HEAT SMART RESILIENCE FRAMEWORK

2021

WSROC

TURN DOWN THE HEAT

The need for this Framework was identified as a priority action under the *Turn Down the Heat Strategy and Action Plan (2018)*. The Turn Down the Heat Strategy was developed by 55 organisations working together to create cooler, more resilient communities.

The Western Sydney Regional Organisation of Councils' (WSROC) mission is to build collaboration between local governments across Greater Western Sydney, promoting Western Sydney, its people and places, through advocacy, business improvement, strategic leadership, research and partnerships. WSROC has facilitated the development of this Framework.

WSROC would like to particularly acknowledge the support of consultancy Risk Frontiers and the Heat Smart Western Sydney project delivery group, consisting of Blacktown City Council, Cumberland City Council, Hawkesbury City Council, Liverpool City Council, City of Parramatta Council, Penrith City Council and the Western Sydney Local Health District. We also thank Resilient Sydney, South Western Sydney Local Health District and Nepean Blue Mountains Local Health District for their ongoing support.

Heat Smart Western Sydney has been funded under the State Government Natural Disaster Resilience Program.

WSROC acknowledges Aboriginal and Torres Strait Islander peoples as the traditional custodians of the lands and waters of this place we now call Metropolitan Sydney. We pay our respect to Elders past, present and future of the Eora, Dharawal (Tharawal), Gundungurra, Dharug (Darug) and Guringai (Kuring-gai) peoples.

Woman sitting in green space near apartment building

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INTRODUCTION

EXTREME HEAT IS ARGUABLY THE GREATEST THREAT TO WESTERN SYDNEY'S HEALTH, LIVEABILITY AND PRODUCTIVITY IN THE IMMEDIATE FUTURE

Western Sydney's naturally hot climate is already being exacerbated by global climate change, and local urban heat islands. Future projections for more frequent and severe heat events will see widespread impacts on city systems and the people that depend on them.

The *Heat Smart Resilience Framework* (this document) sets out a pathway for improving management of extreme heat in Western Sydney, with a focus on building systems that support community resilience. It starts by providing an overview of current heatwave arrangements in NSW, then proposes an integrated approach to heatwave management, and concludes by outlining opportunities for improving the way we manage future heatwaves.

The Framework is underpinned by a comprehensive gap analysis of heatwave management practices in Western Sydney. This involved a literature review, a survey of 317 Western Sydney residents and over 25 in-depth interviews with subject matter experts, and professionals at the frontline of extreme heat management including councils, state and federal agencies, utility providers, and community service organisations. The Framework has also benefited from the ongoing feedback and contributions of countless stakeholders from federal, state and local government as well as the private and community sectors.

This document takes a resilience approach to heat. As such, it expands upon the current NSW Heatwave Sub Plan by identifying where further effort is needed beyond the scope of traditional emergency response and associated combat agencies.

Finally, while the focus of this Framework is Greater Western Sydney, it should be noted that the recommendations are equally applicable to eastern Sydney and regional NSW.

Child playing in public water fountain in Parramatta Square

How we got here:

In 2016, several Western Sydney councils came together to discuss the significant and growing issue of heat. Councils recognised that heat impacts were already significant and wide-reaching, from increasing road maintenance and repair, to street tree die-back, and community health complications. It became clear that this issue required strong, collaborative, multidisciplinary action.

In 2017, WSROC and its councils brought together 55 organsiations from the public, private and not-for-profit sectors to workshop the issue. This led to the development of the Turn Down the Heat Strategy and Action Plan 2018 which identifed 16 priority actions for addressing the impacts of heat in Western Sydney. Priority 11 sought improvements to the way we manage extreme heat events via the review of heatwave emergency management structures, and the integration of community ogranisations and service providers.

Thanks to funding from Resilience NSW, Heat Smart Western Sydney seeks to do just this. The program takes a two-pronged approach to building heat resilience. First, this Framework seeks to provide guidance on governance and system changes to better support communities in need. Second, the program will deliver targeted resources and workshops to build risk awareness, preparedness amoungst at-risk groups and the community sector (Figure 1).

Heat Smart Western Sydney is delivered in partnership with Blacktown, Cumberland, Hawkesbury, Liverpool, City of Parramatta and Penrith councils, the Western Sydney Local Health District, and consultancy Risk Frontiers. We also thank Resilient Sydney, South Western Sydney Local Health District and Nepean Blue Mountains Local Health District for their ongoing support.

PROJECT OVERVIEW: HEAT SMART WESTERN SYDNEY

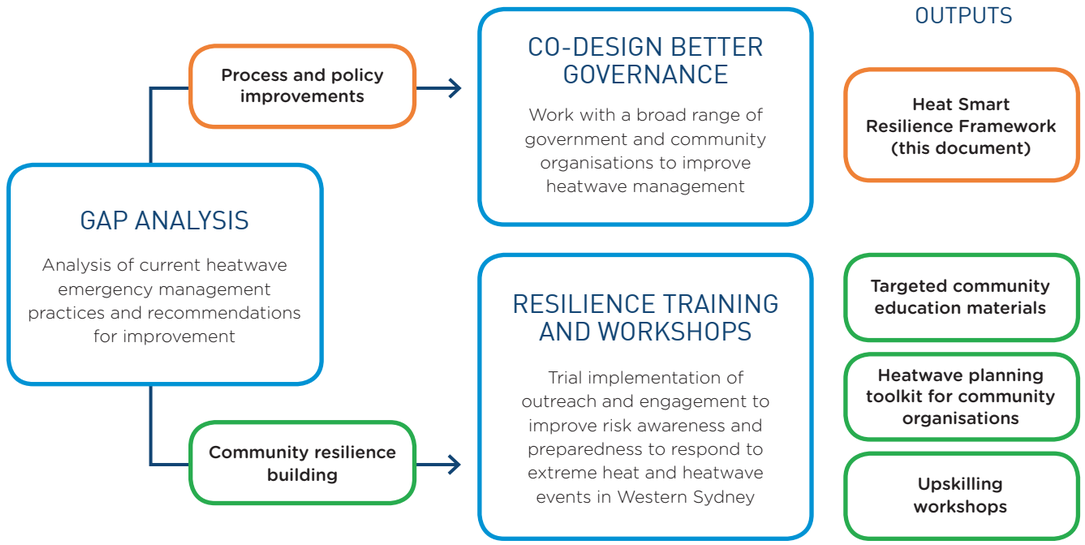

Figure 1. Overview of Heat Smart Western Sydney project process

TURN DOWN THE HEAT STRATEGY CALLS FOR ACTION

Heat Smart Western Sydney is an initiative of the WSROC-led Turn Down the Heat Strategy and Action Plan 2018 that takes a collaborative, multi-sector approach to tackling urban heat in Western Sydney and focuses on achievable actions to reduce the impacts of heat.

Action 11 of the Turn Down the Heat Strategy calls for the development of a "preventative heat response framework" including:

1. Updating governance arrangements for heat with a focus on better clarifying the role of local government
2. Building heat response capacity within community service provider organisations.

Heat Smart Western Sydney seeks to deliver on this action.

"...a coordinated response, applied before and during a heatwave is required to minimise human health risks and risk of disruption to business. Such a response framework will involve emergency management but also outreach to vulnerable populations."

(Turn Down the Heat Strategy, p.62).

Turn Down the Heat Strategy and Action Plan 2018

Other WSROC-led projects being delivered under the Turn Down the Heat Strategy include:

Cool Suburbs	A voluntary design-support tool to identify the most appropriate urban heat interventions (adaptation, mitigation, resilience) for existing and new developments. The tool will provide a 'cool rating' for a development and can be used by government and industry alike.
Urban Heat Planning Toolkit	The Urban Heat Planning Toolkit has been developed to help local government strengthen their planning provisions to reduce the impacts of heat.
Climate Resilient Street Trees	This project will establish street tree demonstration sites across Western Sydney to test the climate-risk and cooling benefits of various species with and without access to passive irrigation.

For information on other Turn Down the Heat visit **wsroc.com.au**

Stakeholders during development of the Turn Down the Heat Strategy

EXTREME HEAT: HAZARD, EXPOSURE, VULNERABILITY

Extreme heat is Australia's most deadly natural hazard causing more fatalities than all other natural hazards combined[1]. Beyond human health, extreme heat is acknowledged to have cumulative and cascading impacts on city systems[2]. Some of these impacts are outlined in Figure 2.

IMPACTS OF HEAT

6%
Higher heat-related mortality risks for residents living in warm neighbourhoods

100%
Increase in peak electricity demand when temperatures increase from 20 °C to 40 °C

Unmeasured
Impacts on flora and fauna. Mass deaths of flying foxes are one indicator of the scale of this impact

$6.9 billion
In lost productivity due to heat stress, annually Australia wide

Figure 2. Heatwave impacts (modified based on WSROC 2018, p.15)

Home owner adjusting the air-conditioner thermostat

NSW Treasury has estimated that the increased frequency and intensity of heatwaves will result in 700,000 to 2.7 million additional lost workdays by 2061 across agriculture, construction, manufacturing and mining alone[1]. Unfortunately, the collective cost of heat on our society including mortality, health system costs, insurance, social welfare, and environment remains unmeasured.

We do know that heat is already placing significant strain on household budgets, community services, and essential infrastructure including energy grids, hospitals and transport networks.[3,4,5,6] We also know that heat impacts are expected to increase in future as extreme heat becomes more common, and heatwaves become more frequent and intense under climate change.[7,8] As a result, heat resilience is a significant and growing challenge for NSW.

HEAT RISK

Heat requires part of the body (e.g., heart, kidneys) to work harder than normal and therefore can present a serious risk to health. While heatwaves are often described by the maximum temperature reached on a particular day, the health risks of heat cannot be represented by a single temperature alone. The risk of ill-health is a combination of temperature, humidity, airflow, and sun exposure, an individual's health, their activity during hot weather, any clothing they must wear, and the duration of heat exposure[9].

HEAT IN WESTERN SYDNEY

Heat is a major issue for all Australian cities, however Greater Western Sydney's (GWS) historical temperature patterns, combined with its socio-economic and demographic make-up, mean it already bears an undue proportion of heat-related impacts, and this is expected to increase in future.

Projections indicate the impacts of climate change will be felt more severely in Western Sydney, with temperatures increasing at a faster rate than other parts of the city[7]. At the same time, Western Sydney's rapid urban development is exacerbating an already hot climate via the urban heat island effect.[5] Many organisations have recognised this unique risk profile.[5, 7, 8, 10, 11,12]

7x more days over 35 degrees
21 days at Penrith
3 days at Observatory Hill[11]

Half the canopy cover
16% in Western City
32% in Eastern City[11]

3x rates of Type 2 diabetes[14]
(and other chronic diseases)

Half the annual rainfall
683mm at Badgerys Creek
1,215mm at Observatory Hill[11]

9/10
Lowest SEIFA LGAs[13]

100% more energy to cool
a home in Western Sydney compared to Eastern Sydney[5]

Figure 3. Contributors to heat risk in Western Sydney

Typical greenfield housing development in Western Sydney

HEATWAVES AND THE COMMUNITY

Heatwaves are acknowledged as a major source of stress and anxiety by Western Sydney communities. A 2020 survey of residents undertaken by WSROC found residents believe heatwaves to be a threat equal to, or larger than bushfires. 62 per cent of respondents believed heatwaves posed extreme or high risks to their health and safety, and 30 per cent had felt unwell or sought medical treatment during previous heatwaves.[12] These results reflect the impacts of heat on the general community. Work by a range of local organisations including Link Wentworth, Resilient Sydney and Western Sydney University has shown impacts on vulnerable groups are far greater.[4, 15, 16]

Individuals experiencing one or more risk factors including low-income, unemployment, disability, chronic illness, or social isolation are more vulnerable to hazards generally, however, the impacts of heatwaves are strongly distributed along socio-economic lines. Capacity to cope in extreme conditions is almost entirely dependent on the ability to pay for air-conditioning, or to access cooling by other means. These options are often unavailable to people on low incomes, those living in rental or social housing, those without private transport, or living with physical or mental limitations.

In addition to experiencing far higher temperatures, Western Sydney has a greater proportion of communities at high risk of heat-related impacts than other parts of Sydney. The region is home to nine out of 10 of Sydney's most socio-economically disadvantaged (SEIFA) local government areas[13].

Western Sydney also has higher rates of chronic illness than coastal parts of the city. Conditions such as Type 2 diabetes are three times more prevalent in Western Sydney[14], putting individuals at greater risk of succumbing to heat-related illness due to the additional stress heat places on the body.

The reality of managing extreme heat when faced with limited income, chronic health issues, lack of private transport or do not own your own home, is reflected in the below statements from Western Sydney residents collected as part of a WSROC community survey in March 2020[12].

> ***"You don't get extra financial support when the harsh heat wave hits. Medical bills go up, air conditioning and water are very expensive and crucial but sometimes the bills choose how much you use and when you use it."***
>
> ***"Air conditioning had broken down, real estate didn't think it was an urgent repair although we have a 2-year-old and it was 48 degrees."***
>
> ***The newer houses are ... not built properly. The walls are thin and there isn't proper insulation, so we just cook in summer, the air conditioning doesn't even make much of a difference sadly,"***

These experiences reflect an urgent need to ensure heatwave management includes holistic policies, protocols and support mechanisms to enable the safety of vulnerable groups.

Women enjoying Harmony Day celebrations

Emergency vehicles sitting in ambulance bay

HEATWAVE RISK MANAGEMENT

Despite posing a significant and growing risk, heatwaves have not historically received the same attention as other environmental hazards when it comes to risk assessment, mapping, land-use provisions, construction standards or emergency management.

In contrast to the comprehensive planning in place for flood, bushfire and coastal erosion, NSW's State Heatwave Sub Plan only covers information sharing between agencies and the public, 'does not address the reduction of risk before the event,'[17] and does not outline practical response or support activities beyond emergency warnings.

WSROC's gap analysis of heatwave management arrangements and practices in Western Sydney found that the impacts of heat on the community and city systems is often poorly understood, and that response to these events is currently ad-hoc and uncoordinated.

This is unsurprising when one considers that the governance arrangements, protocols and assessments are less developed for heatwave than for other hazards.

The impacts of heat are far-reaching and complex, impacting human physical and mental health, city infrastructure, household budgets, economic productivity, and the environment. Given this complexity, and given the projections for increasing heatwave incidence, a more comprehensive approach is needed.

Effective heat risk management requires clearly defined roles and responsibilities across a range of stakeholders including commonwealth, state and local government, community organisations, infrastructure operators and businesses. An integrated approach is necessary, centred around the principle of shared responsibility.

To improve resilience to heatwaves, Greater Western Sydney must address heatwave mitigation and preparedness measures including: better risk awareness, coordination of services, and ensuring individuals have the tools to make informed decisions about their own heat risk. It must also develop processes to ensure the most vulnerable can access practical aid in times of emergency, and that the effectiveness of such measures are regularly reviewed and evaluated.

THE NEED FOR THIS FRAMEWORK

WSROC and its councils recognise that urgent action is needed to better understand heat risk, reduce our contribution to heat, improve our region's capacity to live with a hotter climate, and show resilience in the face of extreme events. The resilience approach taken in this report is outlined in Figure 4.

The National Strategy for Disaster Resilience (2011) states that reducing risks (Step 2) and ensuring communities can act on their knowledge (Step 1 and 3) are essential to building resilience. At present the NSW Heatwave Sub Plan 2018 does not address these aspects of heat resilience but does suggest the need for such an approach at the local or regional level.

Given current and future patterns of heatwave exposure and the community vulnerabilities that exist across Greater Western Sydney, addressing heatwave at the regional level seems most appropriate.

This Framework has been developed in response to this need. By considering heatwave from a resilience perspective, it seeks to expand upon the current NSW Heatwave Sub Plan by identifying a range of priority areas for action, and outlining where further effort is needed.

The recommendations outlined in this report should be seen as a first step in broadening our approach to extreme heat. It is acknowledged that many of the actions are beyond the scope of traditional emergency response and associated combat agencies. This is in line with the goal of developing an integrated, resilience-based, all-of-society approach to the hazard.

Finally, it is important to acknowledge that all actions outlined in this Framework are important for building resilience, those that sit further up the resilience framework hierarchy (Figure 4) will have the greatest impact. The steps outlined in the resilience framework are interdependent rather than stand-alone elements. Therefore addressing steps 1. Awareness, 2. Reduce will reduce the scale of adaptation and emergency response required.

As such, while the recommendations outlined in this Framework are presented on equal footing, it should be noted that efforts to better understand risk, as well as reduce heat through the built environment will ultimately provide a greater impact and risk reduction; particularly for vulnerable groups.

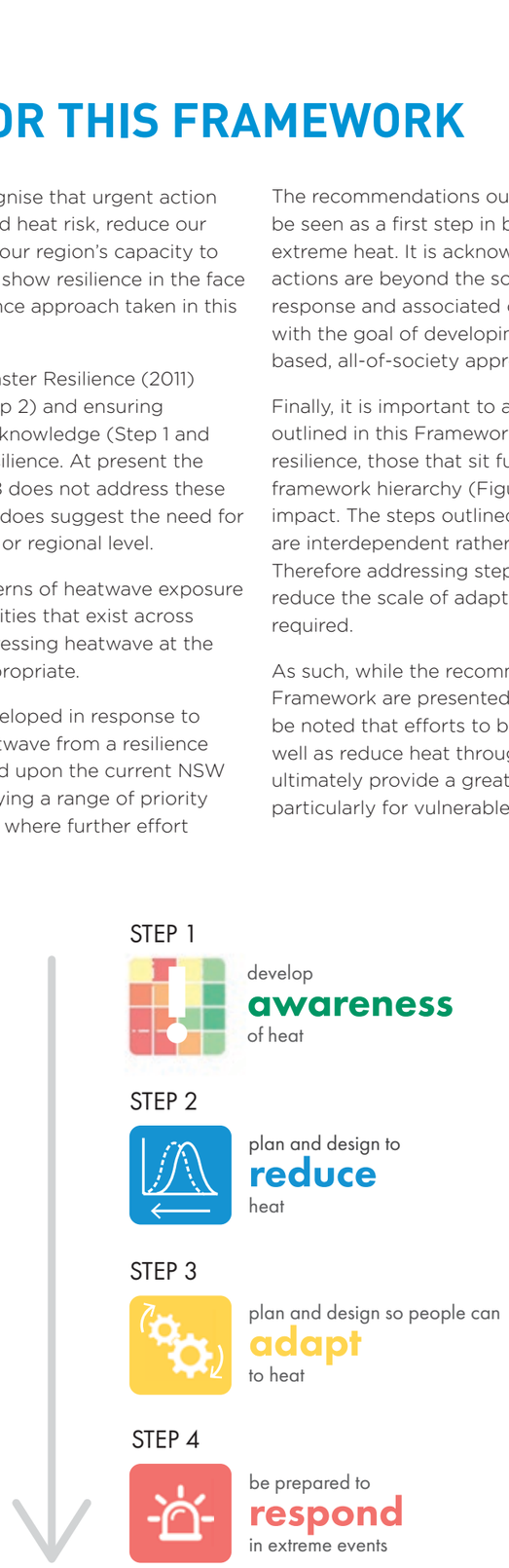

Figure 4. Heat resilience framework

WSROC has engaged a wide range of stakeholders to inform the development of this Framework. We would like to thank the following organisations for their time and contributions:

- Australian Medical Association (NSW)
- Blacktown City Council
- Bureau of Meteorology
- City of Adelaide
- City of Melbourne
- City of Parramatta
- Cumberland City Council
- Endeavour Energy
- Hawkesbury City Council
- Hume Housing
- Link Wentworth Community Housing
- Liverpool City Council
- Local Land Services
- Meals on Wheels
- Multicultural NSW
- Nepean Blue Mountains Local Health District
- Nepean Blue Mountains Primary Health Network
- NSW Council for the Aged (COTA)
- NSW Council of Social Services (NCOSS)
- NSW Department of Planning, Industry and Environment (DPIE)
- NSW Health
- NSW Nurses and Midwives Association
- Office of Local Government
- Penrith City Council
- Red Cross
- Regional Emergency Management Officers (REMOs)
- Resilience NSW
- Resilient Sydney
- Royal Australian College of General Practitioners
- Seniors Rights Advocates
- South Australian State Emergency Service
- South Western Sydney Local Health District
- Sri Lankan Association of NSW
- Sweltering Cities
- Sydney Alliance
- Sydney Olympic Park Authority
- Sydney University
- Sydney Water
- The Sydney Alliance
- Transport for NSW
- Victorian Department of Health and Human Services
- WentWest Limited
- Western Sydney Local Emergency Management Committees (LEMC)
- Western Sydney Local Health District
- Western Sydney University

As well as a range of Western Sydney community organisations who have participated in Heat Smart surveys, workshops and meetings.

Main entrance of emergency department at Hawkesbury Hospital, Windsor.

CASE STUDY

IMPACTS TO WESTERN SYDNEY RESIDENTS AND BUSINESSES FROM THE FEBRUARY 2017 HEATWAVE

The summer of 2016/2017 had more heatwave events than any other period since 1958. There were 35 days during which heatwave conditions were experienced in Sydney. Of these, more than 10 were categorised as 'extreme' (the highest severity) by the Bureau of Meteorology. Daily temperature records were exceeded including temperatures reaching 47 degrees Celsius at Richmond on the 11th of February.[19]

A SURVEY OF RESIDENTS AND BUSINESSES

following the heatwaves highlighted the significant range of emotional, physical and financial impacts Western Sydney communities endured during the heatwave.[3]

11% OF RESPONDENTS REPORTED POWER OUTAGES

as peak electricity demand neared record levels. Higher electricity bills and costs of replacing spoiled food (blackout / refrigeration failure) contributed to emotional and financial stress.

32% OF PEOPLE HAD TROUBLE SLEEPING

and felt lethargic and exhausted (15 per cent). Twelve per cent of respondents reported feeling distressed / mentally fatigued.

59% OF RESPONDENTS REPORTED FEELING DISCOMFORT

with 15 per cent reporting illness or feeling unwell.

ALMOST 41% OF BUSINESSES REPORTED LOWER PRODUCTIVITY

and higher levels of staff absenteeism (30 per cent) during the summer period. Business suppliers were also reported to have suffered disruptions (28 per cent).[iv]

Focus groups conducted with Western Sydney residents following the 2017 heatwave further, outline the challenges experienced during this event [4].

> "I think for me, it was mainly stress and anxiety because of all the other issues. One was health. It impacts my health and the kids and that obviously leads to a really stressful situation and then money because your bills are so high and you're missing work and if you're working casually, you don't get paid."
>
> "For me, the biggest thing was having a non-air-conditioned bus...And the problem I had was I couldn't call a cab because I had a baby under one. You need a special car seat [for a taxi]... So I had no choice. You don't think the bus is going to be hotter than the outside."
>
> "You know, if I ran my conditioner, it would cost me probably something like about five, six, seven hundred dollars a quarter. I live on a disability pension. I'm very good at budgeting. Not to that degree, though."

HEATWAVE MANAGEMENT IN NSW

In NSW, the legislative basis for coordination of emergency preparedness, response and recovery are contained in the State Emergency and Rescue Management Act 1989 (SERM Act). The SERM Act outlines requirements for emergency management planning including the preparation of the State Emergency Management Plan (EMPLAN) and subordinate plans by the State Emergency Management Committee (SEMC).

Unlike other hazards, there is no lead (combat) agency assigned for the management of a heatwave emergency. Instead, control authority rests with the State Emergency Operations Controller (SEOCON) who is a representative from the NSW Police. Roles of supporting NSW Government agencies are outlined in the State Heatwave Sub Plan (the Plan).[17]

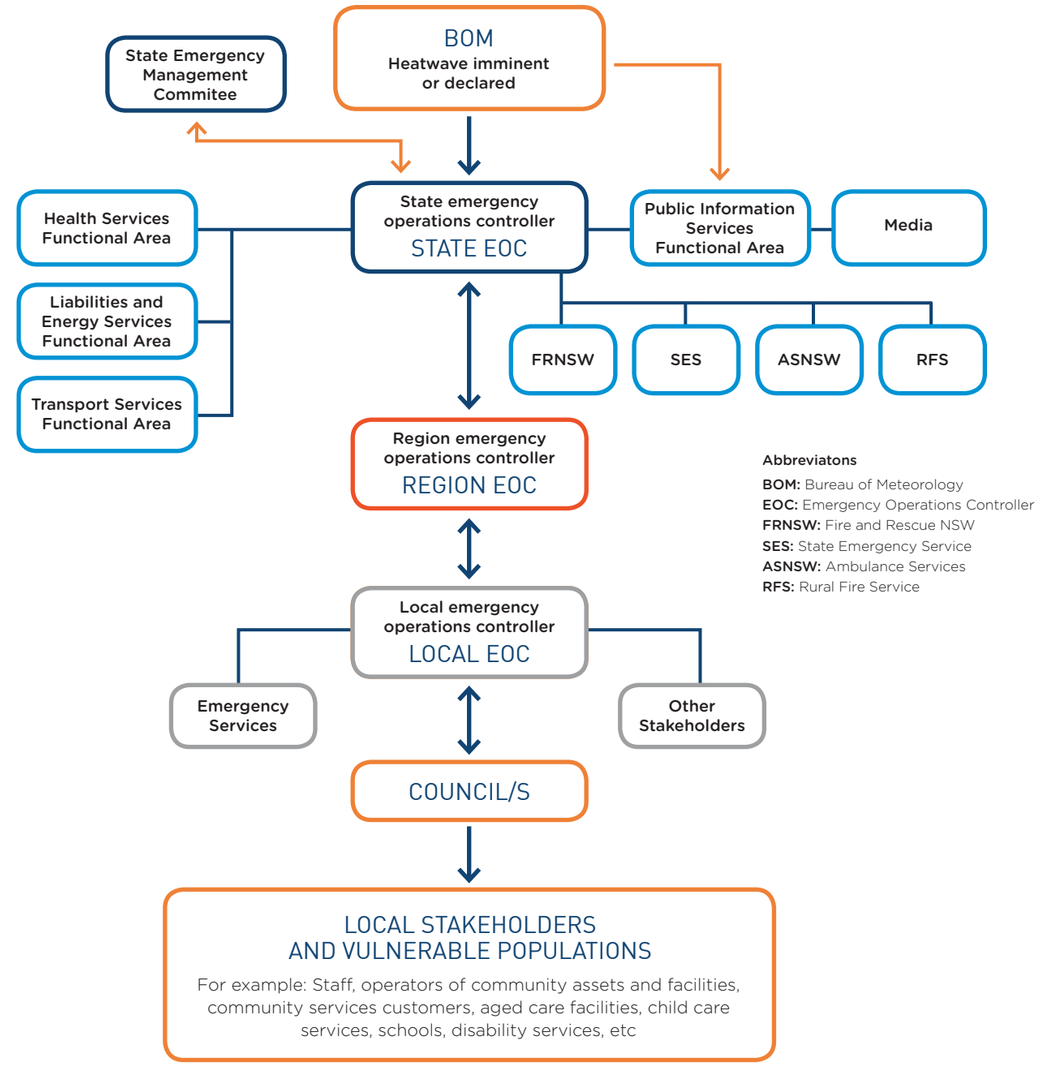

Figure 5. Diagram of emergency management roles and responsibilities for heatwave

The aim of the NSW State Heatwave Sub Plan is to *'...describe the arrangements for the control and coordination of, the preparation for, response to and immediate recovery from extreme heat and heatwave events within NSW to reduce the risk or counter the effects on the community' (p.9).* However, it should be noted that the Sub-Plan only covers information sharing between agencies and the public and *'...does not address the reduction of risk before the event as the actions required are not controlled by the combat agency' (p.9-10).*

The Sub Plan outlines that, where necessary, local or regional heatwave arrangements should be developed with a specific focus on vulnerable people. The Sub Plan outlines that such arrangements should consider practical response and support activities beyond information sharing.

A challenge for developing effective local strategies is that:

- There are no roles outlined for local government in the State Heatwave Sub Plan – despite a stated role in resilience building.
- There is an absence of defined arrangements for both the mitigation of, and preparedness for heatwaves at the state level – including a lead agency to coordinate heatwave emergency risk management strategies.
- There are no clear guidelines for developing regional and local emergency arrangements.

The lack of guidance with regards to heatwave sits in direct contrast to other natural hazards including flood, coastal erosion and bushfire. Table 1 provides a comparison of risk management guidance across common hazards in NSW.

The lack of a coordinating agency, standard guidelines and controls, has ultimately resulted in inconsistent approaches to heatwave across local government areas (LGAs) in Western Sydney including: heatwave risk assessment methodology; sharing of resources and information; and the development of heatwave emergency management arrangements.

Family enjoys Cumberland City Council's Cool and UV Smart playground

Table 1: Comparison of risk management policy

ELEMENT	FLOOD	COASTAL EROSION	BUSHFIRE	HEATWAVE
Legislative linkage	Local Government Act Section 733	Coastal Management Act	Rural Fire Act	Nil
Detailed hazard risk assessment and management guidance	Floodplain Development Manual	Coastal Management Manual	- Bush Fire Risk Management Guidelines - Planning for Bushfire Protection 2019	Nil

RESILIENCE ACTIONS ALREADY UNDERWAY IN WESTERN SYDNEY

Heatwave resilience is recognised as a priority regional issue by WSROC, local government, the health sector, community service providers and infrastructure operators. Many are already acting to address heatwave resilience over and beyond their role in information sharing as identified in the NSW Heatwave Sub Plan.

Current activities include:

- Quantifying urban heat island impacts
- Developing cooler public place strategies
- Implementing tree planting programs
- Updating land use planning and development controls
- Building infrastructure resilience
- Encouraging household cooling strategies
- Enhancing community awareness and engagement
- Trailing cool refuge networks to provide community relief.

More broadly, infrastructure operators are working to ensure the reliability of networks during heatwaves and exploring potential actions to contribute to heatwave mitigation, while community organisations such as Meals on Wheels, religious groups, and charities, undertake a wide diversity of roles which support community resilience and connect with vulnerable groups and individuals.

While the above efforts are to be commended, in the absence of a lead agency to coordinate risk management of this complex, multi-scalar issue; heatwave management remains largely uncoordinated across the region.

City of Parramatta installing heat-reflective coating as part of their Cool Roads Trial

PEOPLE MOST AT RISK FROM HEATWAVES

Extreme heat is dangerous and can affect anyone, including fit and healthy people. However, some people are particularly vulnerable to heat-risk. Figure 6 outlines a number of groups who have a higher-than-average risk of heat-related impacts (in no particular order).

First, some individuals may have impaired physiological ability to regulate body temperatures (e.g. elderly, very young children, and people with medical conditions such as diabetes). Some individuals are more exposed to hot environments or more likely to physically exert themselves (e.g. outdoor workers and people experiencing homelessness).

Secondly, social determinants of health may impact an individual's capacity to keep their body cool either by cooling their home, travelling to cool places, understanding public health warnings, or seeking support from others (e.g. low-income, CALD groups, socially isolated, those living with disability).

Finally, it should be acknowledged that these risk factors are compounding. An 80-year-old pensioner, living with diabetes, without access to air-conditioning, private transport or support networks is at far greater risk than another person of the same age with no underlying health conditions, an operating air-conditioner and access to support networks.

Given the predicted influence of climate change, and the trajectory of Western Sydney's urbanisation and population growth, a range of social, economic, and environmental factors will impact the future vulnerability of Western Sydney residents.

These factors include:

- Predicted higher future extreme temperatures
- Increased development and reduction of green spaces
- Increased pressure on local infrastructure (transport and health)
- Growing rates of chronic disease[xvii]
- An increasing older population
- Higher rates of socio-economic disadvantage
- Higher cultural and linguistic diversity (such groups may have less access to, or limited ability to understand to mainstream warnings, and in some cases, limited support networks).

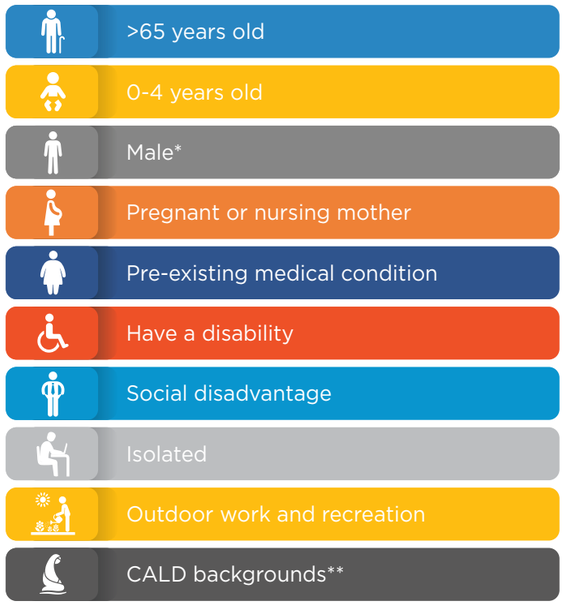

Figure 6. Groups most vulnerable to heatwaves

*Men are more likely to work in outdoor, physical jobs, and may be less likely to seek medical advice.
**May be less likely to receive or understand mainstream warnings. May have limited social networks.

Western Sydney couple

POLICY CONTEXT

There are a number of international, national, state and local policies relevant to disaster risk reduction and heatwave management in NSW and Western Sydney. These policies and frameworks reflect an emphasis on building resilience through an integrated management approach to prevention, preparedness, response and recovery via shared responsibilities and partnerships across government, businesses, community organisations and communities. A selection is outlined in Table 2. It should be noted that many local governments have recently developed, or are in the process of developing, local resilience strategies. This is an rapidly evolving space and therefore reference to specific documents are not made here.

Table 2: International, national, state and local policy context

POLICY NAME	AUTHOR	SCOPE	
Sendai Framework for Disaster Risk Reduction (2015-2030)	**United Nations**	**International**	**The purpose of the framework is to:** "... prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience" [20]
National Strategy for Disaster Resilience (2011)	**Council of Australian Governments**	**National**	**The strategy aims to:** "... develop and embed new ways of doing things that enhance existing arrangements across and within governments, as well as among businesses, the not-for-profit sector, and the community more broadly, to improve disaster resilience and prevent complacency setting in once the memory of a recent disaster has subsided" [18]
The State Emergency and Rescue Management Act 1989 (SERM Act)	**NSW Government Parliamentary Counsels Office**	**State**	**The Act provides the basis for emergency management in NSW and specifies:** - The responsibilities of the Minister - That emergency management committees are established at state, regional and local levels - That Emergency Management Plans (EMPLANs) are prepared and reviewed at state, regional and local levels - Arrangements for controlling emergency operations
NSW Emergency Risk Management Framework (2017)	**Resilience NSW**	**State**	**The Framework aims:** "To build an integrated emergency risk management system that informs decision making and the allocation of resources to proactively manage current and future emergency risks and strengthen emergency management capability and capacity" [21].
NSW State Heatwave Subplan (March 2018)	**NSW Police Force, Emergency Management Unit**	**State**	**The Subplan's aim is to:** "... describe the arrangements for the control and coordination of, the preparation for, response to and immediate recovery from extreme heat and heatwave events within NSW to reduce the risk or counter the effects on the community" [17]
Turn Down the Heat Strategy and Action Plan (2018)	**WSROC**	**Regional**	**The Strategy seeks to:** - Identify and leverage existing best practice to develop a program of effective actions at household, precinct and regional levels - Acknowledge the limitations of the current policy framework with regard to urban heat to galvanise action across diverse stakeholders and - Propose a series of priority actions for development with a broader stakeholder group [10]
Resilient Sydney Strategy	**Resilient Sydney**	**Metropolitan**	**The strategy acknowledges that extreme heat is Sydney's most significant risk.** Reducing the impact of heatwaves is said to require collective action. The Cool Suburbs initiative led by WSROC is recognised as a key component of the Resilient Sydney Strategy. [8]
Minimising the impacts of extreme heat: A guide for local government	**Adapt NSW**	**Local**	This guide seeks to clarify roles and responsibilities in relation to extreme heat events and will examine ways in which local government can minimise the impacts of such events by adapting existing systems, procedures and activities.

A SHARED RESPONSIBILITY

Although governments are central to existing disaster prevention, preparedness, response and recovery frameworks, the National Strategy for Disaster Resilience and 2020 Royal Commission into National Disaster Arrangements emphasise that disaster resilient communities work together.

> *"Disaster resilience is the collective responsibility of all sectors of society, including all levels of government, business, the non-government sector and individuals. If all these sectors work together with a united focus and a shared sense of responsibility to improve disaster resilience, they will be far more effective than the individual efforts of any one sector."* [18]

The roles of NSW Government organisations are outlined in the State Heatwave Sub Plan, non-government stakeholders are not. Businesses, primary health care, community service providers, and other non-government organisations, as well as individuals are fundamental in supporting government efforts to build heatwave-resilient communities.

Community care worker serves up lunch to an elderly woman sitting at her kitchen table

Examples of roles and responsibilities of different sectors are outlined below.

- **Businesses:**
  - Provide resources, expertise and essential services (e.g. electricity for air conditioning)
  - Must understand the risks they face and ensure service continuity during heatwaves
  - Have obligations to ensure the safety and wellbeing of their workers and clients.
- **Non-government and community organisations:** (including primary health care)
  - Are key links for identifying and understanding vulnerable groups
  - Are conduits to communities for sharing preparedness information and conducting welfare checks
  - Are critical for direct response during and after heatwaves.
- **Individuals:**
  - Have a responsibility to prepare for heatwaves and thereby build household resilience
  - Act on heatwave warnings when issued, and check on vulnerable neighbours
  - Can get involved with local emergency management by volunteering with combat agencies or non-government organisations such as the Red Cross.

These roles and responsibilities are not reflected in our current heatwave arrangements. There are significant opportunities to enhance the involvement of businesses, community organisations and individuals in enhancing heatwave resilience thereby harnessing the strengths of all parts of the community. To do this there must be better articulation of the role each sector can play in building resilience, and how each can complement, and integrate with, existing emergency management protocols.

INTEGRATED RISK MANAGEMENT: A RESILIENCE APPROACH

Community and organisational resilience in Australian emergency management is built on the concept of prevention, preparedness, response and recovery (PPRR).

Building heat resilient communities in Western Sydney calls for an integrated, whole-of-community approach under the PPRR principles. An integrated heat management strategy encourages partnerships, shared responsibility, better understanding of the risk environment, and an adaptive and empowered community that acts on this understanding.[18]

Such a strategy would include enhancing aspects of current arrangements in areas such as:

- Identification and understanding of vulnerable people
- Risk assessment processes
- Warning systems and temperature monitoring
- Urban planning controls
- Landscape management
- Emergency and recovery planning
- Community awareness and resilience
- Organisation and business resilience
- Resilient infrastructure

Figure 7. Integrated approach to extreme heat management

OPPORTUNITIES

The Heat Smart Resilience Framework was informed by a comprehensive gap analysis which identified several themes for improving heatwave resilience including:

- **Governance**
  - Enhance governance and coordination through clearly defined extreme heat management arrangements including localised triggers for action.
  - Enhance warning services ensuring they are locally tailored and targeted at the suburb level.
  - Provide guidance on best-practice risk management planning to define a state-wide extreme heat management framework.
- **Data**
  - Improve measurement of extreme heat impacts on our people and our city.
  - Improve the identification and connection with individuals most vulnerable to extreme heat.
  - Improve understanding of extreme heat risk considering current and future conditions as well as community exposure and vulnerability.
  - Undertake research to understand the effectiveness of extreme heat management measures.
- **Policy**
  - Prioritise infrastructure resilience to heat so it functions when people need it most (e.g. energy, transport and telecommunication networks).
  - Revise state and local planning instruments to mitigate urban heat islands.
  - Revise housing design standards to ensure dwellings can maintain survivable temperatures in extreme events without air-conditioning.
  - Improve the availability of cooling shelters, cooled water facilities and air conditioning.
- **People**
  - Build understanding of heat risk and practical measures to manage its impacts.
  - Enhance the capacity of councils and other organisations to manage local heat risks.
  - Improve the integration of community organisations in emergency management planning.
  - Enhance the resilience of businesses, community organisations and institutions to withstand the impacts of extreme heat.

New housing estate on the outskirts of Sydney

PRIORITY AREAS FOR ACTION

This Heat Smart Resilience Framework identifies opportunities for improving current heatwave arrangements. These are ordered under the following five categories: governance, prevention, preparedness, response and recovery/evaluation (Tables 3 – 6).

Under each category, priority areas for action are listed and suggested roles and accountabilities highlighted. In line with the Framework's focus on shared responsibility, a range of agencies across multiple sectors have been identified including:

- Commonwealth Government agencies
- NSW Government agencies (e.g. Resilience NSW, NSW Health, DPIE, Department of Communities and Justice)
- Local government
- Local health districts and primary health networks
- Regional and Local Emergency Management Committees (REMCs and LEMCs)
- State Emergency Operations Centre
- Community organisations (e.g. community housing providers, churches, service providers)
- Emergency management agencies (RFS, SES, NSW Ambulance, NSW Police)
- Infrastructure operators (e.g. Endeavour Energy, Transport for NSW, Sydney Water, Telstra)
- Local businesses
- Advocacy organisations (e.g. NCOSS, COTA, Western Sydney Business)
- Individuals

The suggested roles in Tables 3 – 6 have been made on the basis of extensive stakeholder consultation, however it should be acknowledged that these are suggestions only. We hope this will provide the starting point for discussion that will further clarify roles and responsibilities with regards to heatwave management.

Finally, it should be noted that although this Framework focuses on Western Sydney, many of the improvement opportunities are relevant for the Greater Sydney Metropolitan Area, and NSW as a whole.

Young child at local playground

GOVERNANCE

Governance refers to the actors, legislation, strategies and plans that govern extreme heat management in Western Sydney. The Heat Smart Gap Analysis[12] recognised that governance for heatwave is far less developed than for other hazards. The following recommendations seek to raise heat to a similar level of maturity.

Table 3: Priority areas for action - Governance

THE ISSUE	RECOMMENDED ACTIONS	RESPONSIBILITY
1. Define a lead agency in NSW for heatwave emergency risk management		
Unlike flood, fire or storm, heatwave does not have a lead agency that is responsible for coordinating heatwave risk management across all sectors. This results in an ad-hoc and uncoordinated approach to heatwave management at all levels. It is recognised that heat is a complex issue involving a diverse array of stakeholders, however this increases rather than decreases the need for a risk management lead that can provide cross-sectoral coordination.	• A lead agency should be designated for the emergency risk management of heatwave.	**Suggested lead:** • State Emergency Management Committee
2. Update the NSW Heatwave Sub Plan		
The current NSW Heatwave Sub Plan is limited to information distribution in the lead up to, and during a heatwave event. This is not in line with best practice identified in the *National Strategy for Disaster Resilience*, nor is it in line with the scope of Sub Plans for other hazards. While heatwaves cannot be prevented, their impacts can. There is a need to update the Sub Plan to improve both prevention/mitigation and response actions to reflect the significant and growing risk posed by heatwave.	• Outline roles and actions for prevention/mitigation of heatwave impacts to facilitate better awareness, coordination, and collaboration across the full spectrum of emergency management activities (prevention, preparedness, response and recovery). • Further develop roles and responsibilities in responding to heatwave events beyond information sharing (e.g. on-ground outreach programs, evacuation, and cooling centre operations). • Updates should give consideration to related hazard plans (including the State Bushfire Plan, Electricity Supply Emergency Sub Plan and Human Influenza Pandemic Plan) and address the likelihood of concurrent and compounding events.	**Suggested lead:** • NSW Police Force, Emergency Management Unit **Supporting role:** • Resilience NSW • DPIE • NSW Health • Department of Communities and Justice (DCJ) • Emergency management committees • Energy and Utilities Functional Area
3. Improve clarity of roles and responsibilities for local government and community organisations in heatwave emergency planning		
Strategic statements outlining resilience-based approaches to emergency management (involving all levels of government and sectors of the community) are not well reflected in formal heatwave planning. With increased focus on resilience across all sectors, there is a need to better clarify the roles of LEMCs, councils and community organisations to ensure that strategic intent is reflected on the ground and that efforts are coordinated.	• Provide role clarity for local government in the State Heatwave Sub Plan. • Clarify roles and responsibilities for local government and community organisations in building heatwave resilience, including how this interacts with the work of LEMCs.	**Suggested lead:** • Resilience NSW* **Supporting role:** • Emergency management committees • Local government • Community organisations
4. Develop a suite of model procedures, tools and guidelines to enhance heatwave emergency planning at all levels		
Currently there are no standard risk assessment, mapping or risk management protocols for heatwave. Developing a suite of best practice tools including case studies will facilitate better risk awareness and planning at the regional and local levels.	• Develop a 'how to' guideline on heatwave emergency planning to assist planning at local levels with clearly defined triggers for action. • Develop specific heatwave emergency management arrangements linked to Local EMPLANs including localised triggers for action. • Develop training programs to facilitate upskilling, and maturation of heatwave planning across key actors. • Emergency plans must consider the impacts of concurrent hazards (e.g. pandemics or bushfire) on proposed strategies.	**Suggested lead:** • Resilience NSW **Supporting role:** • Emergency management committees • NSW Health • Local government

*In the absence of a lead agency, Resilience NSW has been identified as a suggested lead where significant coordination or attention to governance is required.

PREVENTION/MITIGATION

The NSW State Emergency Plan defines prevention as *"to eliminate or reduce the level of the risk or severity of emergencies"* (p.6). While it is acknowledged that extreme heat risk – like floods or storm – cannot be eliminated, there are a number of actions that can mitigate the frequency, intensity and duration of heatwaves in our cities. Such strategies include mitigating:

- **Climate change:** which is predicted to exacerbate heatwave events into the future
- **Urban heat islands:** which exacerbate extreme conditions in areas of high population concentration.

It is also possible to reduce the severity of impacts caused by heatwaves. Examples include ensuring infrastructure and utilities are designed to function in a hotter climate, designing dwellings to protect their occupants in the event of power outages, and ensuring community is prepared to respond.

Table 4: Priority areas for action - Prevention/mitigation

THE ISSUE	RECOMMENDED ACTIONS	RESPONSIBILITY
5. Measure and quantify impacts of heat		
While heat is widely recognised as having major impacts on the city, its systems and people, quantifying heat-related impacts on public health, the economy, infrastructure and the environment remains challenging. In 2021, NSW Treasury[21] identified the need to better quantify heat-related impacts on both health and infrastructure in NSW. All studies should consider heat impacts under current and future climate scenarios.	• Improve measurement of heat impacts on mortality and morbidity in NSW (e.g. require heat to be recorded as a factor contributing to mortality and morbidity in emergency department presentations). • Quantify the public health costs of heat-related morbidity and mortality in NSW under current and future climates. • Quantify the costs of heat-related impacts to infrastructure (including lost-time, business disruption, maintenance and repair costs). • Where necessary, conduct further research into the impacts of heat in NSW including heatwave and extreme heat events.	**Suggested lead:** • Resilience NSW **Supporting role:** • NSW Health • DPIE • Infrastructure NSW • NSW Treasury
6. Conduct local heatwave risk assessments		
Understanding the nature, scale and contributors to heat risk is an essential precursor for developing effective mitigation and response measures and targeting resources effectively. While certain aspects of heat-resilience are best assessed at the local level, others (such as city-enabling infrastructure) must be considered at the regional or metropolitan level based on consistent state-wide guidance.	• Undertake a comprehensive heatwave risk assessment for Western Sydney to help estimate potential impacts and prioritise heatwave strategies at the regional and LGA levels: - Collaboration between different sectors, such as infrastructure and health, would best inform results. - The risk assessment should be updated regularly to account for changes in climate, exposure and vulnerability. - The risk assessment should be based on a standardised state-wide guidance.	**Suggested lead:** • Resilience NSW **Supporting role:** • Western Sydney LEMCs • North and South West Metropolitan REMCs • Local councils • NSW Health/LHDs • DCJ • NSW Energy and Utility Services Functional Area • NSW Police • NSW Ambulance • Fire and Rescue NSW/RFS • Infrastructure operators (energy, telecommunications, transport, water)
7. Improve identification and understanding of vulnerable individuals and facilities		
While many organisations are regularly in-touch with vulnerable groups and facilities, comprehensive understanding is limited. Interviews with councils, health groups, and community organisations found that state government and emergency services often overestimate their knowledge of where these groups are and what their needs might be. There is a need to formalise processes for outreach to groups in need. Strategies for reaching socially isolated individuals without formal connections to services must also be considered.	• Support and formalise relationships with community organisations, local and state government to connect with vulnerable people to prepare for extreme heat and to ensure they are safe during events. • Formalise processes for defining, identifying and connecting with heat-vulnerable clients through existing healthcare networks. • Standardise processes for identifying and assessing vulnerable facilities in local emergency planning and update lists regularly.	**Suggested lead:** • NSW Health /LHDs • DCJ **Supporting role:** • LEMCs • Local councils • Community organisations • Primary Health Networks • Individuals
8. Integrate heat mitigation and adaptations into land use planning and urban design		
While we cannot prevent heatwaves, their severity can be exacerbated or mitigated by qualities of the built environment. A resilience approach to heat includes designing the built environment to reduce urban heat, help people adapt to a hotter climate, and support emergency response in extreme events. Delivering resilient design at the lot, precinct and city scale offers the greatest opportunity to mitigate heat-related risk, minimising impacts on individuals and thus reducing scale of emergency response required in extreme events. For further information see WSROC Urban Heat Planning Toolkit at wsroc.com.au	• Promote cooler urban design through state and local planning instruments[2]. Measures include: - Orientation to prevailing winds and solar access. - Delivering quality canopy cover via deep soil, appropriate species selection and passive irrigation. - Making provision for more green space. - Limiting concrete and other impermeable surfaces in public areas. - Increased use of cool materials, particularly roofing. - Increased use of shading and facade treatments. - Better integrate water into urban design. - Ensure planning controls prioritise preservation of existing tree canopy. • Implement place-based adaptation strategies to support community safety (e.g. shading at bus stops, water play parks)	**Suggested lead:** • DPIE **Supporting role:** • Local councils • Development industry • NSW Health/LHDs • Infrastructure NSW • Transport for NSW • Sydney Water
9. Design homes for passive survivability		
Air-conditioning is currently a key response to heatwave, however not everyone has access to air-conditioning or can afford to run it. Air-conditioning reliance is not only unaffordable for vulnerable groups, it also exacerbates risk by contributing to both urban heat and climate change*. Air-conditioning reliance also increases city-wide vulnerability to power failure through increased peak demand. Improving construction standards to ensure homes remain survivable in the absence of power can reduce peak energy demand as well as as well as protecting the most vulnerable during extreme events.	• Advocate for updates to the National Construction Code to ensure residential dwellings can maintain safe temperatures in the absence of mechanical cooling. • Update BASIX SEPP including: - Updating climate data, parameters, and technology options. - Strengthening its targets. - Setting an additional performance target for thermal safety/thermal autonomy. - Assessing buildings against future climate scenarios. • Develop a suite of recommended retrofit options for adapting existing dwellings – particularly for affordable and social housing.	**Suggested lead:** • DPIE • Office of the Building Commissioner-Department of Customer Service **Supporting role:** • Resilience NSW • NSW Energy and Utility Services Functional Area • Development industry • NSW Health

*Where powered via non-renewable energy.

THE ISSUE	RECOMMENDED ACTIONS	RESPONSIBILITY
10. Improve quality of social and community housing stock to ensure safe, liveable conditions		
Social housing tenants are more vulnerable to heatwave because they are less able to afford energy for cooling and face similar restrictions to renters when it comes to home modifications. Ensuring social housing is well-designed is essential for delivering safe, liveable environments for residents.	• Deliver sustainable, energy efficient design in new social housing and social housing renovations as the per the *Good Design for Social Housing*. • Undertake a review of existing social housing stock to determine where adaptations and retrofits could improve tenant safety during extreme heat. • Investigate the provision of solar air-conditioning systems and other cooling strategies within social and community housing properties. • Undertake a policy review to minimise barriers to tenants installing cooling devices (such as ceiling fans and air-conditioning) and other heat-adaptation measures.	**Suggested lead:** • DCJ • DPIE **Supporting role:** • Land and Housing Corporation • Community housing providers
11. Support the transition to renewable energy sources		
Climate change is expected to increase heatwave frequency, severity, and duration over the coming decades. Measures to address climate change will ultimately reduce heatwave risk by reducing exposure to heatwave conditions. All levels and sectors of government have a role to play in understanding and communicating the impacts of climate change in their sector, reducing their own emissions and supporting the transition to renewable energy. The NSW Government's Net Zero Plan provides a key policy driver to delivering this outcome.	• Advocate to the Australian Government to increase renewable targets and reduce emissions. • Invest in emission reduction (e.g. renewable energy, electric vehicles and associated infrastructure) and support others to do so.	**Suggested lead:** • DPIE (Energy, Environment and Science) **Supporting role:** • NSW Treasury • Transport for NSW • Energy providers • Local councils • Industry

Medium density development uses light colours to reflect heat

PREPAREDNESS

The NSW State Emergency Plan defines preparedness '*as enhancing the capacity of agencies and communities to cope with the consequences of emergencies*'. For example, bushfire preparedness activities include:

- Developing bush fire risk management plans as per the *Rural Fires Act 1997*.
- Promoting fire-safety messages at the start of summer.
- Encouraging households develop a bushfire plan – including decisions on when to leave.
- Encouraging households to undertake activities to reduce fire impact: cleaning gutters, clearing leaf litter, checking water sources.
- Providing targeted bushfire warnings and advice to help the community make informed decisions.
- Establishing safe places for community members who need to leave their home (evacuation centres).

While heatwave may not be as visually dramatic as bushfire, human health impacts are significant and reaffirm the need for greater heatwave preparedness at the government, business, and community levels. NSW Health is responsible for educating the public on heatwave health (Beat the Heat) and delivering heatwave warnings. However, more guidance is needed to promote heatwave preparedness and planning across sectors. Examples might include:

- Developing local or regional heatwave risk management plans.
- Promoting heat-health safety in the lead up to summer.
- Helping households plan for heatwaves – including location of cooler places and how they will get there.
- Encouraging households to prepare their home for summer (installing blinds, checking cooling devices are working, zoning the home).
- Providing targeted heatwave warnings and advice to help the community make informed decisions.
- Ensuring that safe, cool places (and access to them) are available for those who are not safe at home.

Several recommendations for improving heatwave preparedness are provided in Table 5.

Table 5: Priority areas for action - Preparedness

THE ISSUE	RECOMMENDED ACTIONS	RESPONSIBILITY
12. Improve infrastructure resilience to heatwave		
Heatwave can cause catastrophic failure of city infrastructure. Energy networks are particularly vulnerable with cascading effects for other systems (e.g. transport and water). Reliable electricity for cooling is the single most important enabling response to heatwaves and should be prioritised. However, as identified in the 2019/2020 Black Summer bushfires, other infrastructure networks such as telecommunications also need to consider their resilience.	• Develop a strategy for improving energy network resilience to heatwave prioritising the safety of vulnerable facilities and communities. • Prioritise the installation of localised back-up power in areas of high heat risk. • Plan for and mitigate impacts to transport infrastructure such as public transport and signalling infrastructure.	**Suggested lead:** • Infrastructure NSW **Supporting role:** • DPIE (Environment, Energy and Science) • NSW Energy and Utility Services Functional Area • Network providers (Endeavour Energy and Ausgrid) • Telecommunications network providers • Transport for NSW • Sydney Water

THE ISSUE	RECOMMENDED ACTIONS	RESPONSIBILITY
13. Improve electricity affordability for vulnerable groups		
In the extreme temperatures seen in Western Sydney, air-conditioning is critical to health. Unfortunately, energy affordability issues may prevent those most vulnerable to heat (particularly the elderly) from cooling (or heating) their homes.	• Investigate policies to incentivise at-risk individuals to utilise cooling measures during heat events (e.g. The UK Winter Fuel Payment helps low-income individuals over 65 years pay energy bills through extreme weather). • Investigate new solutions for reducing cooling costs e.g. district cooling or solar rebate schemes.	**Suggested lead:** • DPIE (Environment, Energy and Science) **Supporting role:** • DCJ • NSW Energy and Utility Services Functional Area • Infrastructure operators (e.g. Endeavour Energy, Ausgrid)
14. Enhance targeted awareness campaigns		
The NSW Heatwave Sub Plan identifies NSW Health as responsible for educating the public regarding actions to prevent, reduce or respond to extreme heat. The Beat the Heat campaign provides key messages, however these must be expanded in scope. Further tailored messaging and channels to suit local audiences is required.	• Develop and deliver locally tailored and targeted awareness campaigns in the lead up to summer focused on those most vulnerable. Ideally, campaigns should: - Contain easy, affordable, practical actions to undertake before, during and after heatwaves, including specific advice for renters. - Use a variety of communication channels including TV, local radio, newspapers and face-to-face to cater for older residents and/or those with poor digital connection. - Be undertaken in partnership with public health authorities, general practitioners, pharmacies, community organisations, and social housing providers. - Be tailored in both messaging and delivery to accommodate different audiences including culturally and linguistically diverse groups, people with physical or mental impairments, or specific medical vulnerabilities. - Involve community members in the design of programs. - Ensure bushfire and heatwave messaging are integrated and consistent. - Utilise lessons from the COVID-19 pandemic response reach vulnerable people (e.g. working with community leaders to determine most appropriate messaging/channels).	**Suggested lead:** • NSW Health **Supporting role:** • Local health districts • Primary health networks • Local councils • Fire & Rescue NSW/RFS • Bureau of Meteorology • Community organisations • Multicultural NSW • Individuals
15. Enhance heatwave warning systems to ensure they are locally tailored and targeted		
Currently, heatwave warnings are delivered at a metropolitan or state level. The significant climate variations across our city mean Western Sydney may have experienced several days of extreme heat before a heatwave is formally declared. A more tailored approach is needed to provide finer resolution information about the risk of impending heatwaves and to deliver public warnings accordingly.	• Develop locally tailored and targeted heatwave warnings to allow more fine-grained triggers for activation of regional and local heatwave plans. • Review heatwave definitions and triggers to ensure they accurately reflect the level of health risk (e.g. is 'unusually high temperatures' the most appropriate way to define risk? Should other factors such as humidity be considered? [23]) • Ensure bushfire and heatwave emergency warnings and messaging are integrated and consistent where appropriate (e.g. urban fringe).	**Suggested lead:** • Bureau of Meteorology (BOM) • NSW Health **Supporting role:** • LHDs • LEMCs • Fire & Rescue NSW/Rural Fire Services (messaging coordination)

THE ISSUE	RECOMMENDED ACTIONS	RESPONSIBILITY
16. Provide localised climate monitoring to help inform decision-making		
Microclimate research by local councils in partnership with Western Sydney University[24] has found ambient temperatures in adjacent residential streets can vary as much as 10 degrees Celsius. This has significant implications for how we target mitigation activities, as well as plan for and respond to heat emergencies.	• Install a network of local climate sensors* to better assist in local heatwave planning (e.g. assisting councils to target resources (UHI mitigation, cool refuges, heatwave response and outreach) to locations of greatest need. This approach must consider: - The most appropriate locations for sensors with a priority focus on understanding human heat experiences. - Planning for the management of data to enhance usability and accessibility by relevant end-users. - Long term funding and maintenance of sensor assets. • Develop an open-source app to assist the community to make informed decisions in seeking cooler areas (e.g. SA Water app).	**Suggested lead:** • Bureau of Meteorology (BOM) **Supporting role:** • Local councils • NSW Health
17. Improve local government emergency management capacity		
The *2020 Royal Commission into National Natural Disaster Arrangements* found that local governments require further resourcing to fulfill their emergency management obligations (across all hazards). In the case of heatwave, lower level of maturity in emergency arrangements at all levels, means available resourcing is less likely to be allocated to heatwave.	• Increase resources to local government to fulfill emergency management functions for all hazards. • Provide training on heatwave planning and response for local government staff. This should extend beyond local emergency management committees to include staff of local facilities such as libraries and leisure centres (which act as informal cooling shelters) and rangers (who often come across rough sleepers exposed to heat stress). Where appropriate staff of key local facilities (e.g. shopping centres) should be included. • Support local government developing partnerships with private sector stakeholders such as shopping centres or aquatic centres.	**Suggested lead:** • Resilience NSW **Supporting role:** • Local councils
18. Enhance capacity of community organisations and service providers and improve integration with emergency management arrangements		
Community organisations, primary healthcare, and funded service providers are often best placed to assist vulnerable individuals prepare and respond in accordance with their personal heatwave risk. They can provide valuable insights for emergency planners and identify opportunities and barriers for their communities. However, such groups are not regularly involved in emergency planning activities.	• Training programs about heatwave risk management should be delivered to staff and volunteers of community organisations and funded services to ensure they have the knowledge and confidence to engage with their clients around heatwave preparedness. • Seek opportunities to include council community development managers on LEMCs. • Seek opportunities to engage community organisations in emergency planning and preparedness activities. • Seek opportunities to engage primary health networks in emergency planning and preparedness activities.	**Suggested lead:** • LEMCs • Local councils **Supporting role:** • Resilience NSW • Community organisations • Local health districts • Primary health networks

*The quantity and location of temperature sensors will need to be decided locally, based on relevant facilities and communities of interest.

THE ISSUE	RECOMMENDED ACTIONS	RESPONSIBILITY
19. Investigate the provision of heatwave planning within aged care facilities and other My Aged Care and NDIS service providers.		
People over the age of 65 are at particular risk of heat-related impacts. *The Royal Commission into Aged Care Quality and Safety 2020*[24] highlighted some significant shortcoming in the aged and disability care sector. Services and facilities catering to this cohort should be required to implement and review heatwave risk assessments, planning and training on a more regular basis.	• Instigate a program to identify heatwave preparedness gaps within aged care facilities and provide improvement recommendations. Such a program could be extended to group homes for the disabled and social/public housing providers. • Identify opportunities for training/retraining aged care staff in heatwave preparedness and response.	**Suggested lead:** • Australian Aged Care Quality and Safety Commission **Supporting role:** • Resilience NSW • Primary health networks • NSW Health/Local health districts • Education providers (TAFE) • DCJ • Aged Care Industry Association • Community organisations
20. Support small business continuity planning		
Businesses can be significantly impacted by heatwave events, especially if such events coincide with power outages. There is a need to assist businesses (including private sector and not-for-profit) prevent losses and ensure safety of staff and clients.	• Business continuity planning on an all-hazards basis should be promoted to improve the resilience of small businesses and encourage any specific heatwave adaptions such as heatwave operating procedures to ensure the safety and wellbeing of staff and clients.	**Suggested lead:** • Small Business Commissioner • Service NSW (business concierge) **Supporting role:** • SafeWork NSW • Western Sydney Business • Local councils • Local business
21. Engage with real estate and property management industry		
Tenancy can be a significant barrier to heatwave preparedness as renters can be limited in the adaptations, they are able to make to their home.	• Engage with real estate and property management companies about how to support their clients to minimise heatwave impacts.	**Suggested lead:** • NSW Department of Customer Service **Supporting role:** • Local councils • Local business (Real estate)
22. Provide cooled water facilities where practicable		
Provision of drinking water, particularly cooled water, will assist individuals comply with NSW Health directions to stay well-hydrated during hot weather.	• Investigate the installation of further cooled water stations in public spaces. • Investigate ways to encourage developers to include water facilities in common areas of new/refurbished high-density developments. • NSW Government to install cooled water stations on state land and infrastructure (e.g. parklands, rail and bus stops).	**Suggested lead:** • Local councils • Sydney Water **Supporting role:** • Transport for NSW • DPIE • NSW Health/LHDs

Boy drinking from water fountain

RESPONSE

The SERM Act 1989 defines response as *"The process of combating an emergency and of providing immediate relief for persons affected by an emergency"*. Under the NSW Heatwave Sub Plan, formal heatwave response is limited to information sharing and reporting. As heatwaves increase in frequency, severity and duration, the need to provide direct relief to those most adversely affected is becoming increasingly urgent.

The following response actions are recommended to improve response to heatwaves.

Table 6: Priority area for action - Response

THE ISSUE	RECOMMENDED ACTIONS	RESPONSIBILITY
23. Provide outreach programs during heatwave events		
Many of our most vulnerable communities have limited capacity to seek cool spaces or travel during extreme heat. As such, outreach programs are needed to monitor their safety and provide relief where required.	• Investigate programs to connect with vulnerable individuals during heatwaves with the view to piloting them in Western Sydney. • Provide resourcing to help local government develop and implement of extreme weather protocols *(e.g. City of Sydney's Emergency Response for Rough Sleepers Protocol).*	**Suggested lead:** • DCJ • NSW Health **Supporting role:** • Local councils • Community organisations (e.g. Meals on Wheels, Red Cross)
24. Plan for the provision of cooling shelters and integration of partner organisations		
Seeking cool places is a key message of NSW Health's Beat the Heat campaign. Many public buildings already act as informal cooling shelters[4], however with increases in heatwaves predicted, more formal approaches to providing relief will be needed. To enable vulnerable groups to act, the provision of cool places that can be accessed free-of-charge, as well as transport to them is essential. Cooling shelter provision is particularly important in areas where shopping centres and other cool spaces may not be accessible due to financial or mobility constraints.	**At the state level:** • Develop a cooling shelters guide including: - Design criteria for cooling shelters (e.g. back-up power, disability access) with consideration to using new and existing buildings - Guidelines regarding when cooling shelters are needed - Guidelines for transport provision to and from cooling shelters - Protocols for cooling shelter operation (e.g. thresholds for activation, staffing, public health requirements during concurrent hazards) - Advice on partnering with private facilities such as shopping centres - Advice on liability and risk management. • Determine governance and funding arrangements for the delivery of cooling shelters. • Develop planning provisions mandating the identification of cooling shelters for new developments at the precinct planning stage.	**Suggested lead:** • Resilience NSW **Supporting role:** • NSW Health • DPIE • Local councils • Community organisations • Shopping centres • Clubs NSW • Transport for NSW • Community transport providers • Infrastructure operators/ local business
	At the local level: • Identify locations suitable to act as cooling shelters in local emergency planning (e.g. local libraries, community centres, school halls, religious buildings). • Strengthen arrangements with private facilities such as shopping centres etc, to act as cooling shelters. • Develop arrangements with community transport and public transport providers to connect the most vulnerable to cooling shelters during heatwaves.	**Suggested lead:** • LEMCs **Supporting role:** • Local councils • Infrastructure operators / local business • Shopping centres • Transport providers • Community organisations

Elderly person approaching hospital emergency department with walking frame

RECOVERY/EVALUATION

Recovery involves supporting individuals and communities affected by emergencies in reconstructing physical infrastructure and restoring physical, emotional, environmental, and economic wellbeing. It also includes evaluation of preparedness and response efforts.

Table 6: Priority area for action – Recovery/evaluation

THE ISSUE	RECOMMENDED ACTIONS	RESPONSIBILITY
25. Evaluation of heatwave risk management strategies		
Heatwave risk management strategies should be subject to an evaluation framework including a review of strategies at the end of each summer. It is recommended that a standard, best-practice evaluation framework be developed to guide consistency across jurisdictions.	• Develop a standard evaluation framework to assess heatwave risk management strategies employed by state and local actors. • Establish a catalogue of best-practice heatwave risk management strategies for professional use. • Provide ongoing training to upskill key actors in heatwave risk and management as our knowledge base grows.	**Suggested lead:** • Resilience NSW **Supporting role:** • LEMCs • Local councils • NSW Health/LHDs • Primary health networks • NSW Energy and Utility Services Functional Area • Community organisations

Thermal camera measuring surface temperatures in a public park

NEXT STEPS

This Heat Smart Resilience Framework outlines priority areas for action and opportunities for improving heatwave management in Western Sydney. However, we acknowledge this is just the first step towards an integrated management approach to heatwave that embraces the principle of collective responsibility across sectors.

Following the release of this Framework, WSROC will be conducting further engagement with key actors, supporting agencies, and Western Sydney communities to further refine the Framework and turn identified 'priority areas' into measurable outcomes that ensure the communities of Sydney's west will be better positioned to mitigate and endure the impacts of future heatwaves.

Local emergency services at Australia Day community event

GLOSSARY

DCJ: NSW Department of Communities and Justice

DPIE: NSW Department of Planning, Industry and Environment

Emergency: *The State Emergency Rescue Management Act 1989 (SERM Act)* defines emergency as

"an actual or imminent occurrence (such as fire, flood, storm, earthquake, explosion, terrorist act, accident, epidemic or warlike action) which:

a. endangers, or threatens to endanger, the safety or health of persons or animals in the State, or

b. destroys or damages, or threatens to destroy or damage, property in the State, or

c. causes a failure of, or significant disruption to, an essential service or infrastructure being an emergency which requires a significant and coordinated response."

Extreme heat: Defined by the Climate Council as temperatures 40°C and over.

Heatwave: Defined by the Australian Bureau of Meteorology as a period of three or more consecutive days of high maximum and minimum temperatures which are unusual for that location.

Local Emergency Management Committee: Local Emergency Management Committees or LEMCs are responsible for emergency planning and management at the LGA level. LEMCs are chaired by the CEO of the Council in which the LEMC functions, and is supported by secretariat services (Local Emergency Management Officer). The remainder of the LEMC is comprised of representatives from local combat agencies, state agencies and service providers (e.g. local police, RFS, local health districts). It should be noted that the LEMC is not a committee of council, but a separate body under the SERM Act.

LEMO: Local Emergency Management Officer. A staff member at council who represents council at, and manages secretariat services for the LEMC.

LGA: Local government area

LHD: Local health district

NCOSS: NSW Council of Social Services. The peak body for social service providers in NSW.

Resilience: Resilience is defined by Resilient Sydney as the capacity of individuals, communities, businesses and systems within a city to survive, adapt and thrive no matter what kinds of chronic stresses and acute shocks they experience.

Urban heat island (UHI) effect: The tendency of cities to be much warmer than their rural counterparts. Urban surfaces such as roads and roofs absorb, hold, and re-radiate heat; raising the temperature in our urban areas. Human activities such as traffic, industry, and electricity usage also generate heat that adds to the urban heat island effect.

Vulnerable communities: Any person or group of people at greater risk of heat-related impacts due to greater exposure (hotter temperatures), physical characteristics that make them prone to heat-related illness (chronic disease, mental health, old-age), or socio-economic circumstances that limit their capacity to respond (low-income, lack of transport, tenancy, social networks).

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WSROC

The Western Sydney Regional Organisation of Councils' (WSROC) mission is to build collaboration between local governments across Greater Western Sydney, promoting Western Sydney, its people and places, through advocacy, business improvement, strategic leadership, research and partnerships. WSROC has facilitated the development of this strategy.

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