generated revenue recognised in the current year but used for capital assets.

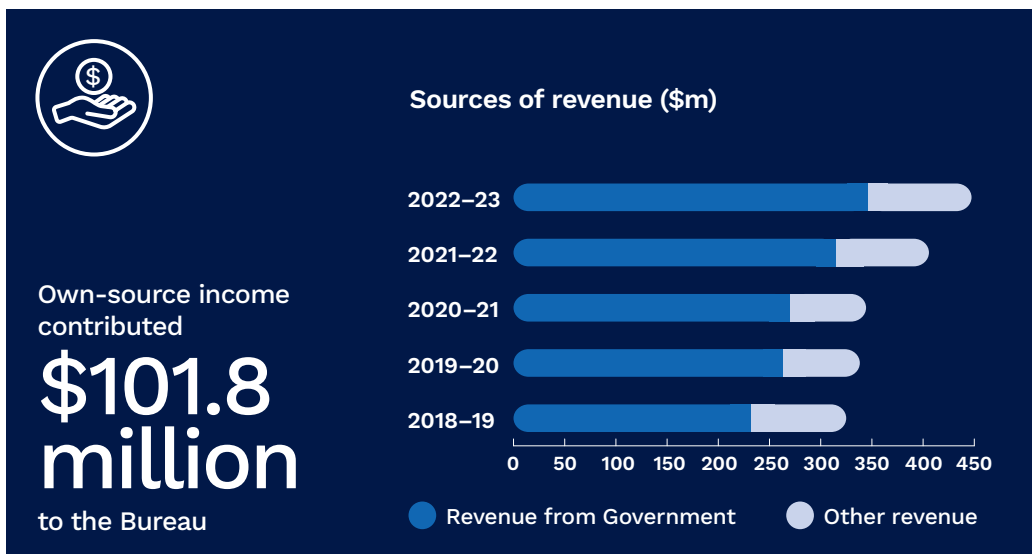
The Bureau recognised prior period errors across its property, plant and equipment, lease and revenue classes of asset and expenses. The prior period errors relate to incorrect application of accounting standards and do not have any impact to the ongoing financial sustainability or operations of the Bureau (see p.228).

Income

Total income for the Bureau for 2022–23 was \$447.3 million. This is an increase of \$41.6 million compared to the 2021–22 year.

Revenue from Government was \$345.5 million in 2022–23, which was \$29.8 million higher than the 2021–22 year. The increase was predominantly due to increases in the Long Term Financial Sustainability measure.

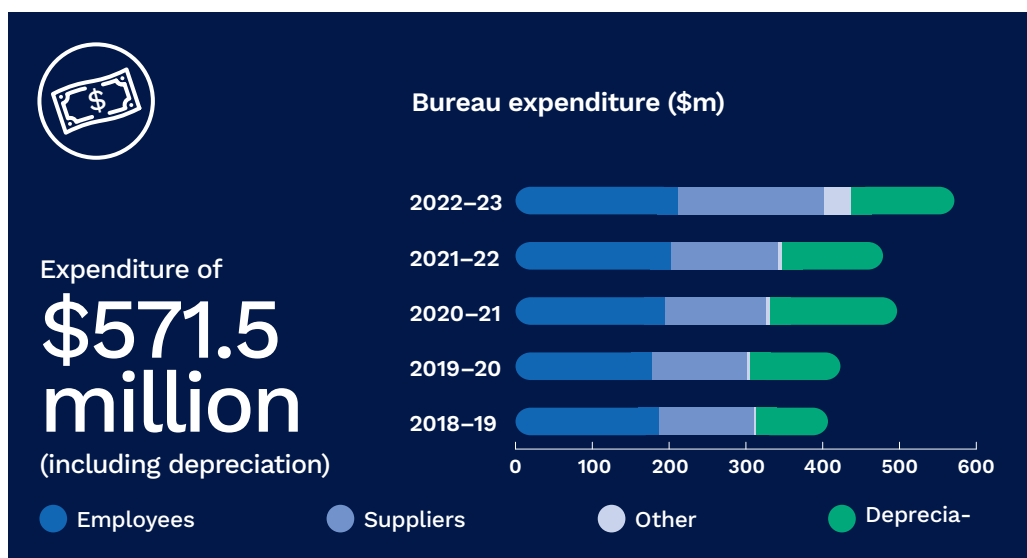
Own-source income was \$101.8 million – an increase of \$ 11.8 million compared to 2021–22, largely due to increased income from the aviation industry resulting from increases in flight activity following the COVID-19 pandemic. Own-source revenue is from cost-recovered activity.



Expenditure

The Bureau's operating expenditure for 2022–23 was \$571.5 million, an increase of \$92.9 million (19%) compared with the 2021–22 year. This increase was due to:

- additional supplier expenses (\$51.3 million) primarily relating to:
 - \$30.1 million higher expenses associated with Australian Climate Service and Long Term Financial Sustainability measures.
 - \$7.6 million in IT related expenses including licencing
 - \$1.7 million in operating leases.
- write down and impairment of assets of \$31.4 million due to stocktake adjustments and impairment of assets.



Significant non-compliance

During 2022–23, there was one instance of significant non-compliance of the finance law under section 19(1)(e) of the *Public Governance, Performance and Accountability Act 2013* (PGPA Act).

Description of non-compliance	Remedial Action
The Bureau disclosed prior period errors in the financial statements because of the incorrect application of accounting standards relating to assets, leases and revenue. A non-compliance with the PGPA Act has occurred due to the requirement to comply with the finance law and the <i>Public Governance, Performance and Accountability (Financial Reporting) Rule 2015</i> .	Remedial action to correct the errors occurred through the 2022–23 financial statement process. The Bureau has implemented stronger internal controls through enhanced asset management, lease and revenue practices and has provided training to all relevant staff.

Resource Statement Summary – current report period (2022–23)

	Actual available appropriation for 2022–23 \$'000 (a)	Payments made 2022–23 \$'000 (b)	Balance remaining 2022–23 \$'000 (a) – (b)
Departmental			
Annual appropriations – ordinary annual services ¹	568,863	458,456	110,407
Annual appropriations – departmental capital budget ¹	59,579	58,263	1,316
Annual appropriations – other services – non-operating ²	267,624	134,611	133,013
Total departmental annual appropriations	896,066	651,330	244,736
Departmental special appropriations ³	-	-	-
Total special appropriations	-	-	-
Special accounts	2,532	650	1,882
Total special accounts	2,532	650	1,882
<i>less departmental appropriations drawn from annual/special appropriations and credited to special accounts</i>	-	-	-
Total departmental resourcing (A)	898,598	651,980	246,618
Administered			
Annual appropriations – ordinary annual services ¹	-	-	-
Annual appropriations – other services – non-operating ²	-	-	-
Annual appropriations – other services – specific payments to States, ACT, NT and local government	-	-	-
Annual appropriations – other services – new administered expenses	-	-	-
Total administered annual appropriations	-	-	-
Administered special appropriations	-	-	-
Total administered special appropriations	-	-	-
Special accounts ³	-	-	-
Total special accounts receipts	-	-	-
<i>less administered appropriations drawn from annual/special appropriations and credited to special accounts</i>	-	-	-
<i>less payments to corporate entities from annual/special appropriations</i>	-	-	-
Total administered resourcing (B)	-	-	-
Total resourcing and payments for the Bureau of Meteorology (A + B)	898,598	651,980	246,618

¹ Appropriation and Supply Act (No. 1) 2022–23 and Appropriation Act (No. 3) 2022–23. This may also include prior-year departmental appropriation and section 74 external revenue.

² Appropriation and Supply Act (No. 2) 2022–23 and Appropriation and Supply Act (No. 4) 2022–23.

³ Excludes trust moneys held in Services for Other Entities and Trust Moneys (SOETM) and other special accounts.

Expenses by Outcome – current report period (2022–23)

Expenses for Outcome 1

Outcome 1: Enabling a safe, prosperous, secure and healthy Australia through the provision of weather, water, climate, ocean and space weather services.	Budget* 2022–23 \$'000 (a)	Actual expenses 2022–23 \$'000 (b)	Variation 2022–23 \$'000 (a) – (b)
Program 1.1: Bureau of Meteorology			
Administered expenses			
Ordinary annual services (Appropriation Act No. 1)	-	-	-
Other services (Appropriation Act Nos. 2, 4 and 6)	-	-	-
s74 External Revenue ¹	-	-	-
Special appropriations	-	-	-
Special accounts	-	-	-
Payments to corporate entities	-	-	-
Expenses not requiring appropriation in the Budget year ²	-	-	-
Administered total	-	-	-
Departmental expenses			
Departmental appropriation	345,500	300,325	45,175
s74 External Revenue ¹	85,017	104,638	(19,621)
Special appropriations	-	-	-
Special accounts	-	598	598
Expenses not requiring appropriation in the Budget year ²	106,622	165,975	(59,353)
Departmental total	537,139	571,536	(34,397)
Total expenses for Outcome 1	537,139	571,536	(34,397)
	2022–23	2022–23	
Average staffing level (number)	1,627	1,629	

* Full-year budget, including any subsequent adjustment made to the 2022–23 budget at Additional Estimates.

¹ Estimated expenses incurred in relation to receipts retained under section 74 of the PGPA Act 2013.

² Expenses not requiring appropriation in the Budget year are made up of depreciation expenses, amortisation expenses, make good expenses, audit fees, write down of assets, and foreign exchange losses.

Asset management

The Bureau manages its assets according to relevant accounting standards and Department of Finance requirements. The agency's asset management policies and procedures cover whole-of-life asset management.

The Bureau's asset base comprises software, leasehold improvements, data centre equipment and right-of-use assets associated with accounting standard AASB 16 Leases relating mainly to property leases.

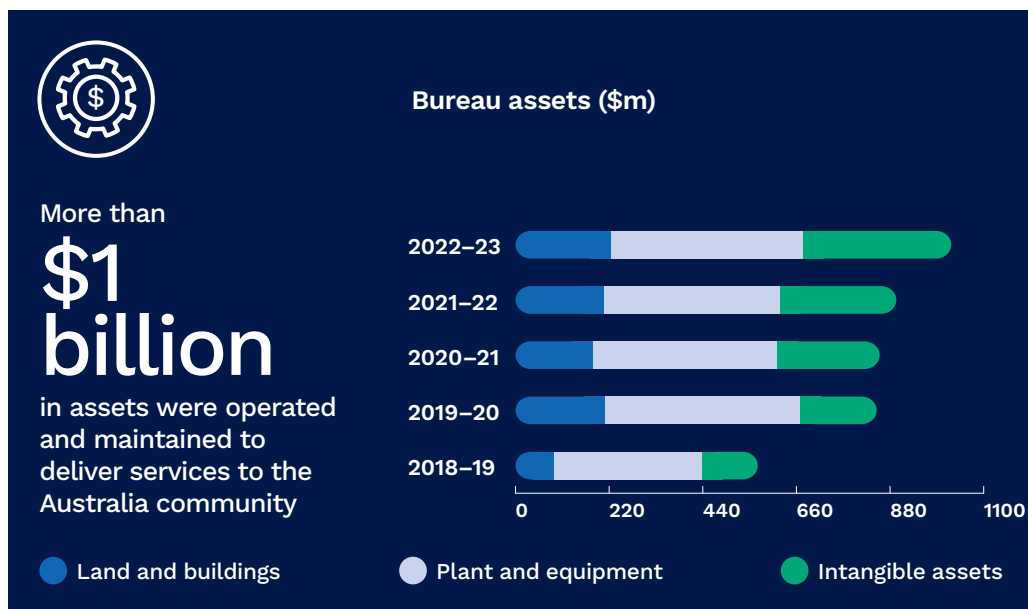
The property portfolio is managed through the property facilities maintenance and upgrade capital plan, to ensure the Bureau's workplaces and facilities are maintained to a suitable standard.

Investment in ICT software and hardware is undertaken according to the ICT technology plan and roadmap, to ensure ICT is sustained and capable of delivering for the agency and its customers.

The Bureau has focussed effort on maturing its asset management practices over the last few years to both the accounting practices and the asset management procedures.

The Bureau uses an asset management system to manage its observing network assets and related IT equipment, including:

- providing reports on asset performance
- scheduling preventive maintenance, inspections and calibrations
- planning, scheduling, assigning and executing work in a safe and efficient manner
- tracking rotables, spare parts and consumables.



Procurement

Value for money is the core principle underpinning all procurement. The Bureau's Accountable Authority Instructions provide internal control of procurement within the agency, and are aligned with the PGPA Act, the Commonwealth Procurement Rules and broader Australian Government policy. The Bureau is committed to assessing and addressing modern slavery risks and this is reflected in the procurement framework. The Bureau also contributes to the annual Commonwealth Modern Slavery Statement and regularly updates its contractual and tendering templates to include obligations under the *Modern Slavery Act 2018*.

There were no instances of contracts of \$100,000 or more (inclusive of GST) entered into during 2022–23 that precluded the Auditor-General from accessing the contractor's premises.

For details of standard clauses that provide the Australian National Audit Office (ANAO) with access to contractors' information, refer to: www.finance.gov.au/procurement/clausebank.

There was one contract in excess of \$10,000 (inclusive of GST) that was exempted by the Accountable Authority from being published on AusTender on the basis that they would disclose exempt matters under the *Freedom of Information Act 1982*.

Information on procurements expected to be undertaken in the coming year is in the Bureau's annual procurement plan, available from the AusTender website: www.tenders.gov.au.

Procurement initiatives to support small business and Indigenous-owned businesses

The Bureau supports small business participation in the Commonwealth Government procurement market. Small and Medium Enterprises (SME) and Small Enterprise participation statistics are available on the Department of Finance's website: www.finance.gov.au/government/procurement/statistics-australian-government-procurement-contracts-

The Bureau's measures to support SMEs include:

- complying with the Commonwealth Procurement Framework
- using standardised contracts for low-risk procurements valued under \$200,000
- implementing the Indigenous Procurement Policy, noting that many Indigenous businesses are also SMEs
- using the Australian Industry Participation policies and programs to encourage SME engagement opportunities
- using credit cards for procurements valued below \$10,000
- complying with the Government's Supplier Pay On-Time or Pay Interest Policy.

The Bureau recognises the importance of ensuring that small businesses are paid on time. The results of the Survey of Australian Government Payments to Small Business are available on the Treasury's website: www.treasury.gov.au.

The Bureau supports the goals of the Australian Government's Indigenous Procurement Policy and achieved its Indigenous procurement target for 2022–23. More information is available on the Department of the Prime Minister and Cabinet's website: www.pmc.gov.au.

Consultancies and reportable non-consultancies

The selection and engagement of consultants was conducted in accordance with the PGPA Act, Commonwealth Procurement Rules and internal policy and procedures. Of the 14 consultancy contracts reported, 5 used a limited tender procurement method and 9 used an open tender, of which 7 used a panel arrangement.

During 2022–23, 8 new reportable consultancy contracts were entered into involving total actual expenditure of \$1,284,251. In addition, 6 ongoing reportable consultancy contracts were active during the period, involving total actual expenditure of \$1,081,383.

Expenditure on Reportable Consultancy Contracts – Current report period (2022–23)

	Number	Expenditure \$ (GST inc.)
New contracts entered into during the reporting period	8	\$1,284,251
Ongoing contracts entered into during a previous reporting period	6	\$1,081,383
Total	14	\$2,365,634

The main categories of purpose for which consultants were engaged were management advisory services, strategic planning consultation services and management support services.

Annual reports contain information about actual expenditure on reportable consultancy contracts. Information on the value of contracts and consultancies is available on the AusTender website: www.tenders.gov.au.

Organisations Receiving a Share of Reportable Consultancy Contract Expenditure – Current report period (2022–23)

Name of Organisation	Organisation ABN	Expenditure \$ (GST inc.)
Chartertech Pty Ltd	ABN: 30 617 464 990	\$626,644
KPMG House	ABN: 51 194 660 183	\$344,314
Protiviti Pty Ltd	ABN: 27 108 473 909	\$276,539
Deloitte Touche Tohmatsu	ABN: 74 490 121 060	\$247,973
Valquip Consulting Pty Ltd	ABN: 73 653 295 080	\$235,526
Total of Largest Shares		\$1,730,996

During 2022–23, 985 new non-consultancy contracts were entered into involving total actual expenditure of \$197,877,722. In addition, 681 ongoing non-consultancy contracts were active during the period, involving total actual expenditure of \$185,530,216.

Annual reports contain information about actual expenditure on reportable non-consultancy contracts. Information on the value of reportable non-consultancy contracts is available on the AusTender website: www.tenders.gov.au.

Expenditure on Reportable Non-Consultancy Contracts – Current report period (2022–23)

	Number	Expenditure \$ (GST inc.)
New contracts entered into during the reporting period	985	\$197,877,722
Ongoing contracts entered into during a previous reporting period	681	\$185,530,216
Total	1,666	\$383,407,938

Organisations Receiving a Share of Reportable Non-Consultancy Contract Expenditure – Current report period (2022–23)

Name of Organisation	Organisation ABN	Expenditure \$ (GST inc.)
Ventia Property Pty Ltd	ABN: 16 618 028 676	\$36,824,569
Rubik3 Pty Ltd	ABN: 59 603 714 085	\$18,346,405
Hays Specialist Recruitment	ABN: 47 001 407 281	\$18,149,167
Hewlett Packard Australia Pty Ltd	ABN: 74 004 394 763	\$16,855,869
Accenture Australia Pty Ltd	ABN: 49 096 776 895	\$12,886,198
Total of Largest Shares		\$103,062,208

Advertising and market research

Under section 311A of the *Commonwealth Electoral Act 1918*, the Bureau is required to disclose payments for advertising and market research.

Advertising and market research over the reporting threshold of \$15,200 (GST inclusive) were undertaken to the value of \$139,064 and \$205,917 respectively, in 2022–23. Details are provided below.

The Bureau did not undertake any polling, direct mail or advertising campaigns during 2022–23.

Organisation	Purpose	Expenditure (\$, GST inclusive)
Media advertising organisations		
Universal McCann (ABN: 19 002 966 001)	Recruitment Advertising	\$139,064
Market research organisations		
Fenton Strategic Communications (ABN: 87 096 279 640)	Communications market research	\$115,088
Ernst & Young (ABN: 75 288 172 749)	Market research for key performance measures	\$90,829
Total		\$344,981

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Section 5: Financial Statements

**For the period
ended 30 June 2023**

BUREAU OF METEOROLOGY
for the period ended 30 June 2023

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INDEPENDENT AUDITOR'S REPORT

To the Minister for Environment and Water

Opinion

In my opinion, the financial statements of the Bureau of Meteorology (the Entity) for the year ended 30 June 2023:

- (a) comply with Australian Accounting Standards – Simplified Disclosures and the *Public Governance, Performance and Accountability (Financial Reporting) Rule 2015*; and
- (b) present fairly the financial position of the Entity as at 30 June 2023 and its financial performance and cash flows for the year then ended.

The financial statements of the Entity, which I have audited, comprise the following as at 30 June 2023 and for the year then ended:

- Statement by the Accountable Authority and Chief Financial Officer;
- Statement of Comprehensive Income;
- Statement of Financial Position;
- Statement of Changes in Equity;
- Cash Flow Statement; and
- Notes to the financial statements, comprising a summary of significant accounting policies and other explanatory information.

Basis for opinion

I conducted my audit in accordance with the Australian National Audit Office Auditing Standards, which incorporate the Australian Auditing Standards. My responsibilities under those standards are further described in the *Auditor's Responsibilities for the Audit of the Financial Statements* section of my report. I am independent of the Entity in accordance with the relevant ethical requirements for financial statement audits conducted by the Auditor-General and his delegates. These include the relevant independence requirements of the Accounting Professional and Ethical Standards Board's APES 110 *Code of Ethics for Professional Accountants (including Independence Standards)* (the Code) to the extent that they are not in conflict with the *Auditor-General Act 1997*. I have also fulfilled my other responsibilities in accordance with the Code. I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my opinion.

Emphasis of matter

I draw your attention to the Overview note of the financial statements, which describes the Entity's correction of prior period errors related to the incorrect recognition and measurement of property, plant, equipment and intangibles; leases; and revenue in the prior year. My opinion is not modified in respect of this matter.

Other information

The Accountable Authority is responsible for the other information. The other information comprises the information included in the annual report for the year ended 30 June 2023 but does not include the financial statements and my auditor's report thereon.

My opinion on the financial statements does not cover the other information, and accordingly I do not express any form of assurance conclusion thereon.

GPO Box 707, Canberra ACT 2601
38 Sydney Avenue, Forrest ACT 2603
Phone (02) 6203 7300

In connection with my audit of the financial statements, my responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or my knowledge obtained in the audit, or otherwise appears to be materially misstated.

If, based on the work I have performed, I conclude that there is a material misstatement of this other information, I am required to report that fact. I have nothing to report in this regard.

Accountable Authority's responsibility for the financial statements

As the Accountable Authority of the Entity, the Chief Executive Officer and Director of Meteorology is responsible under the *Public Governance, Performance and Accountability Act 2013* (the Act) for the preparation and fair presentation of annual financial statements that comply with Australian Accounting Standards – Simplified Disclosures and the rules made under the Act. The Chief Executive Officer and Director of Meteorology is also responsible for such internal control as the Chief Executive Officer and Director of Meteorology determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the Chief Executive Officer and Director of Meteorology is responsible for assessing the ability of the Entity to continue as a going concern, taking into account whether the Entity's operations will cease as a result of an administrative restructure or for any other reason. The Chief Executive Officer and Director of Meteorology is also responsible for disclosing, as applicable, matters related to going concern and using the going concern basis of accounting, unless the assessment indicates that it is not appropriate.

Auditor's responsibilities for the audit of the financial statements

My objective is to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes my opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with the Australian National Audit Office Auditing Standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of the financial statements.

As part of an audit in accordance with the Australian National Audit Office Auditing Standards, I exercise professional judgement and maintain professional scepticism throughout the audit. I also:

- identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for my opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control;
- obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Entity's internal control;
- evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the Accountable Authority;
- conclude on the appropriateness of the Accountable Authority's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Entity's ability to continue as a going concern. If I conclude that a material uncertainty exists, I am required to draw attention in my auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify my opinion. My conclusions are based on the audit evidence obtained up to the date of my auditor's report. However, future events or conditions may cause the Entity to cease to continue as a going concern; and
- evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

I communicate with the Accountable Authority regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that I identify during my audit.

Australian National Audit Office

A handwritten signature in black ink, appearing to read 'Bradley Medina', written in a cursive style.

Bradley Medina
Executive Director
Delegate of the Auditor-General

Canberra
18 September 2023

**BUREAU OF METEOROLOGY
STATEMENT BY THE ACCOUNTABLE AUTHORITY AND CHIEF FINANCIAL OFFICER**

In our opinion, the attached financial statements for the year ended 30 June 2023 comply with subsection 42(2) of the *Public Governance, Performance and Accountability Act 2013* (PGPA Act), and are based on properly maintained financial records as per subsection 41(2) of the PGPA Act.

In our opinion, at the date of this statement, there are reasonable grounds to believe that the Bureau of Meteorology will be able to pay its debts as and when they fall due.

Signed.....

Dr. A. Johnson
Chief Executive Officer and
Director of Meteorology

15 September 2023

Signed.....

J. Stone
Chief Financial Officer

15 September 2023

BUREAU OF METEOROLOGY
Statement of Comprehensive Income
for the period ended 30 June 2023

	Notes	2023 \$'000	Restated ¹ 2022 \$'000	Original Budget 2023 \$'000
NET COST OF SERVICES				
Expenses				
Employee Benefits	1.1A	210,568	201,356	213,955
Supplier Expenses	1.1B	191,008	139,721	193,180
Depreciation and Amortisation	2.2A	133,474	131,137	127,252
Finance Costs	1.1C	2,352	2,083	759
Write-Down and Impairment of Assets	1.1D	31,434	1,460	1
Foreign Exchange Losses		227	127	-
Loss from Sale of Assets		-	24	-
Contributions to WMO and IOC ²		2,473	2,677	1,992
Total expenses		571,536	478,585	537,139
Own-source income				
Own-source revenue				
Revenue from Contracts with Customers	1.2A	64,994	60,410	48,207
Aviation Industry	1.2B	33,269	25,408	37,235
Other Revenue	1.2C	560	3,532	-
Total own-source revenue		98,823	89,350	85,442
Gains				
Sale of Assets		133	124	-
Foreign Exchange Gains		519	462	-
Other Gains		2,354	19	-
Total gains		3,006	605	-
Total own-source income		101,829	89,955	85,442
Net (cost of) services		(469,707)	(388,627)	(451,697)
Revenue from Government	1.2D	345,500	315,733	345,500
Deficit		(124,207)	(72,894)	(106,197)
OTHER COMPREHENSIVE INCOME				
Changes in Asset Revaluation Reserve		49,758	-	-
Total comprehensive loss		(74,449)	(72,894)	(106,197)

1. Financial year 2022 numbers have been restated as per prior period error noted in overview section.
2. Contributions to World Meteorological Organization (WMO) and Inter-Governmental Oceanographic Commission (IOC).

The above statement should be read in conjunction with the accompanying notes.

BUREAU OF METEOROLOGY Statement of Comprehensive Income

for the period ended 30 June 2023

Budget Variances Commentary

Finance Costs

Variance predominately relates to interest on lease liabilities, reflecting higher interest expense after the 2022-23 review and correction of right of use liabilities recognised.

Write-Down and Impairment of Other Assets

Actual expenses reflect the Bureau's stocktake and review of assets where an asset or an asset under construction was found to be partially or fully impaired. This write-down and impairment were not known during the development of the budget.

Foreign Exchange Losses

Foreign exchange losses were not known during the development of the budget.

Contributions to WMO and IOC

Bureau contributions to the World Meteorological Organisation are impacted by contribution rates from the Australian Government and the exchange rate. This has resulted in higher than budgeted contributions.

Revenue from Contracts with Customers

Higher revenue from contracts reflects new and higher revenue than anticipated from arrangements with business and government entities across the Defence, Research and Development, and Energy and Resources sectors.

Aviation Industry

Lower than budgeted Aviation Industry own-source income reflects lower flight activity than assumed during the development of the budget.

Sale of Assets

Sale of assets are not known during the development of the budget.

Foreign Exchange Gains

Foreign exchange gains are not known during the development of the budget.

Other Gains

Other gains are not known during the development of the budget. The actual reflects the discharge of provisions no longer required to be held by the Bureau.

Changes in Asset Revaluation Reserve

Changes to the Asset Revaluation Reserve are not known during the development of the budget. The actual balance reflects the Bureau's review of assets where assets have been revalued.

BUREAU OF METEOROLOGY
Statement of Financial Position

as at 30 June 2023

	Notes	2023 \$'000	Restated ¹ 2022 \$'000	Original Budget 2023 \$'000
ASSETS				
Financial Assets				
Cash and Cash Equivalents	2.1A	3,230	430	430
Trade and Other Receivables	2.1B	254,786	254,846	164,480
Accrued Revenue		6,690	-	3,671
Total Financial Assets		264,706	255,276	168,581
Non-Financial Assets²				
Land	2.2A	14,826	14,906	14,651
Buildings	2.2A	209,661	191,538	147,407
Plant and Equipment	2.2A	452,036	417,203	530,305
Computer Software	2.2A	346,431	269,810	401,865
Other Intangibles	2.2A	861	1,323	1,323
Inventories	2.2B	4,818	4,444	4,446
Prepayments		15,643	16,771	16,771
Total Non-Financial Assets		1,044,276	915,995	1,116,768
Total Assets		1,308,982	1,171,271	1,285,349
LIABILITIES				
Payables				
Suppliers Payable	2.3A	75,426	66,138	94,030
Other Payables	2.3B	6,127	6,484	5,481
Total Payables		81,553	72,622	99,511
Interest Bearing Liabilities				
Leases	2.4A	147,570	138,021	95,512
Total Interest Bearing Liabilities		147,570	138,021	95,512
Provisions				
Employee Provisions	4.1	70,252	67,177	67,177
Provision for Restoration	2.5	28,312	26,965	26,965
Total Provisions		98,564	94,142	94,142
Total Liabilities		327,687	304,785	289,165
Net Assets		981,295	866,486	996,184
EQUITY				
Contributed Equity		1,689,665	1,499,868	1,689,664
Reserves		383,807	334,049	334,049
Accumulated Deficit		(1,092,177)	(967,431)	(1,027,529)
Total Equity		981,295	866,486	996,184

1. Financial year 2022 numbers have been restated as per prior period error noted in overview section.

2. Right-of-use assets are included in the following line items: Land and Buildings.

The above statement should be read in conjunction with the accompanying notes.

BUREAU OF METEOROLOGY
Statement of Financial Position

as at 30 June 2023

Budget Variances Commentary

Trade and Other Receivables

Appropriation balances contained within the receivables balance is higher than anticipated in the budget due to delays in major program of work and a significant movement of funds request.

Accrued Revenue

Balance includes lease incentives that was not known during the development of the budget.

Non-Financial Assets

The Bureau's stocktake and review of assets including where an asset or an asset under construction was found to be partially or fully impaired resulted in revaluation, write off and disposal of assets that was not known during the development of the budget.

Suppliers Payables

Variance reflects timing of payments to vendors.

Leases

Addition of new lease, and adjustments made upon review of right of use asset and lease liabilities that was not known during development of the budget.

BUREAU OF METEOROLOGY
Statement of Changes in Equity
for the period ended 30 June 2023

	2023 \$'000	Restated ¹ 2022 \$'000	Original Budget 2023 \$'000
CONTRIBUTED EQUITY			
Balance carried forward from previous period	1,499,868	1,250,095	1,499,867
Adjusted opening balance	1,499,868	1,250,095	1,499,867
Transactions with owners			
Contributions by owners			
Equity injection - Appropriations	130,218	203,759	130,218
Departmental capital budget	59,579	46,014	59,579
Total transactions with owners	189,797	249,773	189,797
Closing balance as at 30 June	1,689,665	1,499,868	1,689,664
RETAINED EARNINGS			
Opening balance			
Balance carried forward from previous period	(967,431)	(844,934)	(921,332)
Adjustment for errors	-	(48,938)	-
Adjusted opening balance	(967,431)	(893,872)	(921,332)
Comprehensive income			
Deficit for the period	(124,207)	(72,894)	(106,197)
Total comprehensive income	(124,207)	(72,894)	(106,197)
Transactions with owners			
Distributions to owners			
Other	(539)	(665)	-
Total transactions with owners	(539)	(665)	-
Closing balance as at 30 June	(1,092,177)	(967,431)	(1,027,529)
ASSET REVALUATION RESERVE			
Opening balance			
Balance carried forward from previous period	334,049	334,049	334,049
Adjusted opening balance	334,049	334,049	334,049
Comprehensive income			
Change in asset revaluation reserve	49,758	-	-
Total comprehensive income	49,758	-	-
Closing balance as at 30 June	383,807	334,049	334,049

BUREAU OF METEOROLOGY
Statement of Changes in Equity
for the period ended 30 June 2023

	2023 \$'000	Restated ¹ 2022 \$'000	Original Budget 2023 \$'000
TOTAL EQUITY			
Opening balance			
Balance carried forward from previous period	866,486	739,210	912,584
Adjustment for errors	-	(48,938)	-
Adjusted opening balance	866,486	690,272	912,584
Comprehensive income			
Deficit for the period	(124,207)	(72,894)	(106,197)
Total comprehensive income	(124,207)	(72,894)	(106,197)
Other comprehensive income			
Change to asset revaluation reserve	49,758	-	-
Total other comprehensive income	49,758	-	-
Transactions with owners			
Distributions to owners			
Returns of capital			
Other	(539)	(665)	-
Contributions by owners			
Equity injection - Appropriations	130,218	203,759	130,218
Departmental capital budget	59,579	46,014	59,579
Total transactions with owners	189,258	249,108	189,797
Closing balance as at 30 June	981,295	866,486	996,184

1. Financial year 2022 numbers have been restated as per prior period error noted in overview section.

The above statement should be read in conjunction with the accompanying notes.

Accounting Policy

Equity Injections

Amounts appropriated which are designated as 'equity injections' for a year (less any formal reductions) and Departmental Capital Budgets (DCBs), are recognised directly in contributed equity in that year.

Other Distributions to Owners

The Financial Reporting Rule requires that distributions to owners be debited to contributed equity unless it is in the nature of a dividend.

BUREAU OF METEOROLOGY
Cash Flow Statement
for the period ended 30 June 2023

	2023 \$'000	Restated ¹ 2022 \$'000	Original Budget 2023 \$'000
Notes			
OPERATING ACTIVITIES			
Cash received			
Appropriations	461,308	383,075	428,945
Sales of goods and rendering of services	95,289	87,908	85,441
GST received	24,668	25,688	-
Total cash received	581,265	496,671	514,386
Cash used			
Employees	(208,076)	(203,046)	(214,958)
Suppliers	(218,838)	(172,478)	(193,180)
Interest payments on lease liabilities	(1,617)	(1,395)	(759)
Section 74 receipts transferred to the OPA	(113,780)	(85,081)	(85,442)
GST paid	-	-	(1,992)
Total cash used	(542,311)	(462,000)	(496,331)
Net cash from operating activities	38,954	34,671	18,055
INVESTING ACTIVITIES			
Cash received			
Proceeds from sales of property, plant and equipment and assets held for sale	1,153	705	1,225
Total cash received	1,153	705	1,225
Cash used			
Purchase of property, plant and equipment and intangibles	(202,016)	(179,877)	(285,947)
Total cash used	(202,016)	(179,877)	(285,947)
Net cash used by investing activities	(200,863)	(179,172)	(284,722)
FINANCING ACTIVITIES			
Cash received			
Departmental capital budget	58,263	46,014	-
Contributed equity	134,611	126,259	282,161
Total cash received	192,874	172,273	282,161
Cash used			
Principal payments of lease liabilities	(27,626)	(27,098)	(15,494)
Other	(539)	(665)	-
Total cash used	(28,165)	(27,763)	(15,494)
Net cash from financing activities	164,709	144,510	266,667
Net increase/(decrease) in cash held	2,800	9	-
Cash and equivalents at the beginning of the reporting period	430	421	430
Cash and equivalents at the end of the reporting period	3,230	430	430

1. Financial year 2022 numbers have been restated as per prior period error noted in overview section.

The above statement should be read in conjunction with the accompanying notes.

BUREAU OF METEOROLOGY

Cash Flow Statement

for the period ended 30 June 2023

Budget Variances Commentary

Appropriations

Appropriations drawdown higher than budgeted, reflecting the decrease in supplier payables.

Sale of goods

Receipts higher than budgeted reflecting project activity for own source revenue contracts not known at the time of budget development.

GST and Suppliers

Budget reflected GST net against suppliers.

Section 74 receipts transferred to the OPA

Transfers to OPA higher than budgeted, reflecting value and timing of receipts for external contracts.

Purchase of Property Plant and Equipment

Variance reflects lower than anticipated spend on projects; approved movement of ROBUST project funds to 2023-24.

Cash received DCB and Equity

Lower drawdown of DCB/ Equity associated with purchase of Property Plant and Equipment.

Principle payments on lease liabilities

Adjustments impacting 2022 balances made on review of right of use asset and liabilities not known during development of the budget.

BUREAU OF METEOROLOGY

Notes to the Financial Statements

Overview

Objectives of the Entity

The Bureau of Meteorology (the Bureau) is Australia's national weather, climate and water information agency operating under the authority of the *Meteorology Act 1955* and the *Water Act 2007*.

The Bureau is an Executive Agency under the *Public Service Act 1999*, and a non-corporate Commonwealth entity under the PGPA Act. The Bureau operates under the Climate Change, Energy, the Environment and Water Portfolio and reports to the Minister for the Environment and Water.

The Bureau provides essential and trusted products and services that contribute to the safety, prosperity and wellbeing of the Australian community all day, every day.

The Bureau's work directly informs decisions by governments and the community and supports industry in key sectors such as emergency management, aviation, transport, water management, agriculture and environmental management.

The Basis of Preparation

The financial statements are required by section 42 of the PGPA Act.

The financial statements have been prepared in accordance with:

- a) *Public Governance, Performance and Accountability (Financial Reporting) Rule 2015 (FRR)*; and
- b) *Australian Accounting Standards and Interpretations* - including simplified disclosures for Tier 2 Entities under AASB 1060 issued by the Australian Accounting Standards Board (AASB) that apply for the reporting period.

The financial statements have been prepared on an accrual basis and in accordance with the historical cost convention, except for certain assets and liabilities at fair value. Except where stated, no allowance is made for the effect of changing prices on the results or the financial position. The financial statements are presented in Australian dollars.

New Accounting Standards

Adoption of New Australian Accounting Standard Requirements

Two amending standards (AASB2021-2 and AASB2021-6) were adopted earlier than the application date as stated in the standard. These amending standards have been adopted for the 2022-23 reporting period.

Standard/ Interpretation	Nature of change in accounting policy, transitional provisions, and adjustment to financial statements
AASB 2021-2 Amendments to Australian Accounting Standards – Disclosure of Accounting Policies and Definition of Accounting Estimates (AASB2021-2) and	AASB 2021-2 amends AASB7, AASB101, AASB108, AASB134 and AASB Practice Statement 2. The amending standard requires the disclosure of material, rather than significant, accounting policies, and clarifies what is considered a change in accounting policy compared to a change in accounting estimate.
AASB 2021-6 Amendments to Australian Accounting Standards – Disclosure of Accounting Policies: Tier 2 and Other Australian Accounting Standards (AASB2021-6)	AASB 2021-6 amends the Tier 2 reporting requirements set out in AASB 1049, AASB 1054 and AASB 1060 to reflect the changes made by AASB 2021-2.

Taxation

The Bureau is exempt from all forms of taxation except Fringe Benefits Tax (FBT) and the Goods and Services Tax (GST).

Events After the Reporting Period

There has been no subsequent event that had the potential to significantly affect the ongoing structure and financial activities of the Bureau.

BUREAU OF METEOROLOGY Notes to the Financial Statements

Prior Period Errors

The following prior period errors have been restated in the 2022-23 financial statements. The prior period errors relate to: Property, Plant and Equipment and Intangibles

- AASB 116 and AASB 138 include recognition and measurement criteria for assets under construction. The Bureau has reviewed its assets under construction values and identified errors in the application of these standards including values that have been incorrectly capitalised and depreciation not commencing when an asset became available for use. The Bureau has corrected the prior period by restating the closing balance for the 2022 financial year. The Bureau has adopted a practical approach so has not applied a full retrospective restatement.

Leases

- AASB 16 came into effect for the 2020 financial reporting period and was adopted by the Bureau using the modified retrospective approach applying the practical expedient to not reassess whether a contract is or contains a lease at the date of initial application. The Bureau has reviewed its right-of-use asset and lease liability values and identified errors in application of the standard including the omission of contracts that should have been assessed as leases and calculation adjustments. The Bureau has recalculated its lease values and corrected the prior period by restating the amounts for the 2022 financial year.

Revenue

- AASB 15 and AASB 1058 came into effect for the 2020 financial reporting period and were adopted by the Bureau using the modified retrospective approach, with the Bureau electing to apply the new standard to all new and uncompleted contracts at that date. The Bureau has reviewed the value of its accrued revenue and contract liability balances as at 30 June 2022 and has determined that it incorrectly applied AASB 15 and AASB 1058 in recognising its own-source revenue and associated accruals. The Bureau has corrected the prior period by restating the closing balance for the 2022 financial year. The Bureau has adopted a practical approach so has not applied a full retrospective restatement as data supporting the timing of the performance obligations is not available to facilitate retrospective restatement.

The prior period errors above have the following combined impact on 2022 financial year closing balances:

Financial Statement	Line Item	Original \$'000	Adjustment \$'000	Closing and comparative balances \$'000
Statement of Comprehensive Income	Depreciation and amortisation	120,193	10,944	131,137
	Finance costs	1,585	498	2,083
	Supplier expenses	151,806	(12,085)	139,721
Statement of Financial Position	Accrued revenue	3,671	(3,671)	-
	Land	14,320	586	14,906
	Buildings	151,974	39,564	191,538
	Plant and equipment	449,509	(32,306)	417,203
	Computer software	304,432	(34,622)	269,810
	Suppliers payable	94,030	(27,892)	66,138
	Lease liability	(94,483)	(43,538)	138,021
	Equity – accumulated deficit	(921,336)	(46,095)	(967,431)
Statement of Changes in Equity	Deficit for the period	(73,537)	643	(72,894)
	Adjustment for errors	-	(48,938)	(48,938)
	Opening retained earnings	(847,134)	2,200	(844,934)
Cash Flow Statement	Interest payments on lease liabilities	(897)	(498)	(1,395)
	Principal payments of lease liabilities	(15,511)	(11,587)	(27,098)
	Suppliers	(184,563)	12,085	(172,478)

BUREAU OF METEOROLOGY

Notes to the Financial Statements

Financial Performance

This section analyses the financial performance of the Bureau of Meteorology for the year ended 2023.

1.1 Expenses

	2023 \$'000	2022 \$'000
1.1A: Employee Benefits		
Wages and salaries	148,426	144,369
Superannuation		
Defined contribution plans	21,510	19,270
Defined benefit plans	10,359	11,473
Leave and other entitlements	26,230	21,954
Separation and redundancies	3,002	2,371
Other	1,041	1,919
Total employee benefits	210,568	201,356

Accounting Policy

Accounting policies for employee related expenses are contained in the People and Relationships section (Note 4.1).

	2023 \$'000	Restated ¹ 2022 \$'000
1.1B: Supplier Expenses		
Goods and services supplied or rendered		
Consultants	1,879	3,747
Contractors	45,527	42,715
External professional provider services	53,750	15,130
Communication and consumables - observing network	26,206	25,705
Communication consumables - other	38,337	32,944
Property operating expenses	7,880	8,076
IT services	4,244	1,960
Office expenses	1,426	1,126
Other	4,441	3,199
Total goods and services supplied or rendered	183,690	134,602
Goods supplied	14,075	16,262
Services rendered	169,615	118,340
Total goods and services supplied or rendered	183,690	134,602
Other suppliers		
Property operating expenses	5,747	4,122
Workers compensation expenses	846	806
Short-term leases	725	36
Low value leases	-	155
Total other suppliers	7,318	5,119
Total suppliers	191,008	139,721

1. Financial year 2022 numbers have been restated as per prior period error noted in overview section.

BUREAU OF METEOROLOGY

Notes to the Financial Statements

The Bureau has short-term lease commitments of \$724,751 and no low value lease commitments as at 30 June 2023.

The above lease disclosures should be read in conjunction with the accompanying Notes 1.1C, 2.2A and 2.4A.

Accounting Policy

Short-term Leases and Leases of Low-value Assets

The Bureau has elected not to recognise right-of-use assets and lease liabilities for short-term leases of assets that have a lease term of 12 months or less and leases of low-value assets (less than \$10,000). The Bureau recognises the lease payments associated with these leases as an expense on a straight-line basis over the lease term.

	2023 \$'000	Restated ¹ 2022 \$'000
1.1C: Finance Costs		
Unwinding of discount	735	688
Interest on lease liabilities	1,617	1,395
Total finance costs	2,352	2,083

1. Financial year 2022 numbers have been restated as per prior period error noted in overview section.

The above lease disclosures should be read in conjunction with the accompanying Notes 1.1B, 2.2A and 2.4A.

	2023 \$'000	'2022 \$'000
1.1D: Write-Down and Impairment of Assets		
Trade and other receivables	263	3
Property, plant and equipment	23,317	1,014
Intangibles	7,364	80
Inventories	490	363
Total write-down and impairment of assets	31,434	1,460

Write-down of property, plant and equipment and intangibles includes write downs for the change in asset recognition threshold \$3.746m, stocktake adjustments \$10.136m, software impairment assessment \$3.716m, revaluation corrections \$3.908m, and assets under construction review \$9.050m.

BUREAU OF METEOROLOGY
Notes to the Financial Statements

1.2 Own-Source Revenue		
	2023	2022
	\$'000	\$'000

1.2A: Revenue from Contracts with Customers		
Sale of goods	1,629	1,671
Rendering of services	63,365	58,739
Total revenue from sale of goods and services	64,994	60,410

Disaggregation of revenue

Major product / service line:		
Defence weather services	21,549	11,154
Consultative services	24,778	36,452
Research	7,244	6,405
Other revenue	11,423	6,399
	64,994	60,410

Accounting Policy

Revenue from the sale of goods is recognised when control has been transferred to the buyer.

A contract is in scope of AASB 15 when it is probable that the Bureau will collect the consideration to which it will be entitled based on the existing relationship with, and knowledge of, the customer's ability and intention to pay the consideration.

Defence weather, consultative and research services - Recognition is contingent on the terms of the individual contract. Due to the nature of the services, revenue is recognised upon delivery of services or performance obligations over time in line with the term of the contract as per AASB 15.

The transaction price is the total amount of consideration to which the entity expects to be entitled in exchange for transferring promised goods or services to a customer. The consideration promised in a contract with a customer may include fixed amounts, variable amounts, or both.

Receivables for goods and services, which have 30 day terms, are recognised at the nominal amounts due less any impairment allowance account. Collectability of debts is reviewed at end of the reporting period. Allowances are made when collectability of the debt is no longer probable.

	2023	2022
	\$'000	\$'000

1.2B: Aviation Industry		
Revenue from Aviation ¹	33,269	25,408
Total other revenue	33,269	25,408

- Aviation revenue falls under the scope of AASB 1058. Aviation weather services relates to the provision of meteorological services in support of the Civil Aviation, the costs for which is recovered pursuant to the *Meteorology Act 1955*.

BUREAU OF METEOROLOGY
Notes to the Financial Statements

	2023 \$'000	2022 \$'000
1.2C: Other Revenue		
Resources received free of charge		
Remuneration of auditors	105	105
Inventory received free of charge ¹	232	204
Insurance refunds	214	3,212
Other	9	11
Total other revenue	560	3,532

1. Consists of bathythermographs gifted from the US and Japan Navy, radiosondes as replacement for faulty products and project stock donated for general use.

Accounting Policy

Resources Received Free of Charge

Resources received free of charge are recognised as revenue when, and only when, a fair value can be reliably determined and the services would have been purchased if they had not been donated. Use of those resources is recognised as an expense. Resources received free of charge are recorded as either revenue or gains depending on their nature.

	2023 \$'000	2022 \$'000
1.2D: Revenue from Government		
Appropriations		
Departmental appropriations	345,500	312,292
Supplementation	-	3,441
Total revenue from Government	345,500	315,733

Accounting Policy

Revenue from Government

Amounts appropriated for departmental appropriations for the year (adjusted for any formal additions and reductions) are recognised as Revenue from Government when the Bureau gains control of the appropriation, except for certain amounts that relate to activities that are reciprocal in nature, in which case revenue is recognised only when it has been earned. Appropriations receivable are recognised at their nominal amounts.

Departmental operating supplementation is recognised as receivable from Government until the amount approved is legally appropriated.

BUREAU OF METEOROLOGY
Notes to the Financial Statements

Financial Position

This section analyses the Bureau of Meteorology's assets used to conduct its operations and the operating liabilities incurred as a result. Employee related information is disclosed in the People and Relationships section.

2.1 Financial Assets

	2023 \$'000	2022 \$'000
2.1A: Cash and Cash Equivalents		
Cash on hand or on deposit	1,348	430
Cash in special accounts	1,882	-
Total cash and cash equivalents	3,230	430

Accounting Policy

Cash is recognised at its nominal amount. Cash and cash equivalents includes:

- a) Cash on hand.
- b) Cash in special accounts.

	2023 \$'000	2022 \$'000
2.1B: Trade and Other Receivables		
Goods and services receivables		
Goods and Services	5,439	4,265
Contract assets from contracts with customers	7,142	5,168
Total goods and services receivables	12,581	9,433
Appropriation receivables		
For ordinary annual appropriation	103,620	102,207
For capital - capital budget	1,316	-
Prior year supplementation	-	3,441
For equity injection	133,013	137,406
Total appropriation receivables	237,949	243,054
Other receivables		
GST receivable from the Australian Taxation Office	4,331	2,397
Other	14	8
Total other receivables	4,345	2,405
Total trade and other receivables (gross)	254,875	254,892
Less expected credit loss allowance	(89)	(46)
Total trade and other receivables (net)	254,786	254,846

Accounting Policy

Financial Assets

Trade receivables and other receivables that are held for the purpose of collecting the contractual cash flows where the cash flows are solely payments of principal and interest, that are not provided at below-market interest rates, are subsequently measured at amortised cost using the effective interest method adjusted for any loss allowance. Credit terms for goods and services were 30 days (2022: 30 days).

Refer Note 2.3A for information relating to contract liabilities, for contracts with customers.

BUREAU OF METEOROLOGY Notes to the Financial Statements

2.2 Non-Financial Assets

2.2A: Reconciliation of the Opening and Closing Balances of Property, Plant and Equipment and Intangibles

	Land \$'000	Buildings \$'000	Plant and equipment \$'000	Computer software \$'000	Other intangibles \$'000	Total \$'000
As at 1 July 2022	14,906	191,538	417,203	269,810	1,323	894,780
Gross book value	15,534	287,137	689,006	509,889	1,835	1,503,401
Accumulated depreciation and amortisation	(628)	(95,599)	(271,803)	(238,211)	(512)	(606,753)
Accumulated impairment	-	-	-	(1,868)	-	(1,868)
Adjusted total as at 1 July 2022	14,906	191,538	417,203	269,810	1,323	894,780
Additions						
Purchase or internally developed Right-of-use assets	-	795	94,953	116,656	-	212,404
Revaluations recognised in other comprehensive income ¹	631	38,773	-	-	-	39,404
Depreciation and amortisation	48	10,765	38,945	-	-	49,758
Depreciation on right-of-use assets	-	(4,122)	(67,320)	(35,859)	(463)	(107,764)
Reclassification	(367)	(25,343)	-	-	-	(25,710)
Reversal of impairment provision	-	6,685	(8,006)	1,321	-	-
Remeasurement of right-of-use asset	-	-	-	1,868	-	1,868
Impairments recognised in net cost of services	35	3,336	-	-	-	3,371
Disposals with proceeds	(420)	(566)	(22,751)	(7,364)	-	(30,681)
Disposals of right-of-use assets	(9)	(592)	(8)	-	-	(1,020)
Other movements	2	(11,609)	(984)	-	-	(12,602)
		1	4	(1)	1	7
Total as at 30 June 2023	14,826	209,661	452,036	346,431	861	1,023,815
Total as at 30 June 2023 represented by:						
Gross book value	15,817	282,493	482,669	499,969	1,786	1,282,734
Accumulated depreciation and amortisation	(991)	(72,832)	(30,633)	(153,538)	(925)	(258,919)
Total as at 30 June 2023	14,826	209,661	452,036	346,431	861	1,023,815
Carrying amount of right-of-use assets	4,387	133,306	-	-	-	137,693

1. Revaluations of non-financial assets. All revaluations were conducted in accordance with the revaluation policy.

BUREAU OF METEOROLOGY
Notes to the Financial Statements

Contractual commitments for the acquisitions of property, plant and equipment and intangible assets

	2023 \$'000	2022 \$'000
Capital commitments		
Property, plant and equipment		
Within 1 year	80,989	56,975
Between 1 to 5 years	69,511	3,726
Computer software		
Within 1 year	1,285	102,760
Between 1 to 5 years	114	112
Total capital commitments	151,899	163,573

Accounting Policy

Assets are recorded at cost on acquisition except as stated below. The cost of acquisition includes the fair value of assets transferred in exchange and liabilities undertaken. Non-financial assets are initially measured at their fair value plus transaction costs where appropriate.

Assets acquired at no cost, or for nominal consideration, are initially recognised as assets and income at their fair value at the date of acquisition, unless acquired as a consequence of restructuring of administrative arrangements. In the latter case, assets are initially recognised as contributions by owners at the amounts at which they were recognised in the transferor's accounts immediately prior to the restructuring.

Asset Recognition Threshold

The following thresholds apply for the recognition of purchases of property, plant and equipment in the Statement of Financial Position. The cost of an asset includes an estimate of the cost of dismantling and removing the item and restoring the site on which it is located. This is particularly relevant to 'make good' provisions in property leases taken up by the Bureau where there exists an obligation to restore the property to its original condition. These costs are included in the value of the Bureau's leasehold improvements and relevant assets with a corresponding liability recognised as a provision for 'make good' (Note 2.5).

Asset Type	Threshold	
	2023	2022
Land	No threshold	\$5,000
Buildings	\$50,000	\$5,000
Plant and equipment	\$5,000	\$5,000
Computer software	\$50,000	\$5,000
Other intangibles	\$50,000	\$5,000

Lease Right-of-Use (ROU) Assets

Lease ROU assets are capitalised at the commencement date of the lease and comprise of the initial lease liability amount, initial direct costs incurred when entering into the lease less any lease incentives received. After the commencement date, ROU assets are measured at cost less any accumulated depreciation and accumulated losses and adjusted for any re-measurement of the lease liability. These assets are accounted for by the Bureau as separate asset classes to corresponding assets owned outright, but included in the same column as where the corresponding underlying assets would be presented if they were owned.

On initial adoption of AASB 16 the Bureau has adjusted the ROU assets at the date of initial application by the amount of any provision for onerous leases recognised immediately before the date of initial application. Following initial application, an impairment review is undertaken for any ROU lease asset that shows indicators of impairment and an impairment loss is recognised against any ROU lease asset that is impaired. Lease ROU assets continue to be measured at cost after initial recognition.

BUREAU OF METEOROLOGY Notes to the Financial Statements

Revaluations

Following initial recognition at cost, land, buildings, property, plant and equipment (excluding ROU assets) are carried at fair value (or an amount not materially different from fair value) less subsequent accumulated depreciation and accumulated impairment losses. Valuations are conducted with sufficient frequency to ensure that the carrying amounts of assets do not differ materially from the assets' fair values as at the reporting date. The regularity of independent valuations depended upon the volatility of movements in market values for the relevant assets.

Any revaluation increment was credited to equity under the heading of asset revaluation reserve except to the extent that it reversed a previous revaluation decrement of the same asset class that was previously recognised in the surplus/deficit. Revaluation decrements for a class of assets were recognised directly in the surplus/deficit except to the extent that they reversed a previous revaluation increment for that class.

Any accumulated depreciation as at the revaluation date was eliminated against the gross carrying amount of the asset and the asset restated to the revalued amount.

A revaluation was undertaken this financial year, and the assessment of the fair value of the property, plant and equipment of the Bureau as at 30 June 2023 are summarised below.

Valuation Process

The Bureau engaged the service of ValQuip Consulting Pty Ltd (ValQuip) together with CIVAS (NSW) Pty Ltd (a subsidiary to Colliers) to carry out an independent valuation of certain property, plant, and equipment assets as at 30 June 2023. The valuation for financial reporting has been conducted in accordance with AASB 13 Fair Value Measurement.

The following methods were used to estimate Fair Value:

- Market approach - is used to estimate value from an analysis of actual transactions or offerings for economically comparable assets available as of the valuation date. The process is essentially that of comparison and correlation between the subject asset and similar assets that have been sold or are offered for sale in the market. The transaction or offering prices of the comparable assets are adjusted for dissimilarities in characteristics including location, age, time of sale, size, and utility, among others. The adjusted prices of the comparable assets provide an indication of value for the subject asset.
- Cost approach - is based on the principle of substitution, which suggests that a prudent buyer will pay no more for an asset than the cost to acquire a substitute asset of equal utility. When the cost to reproduce an asset exceeds the cost to replace it, if measurable, the cost of replacement is normally the appropriate starting point to develop an indication of value using the cost approach. The cost approach is used to determine values in circumstances where it is not possible to determine values using a market approach or an income approach.

Land and buildings were valued using the market and cost approach.

Plant and equipment primarily used the cost approach.

Depreciation

Depreciable property, plant and equipment assets are written-off to their estimated residual values over their estimated useful lives to the Bureau using, in all cases, the straight-line method of depreciation.

Depreciation rates (useful lives), residual values and methods are reviewed at each reporting date and necessary adjustments are recognised in the current, or current and future reporting periods, as appropriate.

Depreciation rates applying to each class of depreciable asset, excluding ROU assets, are based on the following useful lives:

	2023	2022
Buildings on freehold land	5 to 52 Years	5 to 52 Years
Leasehold improvements	Lease term	Lease term
Property, plant and equipment	2 to 50 Years	2 to 50 Years

The depreciation rates for ROU assets are based on the commencement date to the earlier of either the end of the useful life of the ROU asset or the end of the lease term.

BUREAU OF METEOROLOGY Notes to the Financial Statements

Impairment

All assets, including intangible assets, were assessed for impairment at 30 June 2023. Where indications of impairment exist, the asset's recoverable amount is estimated and an impairment adjustment made if the asset's recoverable amount is less than its carrying amount.

The recoverable amount of an asset is the higher of its fair value less costs of disposal and its value in use. Value in use is the present value of the future cash flows expected to be derived from the asset. Where the future economic benefit of an asset is not primarily dependent on the asset's ability to generate future cash flows and the asset would be replaced if the Bureau were deprived of the asset, its value in use is taken to be its depreciated replacement cost.

Derecognition

An item of property, plant and equipment is derecognised upon disposal or when no further future economic benefits are expected from its use or disposal.

Intangibles

The Bureau's intangibles comprise computer software which is carried at cost less accumulated amortisation and accumulated impairment losses.

Software is amortised on a straight-line basis over its anticipated useful life. The useful lives of the Bureau's software is predominately 3 to 5 years other than the Services System software which has a useful life of 20 years (2022: 3-5 years and 20 years, respectively).

For intangible assets assessed as having an indefinite useful life, these consist of software licences that authorise the Bureau to use the program indefinitely.

	2023 \$'000	2022 \$'000
2.2B: Inventories		
Inventories held for distribution	7,912	7,315
less: provision for obsolescence	(3,094)	(2,871)
Total inventories	4,818	4,444

During 2023, impairment losses of \$489,952 were recognised in profit or loss (2022: \$363,428).

Assessment of the loss of service potential of inventories held for distribution was based on frequency of usage, potential obsolescence and overstocking.

Accounting Policy

Inventories held for distribution are valued at cost, adjusted for any loss of service potential.

The Bureau's inventory holding consists of items utilised in the installation of sites, or the repair/maintenance of its equipment.

Items held for the purposes of major spare parts or as stand-by equipment are classified in the Bureau's accounts and records as property, plant and equipment in accordance with AASB 116.

BUREAU OF METEOROLOGY
Notes to the Financial Statements

2.3 Payables		
	2023	Restated ¹
	\$'000	2022 \$'000
2.3A: Suppliers Payable		
Trade creditors and accruals	58,653	51,997
Contract liabilities from contracts with customers	16,773	14,141
Total suppliers payable	75,426	66,138

1. Financial year 2022 numbers have been restated as per prior period error noted in overview section.

Settlement was usually made within 30 days. All supplier payables are expected to be settled within 12 months.

Refer Note 2.1B for information relating to contract assets from contracts with customers.

	2023	2022
	\$'000	\$'000
2.3B: Other Payables		
Wages and salaries	5,707	4,024
Superannuation	156	707
Separation and redundancies	264	1,753
Total other payables	6,127	6,484

Accounting Policy

Financial Liabilities

Supplier and other payables are recognised at amortised cost. Liabilities are recognised to the extent that the goods or services have been received regardless of whether an invoice has been received.

The contract liabilities from contracts with customers are associated with revenues received in advance of services being performed.

BUREAU OF METEOROLOGY
Notes to the Financial Statements

2.4 Interest Bearing Liabilities

	2023 \$'000	Restated ¹ 2022 \$'000
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2.4A: Leases

Lease liabilities		
Land	4,584	4,224
Buildings	142,986	132,811
Plant and equipment	-	986
Total leases	147,570	138,021

Maturity analysis – contractual undiscounted cash flows

Within 1 year	21,490	27,266
Between 1 to 5 years	75,332	73,676
More than 5 years	73,387	66,253
Total leases	170,209	167,195

1. Financial year 2022 numbers have been restated as per prior period error noted in overview section.

Total cash outflow for leases for the year ended 30 June 2023 was \$29.243m (2022: \$28.493m).

Significant lease arrangements:

- Canberra Data Centre, Fyshwick ACT – 15 year lease term expiring 14 April 2034. Contains annual price increases based on CPI rates.
- Future Data Centre - 6 year lease term, with 3 option periods up to 11 May 2038. Contains annual price increases based on CPI rates.
- 700 Collins Street, Docklands VIC – 10 year lease term expiring 31 July 2026. Contains annual fixed price increases based on 3.5% annual fixed rate review.

The Bureau in its capacity as lessee does not have any significant leasing arrangements with below market terms.

The above lease disclosures should be read in conjunction with the accompanying notes 1.1B, 1.1C and 2.2A.

Accounting Policy

For all new contracts entered into, the Bureau considers whether the contract is, or contains a lease. A lease is defined as 'a contract, or part of a contract, that conveys the right to use an asset (the underlying asset) for a period of time in exchange for consideration'.

Once it has been determined that a contract is, or contains a lease, the lease liability is initially measured at the present value of the remaining lease payments unpaid at the commencement date, discounted using the interest rate implicit in the lease, if that rate is readily determinable, or the department's incremental borrowing rate.

Subsequent to initial measurement, the liability will be reduced for payments made and increased for interest. It is remeasured to reflect any reassessment or modification to the lease. When the lease liability is remeasured, the corresponding adjustment is reflected in the right-of-use asset or profit and loss depending on the nature of the reassessment or modification.

BUREAU OF METEOROLOGY
Notes to the Financial Statements

2.5 Provision for Restoration		
	2023	2022
	\$'000	\$'000
As at 1 July	26,965	25,232
Additional provisions made	612	1,045
Unwinding of discount or change in discount rate	735	688
Total as at 30 June	28,312	26,965

Accounting Judgements and Estimates

Make Good

A provision for restoration obligation (make good) is recognised if, as a result of a past event, the Bureau has a present obligation (legal or constructive) that can be estimated reliably and it is probable that an outflow of economic benefits will be required to settle the obligation. Make good provisions are measured at the best estimate of the expenditure required to settle the present obligation at reporting date, including the risks and uncertainties specific to the liabilities.

Make good provisions are discounted to present value when the time value of money is material.

Provisions are reviewed annually and adjusted to reflect the current best estimate.

BUREAU OF METEOROLOGY

Notes to the Financial Statements

Funding

This section identifies the Bureau of Meteorology's funding structure.

3.1 Appropriations

3.1A: Annual Appropriations

Annual Appropriations for 2023

	Annual Appropriations	Adjustments to Appropriations ¹	Total Appropriations	Appropriation applied in 2023 (current and prior years)	Variance ²
	\$'000	\$'000	\$'000	\$'000	\$'000
Departmental					
Ordinary annual services	348,941	113,780	462,721	(458,456)	4,265
Capital budget ³	59,579	-	59,579	(58,263)	1,316
Other services					
Equity injections	130,218	-	130,218	(134,611)	(4,393)
Total Departmental	538,738	113,780	652,518	(651,330)	1,188

1. The adjustments to appropriations includes adjustments to current year annual appropriations including the PGPA Act Section 74 Receipts.
2. The variances disclosed are made up of the movement in cash, appropriation receivable and GST receivable.
3. Departmental and Administered Capital Budgets are appropriated through Appropriation Acts (No.1,3,5). They form part of ordinary annual services and are not separately identified in the Appropriation Acts.

Annual Appropriations for 2022

	Annual Appropriations	Adjustments to Appropriations ¹	Total Appropriations	Appropriation applied in 2022 (current and prior years)	Variance ²
	\$'000	\$'000	\$'000	\$'000	\$'000
Departmental					
Ordinary annual services	312,292	85,081	397,373	(382,735)	14,638
Capital budget ³	46,014	-	46,014	(46,014)	-
Other services					
Equity injections	203,759	-	203,759	(126,259)	77,500
Total Departmental	562,065	85,081	647,146	(555,008)	92,138

1. The adjustments to appropriations includes adjustments to current year annual appropriations including the PGPA Act Section 74 Receipts.
2. The variances disclosed are made up of the movement in cash, appropriation receivable and GST receivable.
3. Departmental and Administered Capital Budgets are appropriated through Appropriation Acts (No.1,3,5). They form part of ordinary annual services and are not separately identified in the Appropriation Acts.

BUREAU OF METEOROLOGY
Notes to the Financial Statements

	2023 \$'000	2022 \$'000
3.1B: Unspent Annual Appropriations ('Recoverable GST exclusive')		
Departmental		
Appropriation Act (No 1) - Operating - 2022-23	42,482	-
Supply Act (No. 3) - Operating - 2022-23	61,138	-
Appropriation Act (No. 1) - Operating - 2021-22	-	102,207
DCB Supply Act (No.3) 2022 -2023	1,316	-
Appropriation Act (No.2) Equity 2022-2023	58,557	-
Appropriation Act (No.4) Equity 2022-2023	71,661	-
Appropriation Act (No.2) Equity 2021-2022	2,626	98,550
Appropriation Act (No.4) Equity 2021-2022	-	1,168
Appropriation Act (No.2) Equity 2020-2021	-	35,079
Appropriation Act (No.4) Equity 2020-2021	169	2,609
Cash and cash equivalents	1,347	430
Total departmental	239,296	240,043

3.2 Special Accounts		
	Services for Other Entities and Trust Moneys - Bureau of Meteorology Special Account ¹	
	2023 \$'000	2022 \$'000
Balance brought forward from previous period	1,108	1,574
Increases	1,424	214
Available for payments	2,532	1,788
Decreases	(650)	(680)
Total Departmental	1,882	1,108
Total balance carried to the next period	1,882	1,108
Balance represented by:		
Cash held in the Official Public Account	1,882	1,108
Total balance carried to the next period	1,882	1,108

1. Appropriation: *Public Governance, Performance and Accountability Act 2013, section 78.*
 Establishing Instrument: *Financial Management and Accountability Determination 2010/02.*
 Purpose: To enable the Bureau to hold and expend amounts on behalf of persons or entities other than the Commonwealth.

BUREAU OF METEOROLOGY
Notes to the Financial Statements

3.3 Net Cash Appropriation Arrangements		
	2023	2022
	\$'000	\$'000
3.3: Net Cash Appropriation Arrangements		
Total comprehensive income/(loss) - as per the Statement of Comprehensive Income	(74,449)	(72,894)
Plus: depreciation/amortisation of assets funded through appropriations (departmental capital budget funding and/or equity injections)	107,764	103,793
Plus: depreciation right-of-use assets	25,710	16,400
Less: lease principal repayments	(26,009)	(25,703)
Net Cash Operating Surplus	33,016	21,596
Plus: write-down and impairment of other assets	31,434	1,457
Less: change in asset revaluation reserve	(49,758)	-
Net Cash Operating Surplus attributable to the Bureau	14,692	23,053

From 2010-11, the Government introduced net cash appropriation arrangements where revenue appropriations for depreciation/amortisation expenses of non-corporate Commonwealth entities and selected corporate Commonwealth entities were replaced with a separate capital budget provided through equity appropriations. Capital budgets are to be appropriated in the period when cash payment for capital expenditure is required.

The inclusion of depreciation/amortisation expenses related to ROU leased assets and the lease liability principal repayment amount reflects the impact of AASB 16 Leases, which does not directly reflect a change in appropriation arrangements.

BUREAU OF METEOROLOGY Notes to the Financial Statements

People and Relationships

This section describes a range of employment and post employment benefits provided to our people and our relationships with other key people.

4.1 Employee Provisions

	2023 \$'000	2022 \$'000
4.1: Employee Provisions		
Leave	70,218	67,143
FBT payable	34	34
Total employee provisions	70,252	67,177

Accounting Policy

Liabilities for 'short-term employee benefits' and termination benefits expected within twelve months of the end of reporting period are measured at their nominal amounts.

Other long term employee benefits are measured as net total of the present value of the defined benefit obligation at the end of the reporting period minus the fair value at the end of the reporting period of plan assets (if any) out of which the obligations are to be settled directly.

Leave

The liability for employee benefits includes provision for annual leave and long service leave.

The leave liabilities are calculated on the basis of employees' remuneration at the estimated salary rates that will be applied at the time leave is taken, including the Bureau's employer superannuation contribution rates to the extent that the leave is likely to be taken during service rather than paid out on termination.

The liabilities for annual leave and long service leave have been determined by reference to the work of an actuary as at 30 June 2022. The estimate of the present value of the liability takes into account attrition rates and pay increases through promotion and inflation.

Separation and redundancy

Provision is made for separation and redundancy benefit payments. The Bureau recognises a provision for termination when it has developed a detailed formal plan for the terminations and has informed those employees affected that it will carry out the terminations.

Termination benefits

An employee whose employment is terminated under section 29(3) of the PS Act following their agreement to be voluntarily retrenched is entitled to be paid a severance benefit of an amount equal to two weeks' salary for each completed year of continuous service, plus a pro-rata payment for completed months of service since the last completed year of service, subject to any minimum amount the employee is entitled to under the National Employment Standards (NES). Separation payments for the year ended 30 June 2023 were \$0 (2022: \$2,591,563.02).

Superannuation

Staff of the Bureau are members of the Commonwealth Superannuation Scheme (CSS), the Public Sector Superannuation Scheme (PSS), the PSS accumulation plan (PSSap) and other superannuation funds held outside the Australian Government. The CSS and PSS are defined benefit schemes for the Australian Government. The PSSap is a defined contribution scheme.

The liability for defined benefits is recognised in the financial statements of the Australian Government and is settled by the Australian Government in due course. This liability is reported in the Department of Finance's administered schedules and notes.

The Bureau makes employer contributions to the employees' superannuation scheme at rates determined by an actuary to be sufficient to meet the current cost to the Government. The Bureau accounts for the contributions as if they were contributions to defined contribution plans.

The liability for superannuation recognised as at 30 June 2023 represents outstanding contributions.

BUREAU OF METEOROLOGY

Notes to the Financial Statements

4.2 Key Management Personnel Remuneration

Key management personnel are those persons having authority and responsibility for planning, directing and controlling the activities of the Bureau, directly or indirectly, including any director (whether executive or otherwise) of the Bureau. The Bureau has determined the key management personnel to be the Director of Meteorology/Chief Executive Officer and Group Executives. Key management personnel remuneration is reported in the table below:

	2023 \$'000	2022 \$'000
Short-term employee benefits	2,735	2,651
Post-employment benefits	401	416
Other long-term employee benefits	49	94
Termination benefits	-	32
Total key management personnel remuneration expenses¹	3,185	3,193

The total number of key management personnel that are included in the above table are 8 individuals (2022: 9 individuals).

1. The above key management personnel remuneration excludes the remuneration and other benefits of the Portfolio Minister. The Portfolio Minister's remuneration and other benefits are set by the Remuneration Tribunal and are not paid by the Bureau.

4.3 Related Party Disclosures

Related party relationships:

The Bureau is an Australian Government controlled entity. Related parties to the Bureau are Key Management Personnel including the Portfolio Minister and Executive, and other Australian Government entities.

Transactions with related parties:

Given the breadth of Government activities, related parties may transact with the government sector in the same capacity as ordinary citizens. Such transactions include the payment or refund of taxes, receipt of a Medicare rebate or higher education loans. These transactions have not been separately disclosed in this note.

Significant transactions with related parties can include:

- the payments of grants or loans;
- purchases of goods and services;
- asset purchases, sales, transfers or leases;
- debts forgiven; and
- guarantees.

Giving consideration to relationships with related entities, and transactions entered into during the reporting period by the Bureau, it has been determined that there are no related party transactions to be separately disclosed.

BUREAU OF METEOROLOGY Notes to the Financial Statements

Managing Uncertainties

This section analyses how the Bureau of Meteorology manages financial risks within its operating environment.

5.1 Contingent Assets and Liabilities

	Claim for damages or costs	
	2023 \$'000	2022 \$'000
5.1A: Contingent Assets		
Contingent assets		
Balance from previous period	365	58
New contingent assets recognised	124	119
Re-measurement	-	4,901
Assets realised	(410)	(4,713)
Total contingent assets	79	365

Quantifiable contingencies

The Bureau has a number of claims with Comcover in respect of motor vehicle damage, radar equipment and property.

The Bureau had no quantifiable contingent liabilities in 2023 (2022: Nil).

Unquantifiable contingencies

The Bureau has no unquantifiable contingencies to report in 2023.

Accounting Policy

Contingent liabilities and contingent assets are not recognised in the Statement of Financial Position but are reported in the notes. They may arise from uncertainty as to the existence of a liability or asset or represent an asset or liability in respect of which the amount cannot be reliably measured.

Contingent assets are disclosed when settlement is probable but not virtually certain and contingent liabilities are disclosed when settlement is greater than remote.

BUREAU OF METEOROLOGY
Notes to the Financial Statements

5.2 Financial Instruments		
	2023	2022
	\$'000	\$'000

5.2A: Categories of Financial Instruments

Financial assets at amortised cost

Cash and cash equivalents	3,230	430
Trade receivables	12,492	9,387
Total financial assets at amortised cost	15,722	9,817
Total financial assets	15,722	9,817

Financial liabilities measured at amortised cost

Supplier payables	31,154	35,652
Total financial liabilities measured at amortised cost	31,154	35,652
Total financial liabilities	31,154	35,652

Accounting Policy

Financial Assets

In accordance with AASB 9 *Financial Instruments*, the Bureau classifies its financial assets in the following categories:

- a) financial assets at fair value through profit or loss;
- b) financial assets at fair value through other comprehensive income; and
- c) financial assets measured at amortised cost.

The classification depends on both the entity's business model for managing the financial assets and contractual cash flow characteristics at the time of initial recognition. Financial assets are recognised when the entity becomes a party to the contract and, as a consequence, has a legal right to receive or a legal obligation to pay cash and derecognised when the contractual rights to the cash flows from the financial asset expire or are transferred upon trade date.

Financial Assets at Amortised Cost

Financial assets included in this category need to meet two criteria:

1. the financial asset is held in order to collect the contractual cash flows; and
2. the cash flows are solely payments of principal and interest (SPPI) on the principal outstanding amount.

Amortised cost is determined using the effective interest method.

Effective Interest Method

Income is recognised on an effective interest rate basis for financial assets that are recognised at amortised cost.

Impairment of Financial Assets

Financial assets are assessed for impairment at the end of each reporting period based on Expected Credit Losses, using the general approach which measures the loss allowance based on an amount equal to lifetime expected credit losses where risk has significantly increased, or an amount equal to 12-month expected credit losses if risk has not increased.

The simplified approach for trade, contract and lease receivables is used. This approach always measures the loss allowance as the amount equal to the lifetime expected credit losses.

A write-off constitutes a derecognition event where the write-off directly reduces the gross carrying amount of the financial asset.

BUREAU OF METEOROLOGY
Notes to the Financial Statements

Financial liabilities

Financial liabilities are classified as either financial liabilities 'at fair value through profit or loss' or other financial liabilities. Financial liabilities are recognised and derecognised upon 'trade date'.

Financial Liabilities at Amortised Cost

Financial liabilities, including borrowings, are initially measured at fair value, net of transaction costs. These liabilities are subsequently measured at amortised cost using the effective interest method, with interest expense recognised on an effective interest basis.

Supplier and other payables are recognised at amortised cost. Liabilities are recognised to the extent that the goods or services have been received (and irrespective of having been invoiced).

5.2B: Fair Value Measurements

	Fair value measurements at the end of the reporting period	
	2023 \$'000	Restated ¹ 2022 \$'000
Non-financial assets		
Land	10,439	10,810
Buildings	75,742	63,388
Plant and equipment	293,329	270,100
	379,510	344,298

1. Financial year 2022 numbers have been restated as per prior period error noted in overview section.

Accounting Policy

During the year the Bureau procured valuation services from a qualified valuer for the purpose of a revaluation in accordance with AASB 116 and AASB 13.

BUREAU OF METEOROLOGY
Notes to the Financial Statements

Other Information

6.1 Current/Non-Current Distinction for Assets and Liabilities

	2023	2022
	\$'000	\$'000

6.1A: Current/non-current distinction for assets and liabilities

Assets expected to be recovered in:

No more than 12 months

Cash and cash equivalents	3,230	430
Trade and other receivables	254,786	254,846
Accrued revenue	6,690	-
Prepayments	15,643	16,771
Inventories	4,818	4,444

Total no more than 12 months

285,167	276,491
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More than 12 months

Land	14,826	14,906
Buildings	209,661	191,538
Plant and equipment	452,036	417,203
Computer software	346,431	269,810
Other intangibles	861	1,323

Total more than 12 months

1,023,815	894,780
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Total assets

1,308,982	1,171,271
------------------	------------------

Liabilities expected to be settled in:

No more than 12 months

Suppliers	75,426	66,138
Other payables	6,127	6,484
Leases	21,044	24,330
Employee provisions	29,493	20,600
Other employee provisions	34	34
Provisions for restoration	1,347	1,156

Total no more than 12 months

133,471	118,742
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More than 12 months

Leases	126,526	113,691
Employee provisions	40,725	46,543
Provisions for restoration	26,965	25,809

Total more than 12 months

194,216	186,043
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Total liabilities

327,687	304,785
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Section 6: Appendices

Appendix A

Glossary

A

AASB	Australian Accounting Standards Board
ACCESS	Australian Community Climate and Earth System Simulator
ACCESS-C	a city scale ACCESS model
ACCESS-CE	an ensemble version of ACCESS-C
ACCESS-G	a global scale ACCESS model
ACCESS-GE	an ensemble version of ACCESS-G
ACO	Agri-Climate Outlooks
ACORN-SAT	Australian Climate Observations Reference Network - Surface Air Temperature dataset
ACS	Australian Climate Service
ACSC	Australian Cyber Security Centre
ACT	Australian Capital Territory
AFAC	the Australasian Fire and Emergency Services Authorities Council
AFDRS	Australian Fire Danger Rating System
AMBLs	automated meteorological balloon launching system
AMSA	Australian Maritime Safety Authority

ANAO	Australian National Audit Office
APS	Australian Public Service
ASO	Administrative Service Officer
ASWFC	Australian Space Weather Forecasting Centre
ATWS	Australian Tsunami Warning System
AWRA-L	the Bureau's land-surface water balance model
AUD	Australian dollar
Australis	the Bureau's supercomputer
AWS	automatic weather station

B

BARRA	Bureau of Meteorology atmospheric high-resolution regional reanalysis for Australia
BARPA	Bureau of Meteorology Atmospheric Regional Projections for Australia
BOM	Bureau of Meteorology
BOMIdeas	the Bureau's online research community
BPM	business process management
B-SAC	the Bureau's Science Advisory Committee
BST	Business Systems Transformation Program
Bureau	Bureau of Meteorology

C

°C	degrees Celsius
CARES	Compensation and Rehabilitation Employee Services
CEO	Chief Executive Officer
CIRMP	Critical Infrastructure Risk Management Program
cm	centimetre
CO ₂	Carbon Dioxide
COSMIC-2	a constellation of meteorological satellites
COSPPac	Climate and Oceans Support Program for the Pacific
COVID-19	an infectious disease caused by the coronavirus SARS-CoV-2
CRM	Customer relationship management system
CRPS	Continuous Ranked Probability Score
CSA	Climate Services for Agriculture
CSIRO	Commonwealth Scientific and Industrial Research Organisation

CSS	Commonwealth Superannuation Scheme
Cth	Commonwealth

D

DCB	Departmental Capital Budget
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DDG	Data and Digital Group
DR	Disaster Recovery

E

EA	Enterprise Agreement
EAMS	Enterprise Asset Management System
EAP	Employee Assistance Program
EIP	Enterprise Integration Platform
EL	Executive Level
El Niño	See ENSO
EMPA	Emergency Media and Public Affairs
ENSO	El Niño-Southern Oscillation

F

FAICD	Fellow of the Australian Institute of Company Directors
FBT	Fringe Benefits Tax
FDC	Future Data Centre
FOI	Freedom of Information
FOI Act	<i>Freedom of Information Act 1982</i>
FRR	<i>Public Governance, Performance and Accountability (Financial Reporting) Rule 2015</i>
FTSE	Fellow of the Australian Academy of Technological Services and Engineering

G

GBON	Global Basic Observing Network
GDP	Gross Domestic Product
GSO	General Service Officer
GST	Goods and Services Tax

H

HRWS	high-risk weather season
HOA	Head of Agency
hPa	hectopascal

HPC	high performance computer
HPR	Hazard Preparedness and Response
HSE	Health, Safety and Environment
HSF	Hazards Services Forum
HSR	Health and Safety Representative
Himawari	Japan Meteorological Agency geostationary meteorological satellite
HyFS	Hydrological Forecasting System

I

ICT	Information and communication technology
IGA	Intergovernmental Agreement
IDAHOBIT	International Day Against Homophobia, Biphobia, Interphobia and Transphobia
IMO	International Maritime Organization
IMSAS	International Maritime Organization Member State Audit Scheme
IOC	Intergovernmental Oceanographic Commission (of UNESCO)
ISO	International Organization of Standardization
IT	information technology
ITO	Information Technology Officer
IWTC-10	10th International Workshop on Tropical Cyclones

J

JATWC	Joint Australian Tsunami Warning Centre
JULES	the Bureau's operational land surface model

K

km	kilometre
km/h	kilometre per hour
kWh	kilowatt hour

L

La Niña	see ENSO
LGBTQIA+	People who identify as lesbian, gay, bisexual, transgender, queer, intersex, asexual or otherwise sexually or gender diverse
LTIFR	lost time injury frequency rate

M

MET5	Meteorology Five Eyes Community of Practice
METoP-A	a meteorological operational satellite developed by the European Space Agency
miPDS	Employee Performance Development Scheme
m	metre
mm	millimetre
MSLP	mean sea level pressure

N

NAIDOC	National Aborigines and Islanders Day Observance Committee
NEMA	National Emergency Management Agency
NSSP	National Security and Space Program
NSW	New South Wales
NT	Northern Territory
NTFGS	National Thunderstorm Forecast Guidance System
NWP	Numerical Weather Prediction
NWS	National Weather Service

O

OceanMAPS	Ocean Modelling Analysis and Prediction System
OPA	Official Public Account
OT	observation technology

P

PBS	Portfolio Budget Statements
PGPA Act	<i>Public Governance, Performance and Accountability Act 2013</i>
PGPA Rule	<i>Public Governance, Performance and Accountability Rule 2014</i>
PhD	Doctor of Philosophy
PNG	Papua New Guinea
PO	Professional Officer
PSS	Public Sector Superannuation Scheme
PSSap	PSS accumulation plan
PST	Public Services Transformation Program
Public Service Act	<i>Public Service Act 1999</i>

Q

QLD	Queensland
QFES	Queensland Fire and Emergency Services
QMS	Quality Management System

R

R&D	research and development
RA-II	Regional Association II (Asia) of WMO
RA-V of WMO	Regional Association V (South-West Pacific)
RAAF	Royal Australian Air Force
RAP	Reconciliation Action Plan
RFDS	Royal Flying Doctors Service
ROBUST	A program to increase resilience of critical business functions
ROU	Right of Use
RS	Research Scientist

S

SA	South Australia
SDGs	Sustainable Development Goals
SEOCN	State Emergency Operations Controller
SES	State Emergency Service
SES	Senior Executive Service
SOFF	Systematic Observations Financing Facility (of WMO)
SOLAS	<i>International Convention for the Safety of Life at Sea 1974</i>
SSM	Strategic Success Measure
STEM	Science, Technology, Engineering and Mathematics
STEPS	Short Term Ensemble Prediction System
SIA	Strategy in Action workshop
SIMS	Solomon Islands Meteorological Services
Strategy	Strategy 2022–2027

T

TAF	An aerodrome forecast
Tas	Tasmania
TO	Technical Officer
TR	Trainee

U

UK	United Kingdom
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
USD	United States dollar
UTC	Universal Time Coordinated
UV	Ultraviolet

V

VAAC	Volcanic Ash Advisory Centre
Vic	Victoria

W

WA	Western Australia
WHS	work health and safety
WMO	World Meteorological Organization

Appendix B

List of requirements

This list of requirements is provided in accordance with the *Public Governance, Performance and Accountability Rule 2014*, section 17AJ: Aids to access.

N/A notes that the requirement was not applicable to the Bureau in 2022–23.

PGPA Rule Reference	Description	Requirement	Part of Report	Page
17AD(g) Letter of transmittal				
17AI	Letter of transmittal	Mandatory	Letter of transmittal	1
17AD(h) Aids to access				
17AJ(a)	Table of contents	Mandatory	Contents	3
17AJ(b)	Alphabetical index	Mandatory	Appendices	262–270
17AJ(c)	Glossary of abbreviations and acronyms	Mandatory	Appendices	251–254
17AJ(d)	List of requirements	Mandatory	Appendices	255–261
17AJ(e)	Details of contact officer	Mandatory	Inside back cover	IBC
17AJ(f)	Entity's website address	Mandatory	Inside back cover	IBC
17AJ(g)	Electronic address of report	Mandatory	Inside back cover	IBC
17AD(a) Review by Accountable Authority				
17AD(a)	Review by the Accountable Authority	Mandatory	Review by the CEO and Director of Meteorology	21
17AD(b) Overview of the entity				
17AE(1)(a)(i)	Role and functions	Mandatory	Agency overview	28
17AE(1)(a)(ii)	Organisational structure	Mandatory	Corporate governance	144–145
17AE(1)(a)(iii)	Outcome and program administered	Mandatory	The Bureau at a glance	6
17AE(1)(a)(iv)	Purpose	Mandatory	The Bureau at a glance	5

PGPA Rule Reference	Description	Requirement	Part of Report	Page
17AE(1)(aa)(i)	Name of the Accountable Authority	Mandatory	Corporate governance	146
17AE(1)(aa)(ii)	Position title of the Accountable Authority	Mandatory	Corporate governance	149
17AE(1)(aa)(iii)	Period as the Accountable Authority	Mandatory	Corporate governance	146
17AE(1)(b)	An outline of the structure of the portfolio of the entity	Portfolio Dept. mandatory	N/A	–
17AE(2)	Where the outcomes and programs differ from budget statements	If applicable, Mandatory	N/A	–
17AD(c)	Report on the Performance of the entity			
	Annual performance Statements			
17AD(c)(i); 16F	Annual performance statement in accordance with the PGPA Act and Rule	Mandatory	Annual Performance Statement	33–54
17AD(c)(ii)	Report on Financial Performance			
17AF(1)(a)	A discussion and analysis of the entity's financial performance	Mandatory	Financial resource Management	203
17AF(1)(b)	A table summarising the total resources and total payments of the entity	Mandatory	Financial resource Management	205–206
17AF(2)	Significant changes in the financial results during or after the previous or current reporting period	If applicable, Mandatory	N/A	–
17AD(d)	Management and Accountability			
	Corporate Governance			
17AG(2)(a)	Information on compliance with section 10 (fraud systems)	Mandatory	Corporate governance	158–159
17AG(2)(b)(i)	A certification by accountable authority that fraud risk assessments and fraud control plans have been prepared	Mandatory	Letter of transmittal	1
17AG(2)(b)(ii)	A certification by accountable authority that appropriate mechanisms for preventing, detecting incidents of, investigating or otherwise dealing with, and recording or reporting fraud are in place	Mandatory	Letter of transmittal	1

PGPA Rule Reference	Description	Requirement	Part of Report	Page
17AG(2)(b)(iii)	A certification by accountable authority that all reasonable measures have been taken to deal appropriately with fraud relating to the entity	Mandatory	Letter of transmittal	1
17AG(2)(c)	An outline of structures and processes in place for corporate governance	Mandatory	Corporate governance	146–159
17AG(2)(d) – (e)	A statement of significant issues reported to Minister under paragraph 19(1)(e) of the Act that relates to non compliance with Finance law	If applicable, Mandatory	Financial resource management	204
Audit Committee				
17AG(2A)(a)	Direct electronic address of the audit committee charter	Mandatory	Corporate governance	153
17AG(2A)(b)	The name of each audit committee member	Mandatory	Corporate governance	153–155
17AG(2A)(c)	The qualifications, knowledge, skills or experience of audit committee members	Mandatory	Corporate governance	153–155
17AG(2A)(d)	Information about the attendance of each member of the audit committee at committee meetings	Mandatory	Corporate governance	153–155
17AG(2A)(e)	The remuneration of each member of the audit committee	Mandatory	Corporate governance	153–155
External Scrutiny				
17AG(3)	Information on the most significant developments in external scrutiny and the entity's response to the scrutiny	Mandatory	Corporate governance	159
17AG(3)(a)	Information on judicial decisions and decisions of administrative tribunals and by the Australian Information Commissioner that may have a significant effect on the operations of the entity	If applicable, Mandatory	N/A	–
17AG(3)(b)	Information on any reports on operations of the entity by the Auditor General, a Parliamentary Committee, or the Commonwealth Ombudsman	If applicable, Mandatory	Corporate governance	159
17AG(3)(c)	Information on any capability reviews that were released during the period	If applicable, Mandatory	N/A	–
Management of Human Resources				
17AG(4)(a)	An assessment of the entity's effectiveness in managing and developing employees to achieve entity objectives	Mandatory	People management	180–182

PGPA Rule Reference	Description	Requirement	Part of Report	Page
17AG(4)(aa)	<p>Statistics on the entity's employees on an ongoing and non ongoing basis, including the following:</p> <p>(a) statistics on full time employees (b) statistics on part time employees (c) statistics on gender (d) statistics on staff location</p>	Mandatory	People management	191 –202
17AG(4)(b)	<p>Statistics on the entity's APS employees on an ongoing and non ongoing basis; including the following:</p> <ul style="list-style-type: none"> • Statistics on staffing classification level • Statistics on full time employees • Statistics on part time employees • Statistics on gender • Statistics on staff location • Statistics on employees who identify as Indigenous 	Mandatory	People management	191 –202
17AG(4)(c)	Information on any enterprise agreements, individual flexibility arrangements, Australian workplace agreements, common law contracts and determinations under subsection 24(1) of the <i>Public Service Act 1999</i>	Mandatory	People management	186
17AG(4)(c)(i)	Information on the number of SES and non SES employees covered by agreements etc identified in paragraph 17AG(4)(c)	Mandatory	People management	186
17AG(4)(c)(ii)	The salary ranges available for APS employees by classification level	Mandatory	People management	187
17AG(4)(c)(iii)	A description of non salary benefits provided to employees	Mandatory	People management	186
17AG(4)(d)(i)	Information on the number of employees at each classification level who received performance pay	If applicable, Mandatory	People management	187
17AG(4)(d)(ii)	Information on aggregate amounts of performance pay at each classification level	If applicable, Mandatory	N/A	–
17AG(4)(d)(iii)	Information on the average amount of performance payment, and range of such payments, at each classification level	If applicable, Mandatory	N/A	–
17AG(4)(d)(iv)	Information on aggregate amount of performance payments	If applicable, Mandatory	N/A	–

PGPA Rule Reference	Description	Requirement	Part of Report	Page
Assets Management				
17AG(5)	An assessment of effectiveness of assets management where asset management is a significant part of the entity's activities	If applicable, mandatory	Financial resource management	207
Purchasing				
17AG(6)	An assessment of entity performance against the <i>Commonwealth Procurement Rules</i>	Mandatory	Financial resource management	208
Reportable consultancy contracts				
17AG(7A)(a)	A summary statement detailing the number of new reportable consultancy contracts entered into during the period; the total actual expenditure on all such contracts; the number of ongoing reportable consultancy contracts that were entered into during a previous reporting period; and the total actual expenditure in the reporting period on those ongoing contracts	Mandatory	Financial resource management	209
17AG(7)(b)	Summary statement regarding the engagement of consultants in the format specified at paragraph 17AG (7) (b) of the PGPA Rule	Mandatory	Financial resource management	209
17AG(7)(c)	A summary of the policies and procedures for selecting and engaging consultants and the main categories of purposes for which consultants were selected and engaged	Mandatory	Financial resource management	209
17AG(7)(d)	Statement regarding actual expenditure on contracts for consultancies in the format specified at paragraph 17AG (7) (d) of the PGPA rule	Mandatory	Financial resource management	209
Reportable non-consultancy contracts				
17AG(7A)(a)	A summary statement detailing the number of new reportable non-consultancy contracts entered into during the period; the total actual expenditure on such contracts; the number of ongoing reportable non-consultancy contracts that were entered into during a previous reporting period; and the total actual expenditure in the reporting period on those ongoing contracts	Mandatory	Financial resource management	210

PGPA Rule Reference	Description	Requirement	Part of Report	Page
17AG(7A)(b)	Statement regarding actual expenditure on reportable non-consultancy contracts in the format specified at paragraph 17AG (7A)(b) of the PGPA rule	Mandatory	Financial resource management	210
17AD(daa)	Additional information about organisations receiving amounts under reportable consultancy contracts or reportable non-consultancy contracts			
17AGA	Additional information, in accordance with section 17AGA, about organisations receiving amounts under reportable consultancy contracts or reportable non-consultancy contracts	Mandatory	Financial resource management	209 –210
Australian National Audit Office Access Clauses				
17AG(8)	Contracts with a value of more than \$100,000 (inclusive of GST) that did not provide the Auditor General with access to the contractor's premises	If applicable, Mandatory	Financial resource management	208
Exempt contracts				
17AG(9)	Statement regarding contracts or standing offers with a value greater than \$10,000 (inclusive of GST) that have been exempted from being published in AusTender because it would disclose exempt matters under the FOI Act	If applicable, Mandatory	Financial resource management	208
Small business				
17AG(10)(a)	Summary statement detailing procurement initiatives supporting small business using the text specified at paragraph 17AG (10)(a) of the PGPA Rule	Mandatory	Financial resource management	208
17AG(10)(b)	An outline of the ways in which the procurement practices of the entity support small and medium enterprises	Mandatory	Financial resource management	208
17AG(10)(c)	Summary statement regarding timely payments to small businesses using the text specified at paragraph 17AG (10)(c) of the PGPA Rule	If applicable, Mandatory	Financial resource management	208
Financial Statements				
17AD(e)	Inclusion of the annual financial statements in accordance with subsection 43(4) of the Act	Mandatory	Financial statements	213 –249

PGPA Rule Reference	Description	Requirement	Part of Report	Page
Executive Remuneration				
17AD(da)	Information about executive remuneration in accordance with Subdivision C of Division 3A of Part 2-3 of the Rule	Mandatory	People management	187–190
17AD(f) Other Mandatory Information				
17AH(1)(a)(i)	Statement in relation to advertising campaigns conducted as specified in the PGPA rule	If applicable, Mandatory	N/A	–
17AH(1)(a)(ii)	If the entity did not conduct advertising campaigns, a statement to that effect	If applicable, Mandatory	Financial resource management	211
17AH(1)(b)	Statement on grants awarded for the reporting period, as specified in the PGPA Rule	If applicable, Mandatory	N/A	–
17AH(1)(c)	Mechanisms of disability reporting	Mandatory	Corporate responsibility	171
17AH(1)(d)	Website reference for the entity's Information Publication Scheme statement pursuant to the FOI Act	Mandatory	Corporate governance	158
17AH(1)(e)	Correction of material errors in previous annual report	If applicable, mandatory	Corporate governance	159
17AH(2)	Information required by other legislation:	Mandatory		
	• <i>Freedom of Information Act 1982</i>		Corporate governance	159
	• <i>Environmental Environment Protection and Biodiversity Conservation Act 1999</i>		Corporate responsibility	175–179
	• <i>Work Health and Safety Act 2011</i>		People management	183–185
	• <i>Commonwealth Electoral Act 1918</i>		Financial resource management	211

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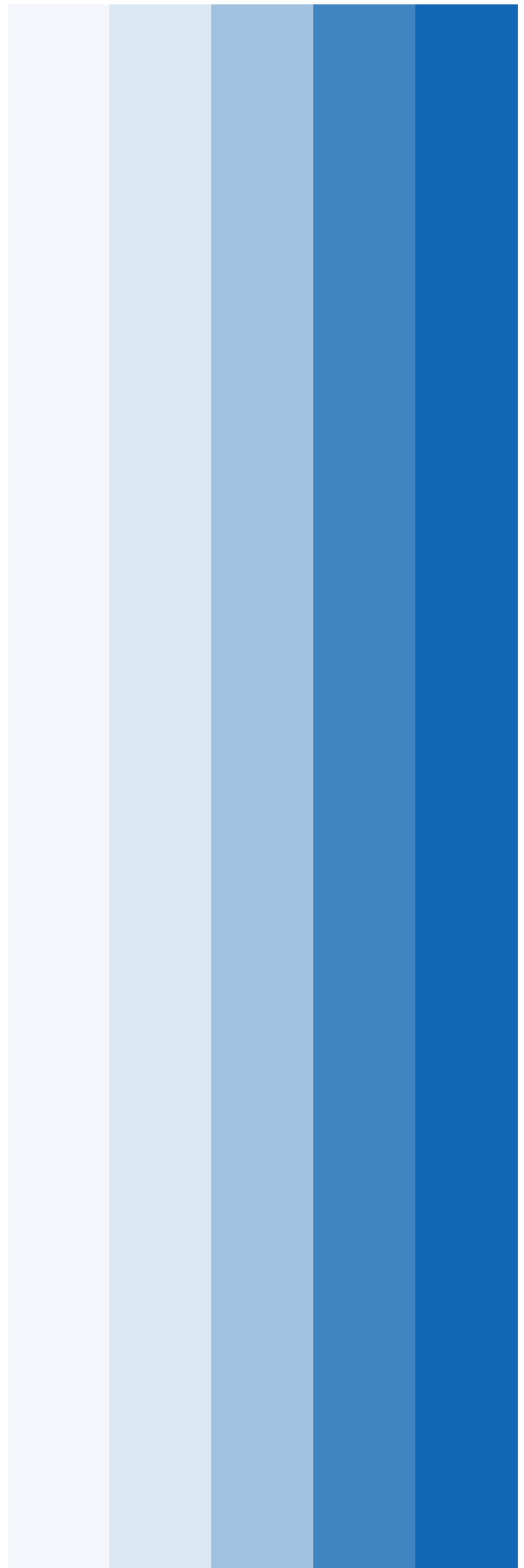
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