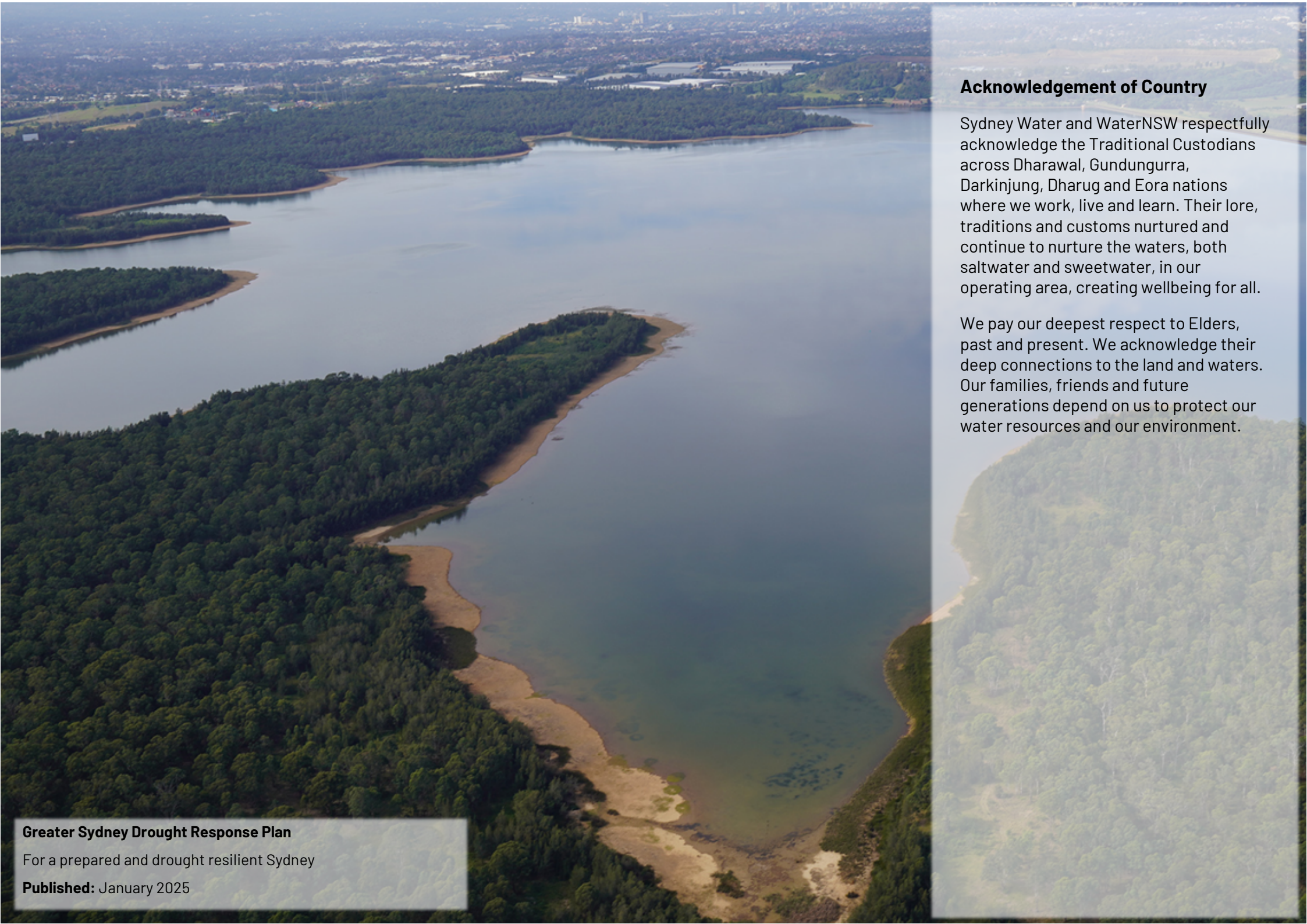




Greater Sydney Drought Response Plan (GSDRP) Overview

For a prepared and drought resilient Sydney
January 2025



Acknowledgement of Country

Sydney Water and WaterNSW respectfully acknowledge the Traditional Custodians across Dharawal, Gundungurra, Darkinjung, Dharug and Eora nations where we work, live and learn. Their lore, traditions and customs nurtured and continue to nurture the waters, both saltwater and sweetwater, in our operating area, creating wellbeing for all.

We pay our deepest respect to Elders, past and present. We acknowledge their deep connections to the land and waters. Our families, friends and future generations depend on us to protect our water resources and our environment.

Greater Sydney Drought Response Plan

For a prepared and drought resilient Sydney

Published: January 2025

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Why does Greater Sydney need a drought plan?

The Greater Sydney Drought Response Plan (GSDRP) sets out how Sydney Water and WaterNSW will work with the NSW Government to respond to water supply challenges and risks through different stages of drought.

Water is essential for Greater Sydney to grow and prosper, as well as meeting the daily needs of households and businesses. Water is vital for maintaining the city's amenity and liveability, and for protecting and enjoying its unique natural environment. To continue building a vibrant and prosperous metropolis, our water supply needs to be secure and resilient, especially in times of drought.

Over the last 20 years, Greater Sydney has been in drought almost 50% of the time. From mid-2017 to early February 2020, the Greater Sydney system, inclusive of the Illawarra and Blue Mountains, experienced one of the worst drought sequences on record. This period saw record low inflows across all drinking water catchments and unprecedented storage depletion rates, reducing total storage by over 50% in 2.5 years (Figure 1). This event also highlighted Greater Sydney's vulnerability to severe drought, showing:

- storage levels can deplete more rapidly in extreme dry conditions than previously observed and planned for
- some water delivery systems can be impacted much faster than others
- had the severe drought sequence continued with the same intensity, the timely delivery of new supplies to avoid severe water restrictions or running out of water would have been at risk.

To better respond to potentially more severe droughts due to climate change and support a growing population, an adaptive plan that combines a coordinated operational, capital, and customer response is required. This will allow decisions and actions to adjust to observed conditions, growth, supply challenges, and to the broader context. Additionally, it is essential to allocate sufficient time to prepare for drought so plans and resources can be put in place.

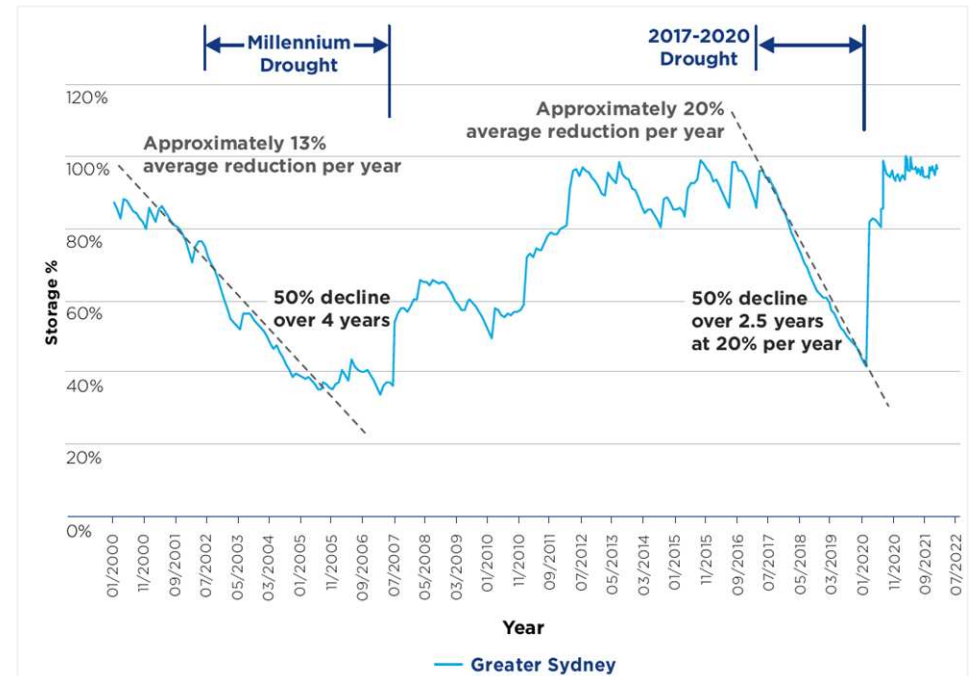
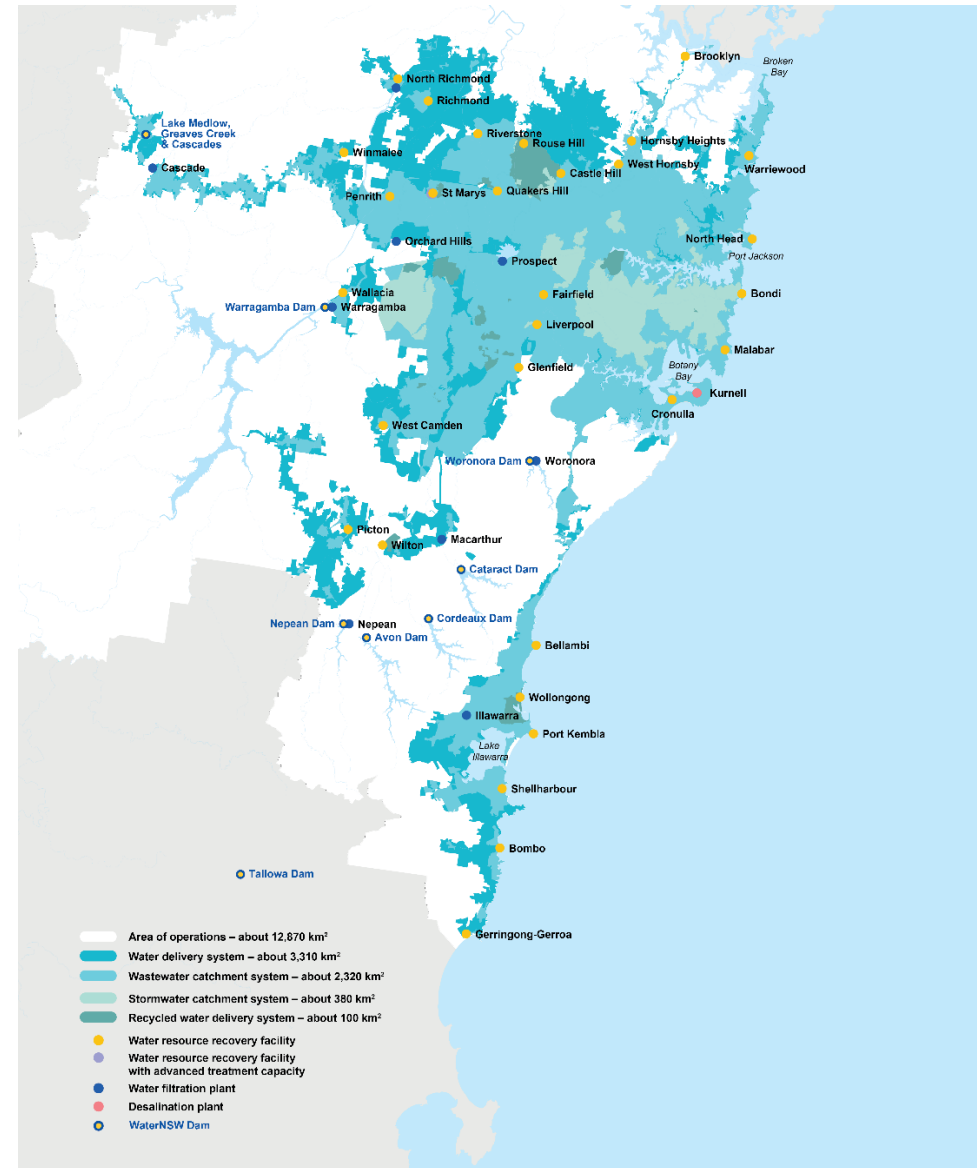


Figure 1: Declining dam levels during the last two droughts

Who is responsible for managing Sydney’s water supply system?

- WaterNSW** operates the state’s dams, capturing and storing water and then supplying it ready for distribution. In Greater Sydney, WaterNSW collects water from river catchments to the south and west of Sydney, and stores it in 21 dams including Warragamba, Nepean, Cataract and Avon dams. The stored water is transported from these dams via a network of rivers, pipes and canals to Sydney Water’s water filtration plants. WaterNSW is also responsible for protecting the Greater Sydney drinking water catchment, including during periods of drought.
- Sydney Water** operates the nine water filtration plants (directly or by private contract) that treat the source water provided by WaterNSW. Sydney Water distributes the treated drinking water to customers, collects and treats wastewater, provides recycled water services to some areas, and manages some major stormwater infrastructure. Sydney Water is also responsible for planning and incurring costs of water supply options.
- The NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) – Water Group** leads and coordinates the metropolitan water strategy and framework for Greater Sydney. It supports Sydney Water and WaterNSW to implement the GSDRP and plays a key role in coordinating advice to the Minister for Water and supporting the NSW Government’s decision-making to respond to drought.

WaterNSW and Sydney Water are responsible for implementing the majority of drought response measures under the GSDRP.



How do we know when Greater Sydney is in drought?

The onset and severity of drought is challenging to predict, but regular monitoring and assessment of conditions and water security risks can inform decisions on when to start preparing for drought.

Drought is a slow-onset, complicated phenomenon, and its impacts are felt over a long period of time. Climate change will not only impact rainfall patterns and our water supply, but increasing temperatures will also lead to an increase in water demand. Therefore, regular monitoring and evaluation of conditions and water supply risks are essential to initiate actions and aid decision-makers in making critical drought management and investment decisions.

Previously, dam level triggers guided the timing of drought response measures. However, the 2017-2020 drought highlighted the need for greater sophistication in analysing the risk as storages are depleting more rapidly in a severe drought with additional influences from changing climate conditions, leaving less time than indicated from analysis of previous droughts to plan and deliver time-critical actions. The process of evaluating indicators and drought risk will be improved over time as more sophisticated analysis and drought forecasting capabilities are developed.

To provide early warning and allow more time to prepare for drought, the GSDRP includes a structured drought monitoring process to support proactive and adaptive planning (Figure 2).

Drought monitoring involves tracking the trend of primary and secondary indicators (Table 1) and sharing the relevant information with decision-makers on climatic and hydrologic conditions and how these may impact water supply. Collectively, these

indicators can be used to detect the onset of drought and monitor its progression and severity over time.

Figure 2: Drought monitoring process

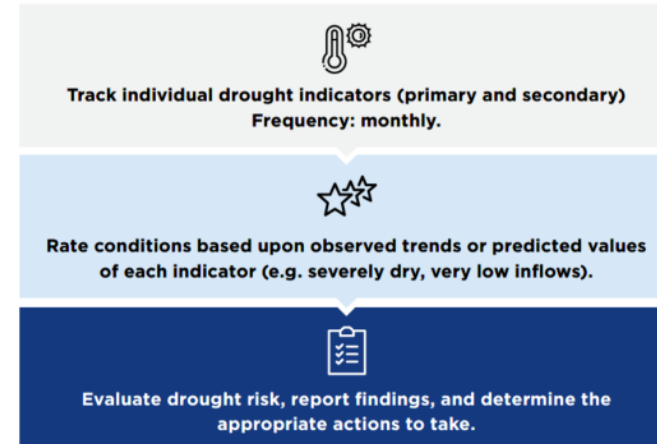


Table 1: Primary and secondary drought indicators

Primary indicators to inform decision-making processes	
Recorded rainfall in catchments	Extended periods of very low rainfall could signal the emergence of a drought.
Recorded inflows to storages	Extended periods of inflow deficit, relative to demand, will accelerate the rate of storage depletion.
Predicted time to reach 15% storage level in a hypothetical drought	Storage depletion forecast provides an estimate of how much time is left to enable key supply measures before reaching critical storage levels.
Water quality analytes that affect treatment	Water quality risks escalate as storage levels decline and when the drought breaks.
Secondary indicators for further guidance	
Observed storage depletion rates and BOM's climate driver updates that include rainfall projections and El Niño/La Niña outlooks.	

When should we start our drought response?

The GSDRP framework supports proactive drought preparedness under all conditions and the ramping up of activities as we move through different stages of drought.

This plan sets out a staged drought response to enhance our preparedness and how we mitigate water supply security and continuity risks. It defines actions and decisions that are required:

- pre-drought
- as drought conditions develop and intensify
- during recovery.

This approach allows Sydney Water and WaterNSW to plan and prepare for the effective implementation of deliverable drought response measures. This is important as the Greater Sydney system is currently operating beyond its sustainable yield, and there will be heightened drought risk prior to the construction of new rainfall independent supplies over the coming decades.

Additionally, the staged approach sets the expectations for drought management and provides sufficient time to allocate resources, update the action plans, and explore funding mechanisms to implement some drought response measures.

The focus of each stage of drought and when each stage could be activated are summarised in Table 2. Drought indicators, in addition to dam levels and nodal supply risks, will guide the transition from one stage to another.

Table 2: Focus and condition of each stage of drought

Stage	Focus	Condition
Normal operations	Build capability, plan for and deliver resilient supplies/assets, and establish initiatives to enhance drought preparedness.	Drought indicators signal likelihood of drought is very low.
Preparing for drought	Allocate/enable resources, update action plans, and guide government to make informed and timely decisions.	Indicators signal likelihood of drought is increasing; anticipated to be triggered as total storage approaches 75%, subject to nodal supply risks.
Responding to drought	Ramp up measures in line with observed conditions to reduce demand, maximise supplies, and mitigate treatment and distribution risks. Prepare for the worst-case scenario.	Total storage approaching 60%; may be activated earlier if indicators signal an early response is needed.
Extreme drought	Allocate resources for managing the worst-case scenario and support the community through extreme drought.	Indicators signal dry conditions likely to persist; total storage approaching 30%.
Transitioning out of drought	Monitor conditions and risks, and inform decisions on when to ease/lift drought measures. Capture learnings and consider which initiatives to progress outside of drought.	Indicators signal wet conditions are likely to continue and supply risks have abated. Drought governance could be dissolved when total storage level return to 75% or higher.

What should we do in a drought response?

Key elements of the GSDRP

Drought governance	<p>How and when key decisions and actions need to be undertaken and responsible parties:</p> <ul style="list-style-type: none"> governance structure, including roles and responsibilities and decision-making processes for managing drought across Sydney Water, WaterNSW and the NSW Government drought indicator monitoring to activate drought stages and guide decision-makers
Demand-side responses	<p>Measures that reduce Greater Sydney’s overall water demand both in and out of drought:</p> <ul style="list-style-type: none"> water restrictions water conservation, including water efficiency programs, system leakage reduction, and recycled water
Supply-side responses	<p>Measures that increase Greater Sydney’s water supply:</p> <ul style="list-style-type: none"> actions required to maximise existing supplies and maintain service continuity to customers at low dam levels supply augmentation requirements to ensure additional rainfall independent supply is deliverable before or in the next drought

An overview of what actions need to be taken under different stages of drought is shown in Figure 4 and Table 3. Many measures need to progress under normal operations as part of normal Sydney Water, WaterNSW and NSW Government business functions, such as progressing the delivery of rainfall independent supplies.

When the ‘preparing for drought’ stage is triggered, a drought governance structure will be activated to support Sydney Water, WaterNSW and NSW DCCEEW effectively and efficiently manage Greater Sydney’s water supply in preparation for, responding to, and recovering from drought conditions (Figure 3).

Once established, the groups and committees will be responsible for implementing and adapting drought response measures, and making key decisions and recommendations, including transitioning to the next stage of drought.

Figure 3: Drought governance structure

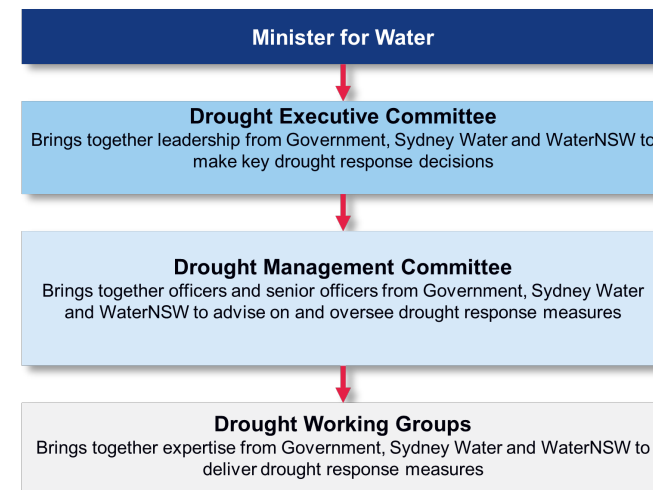


Figure 4: Stages of drought response and priorities

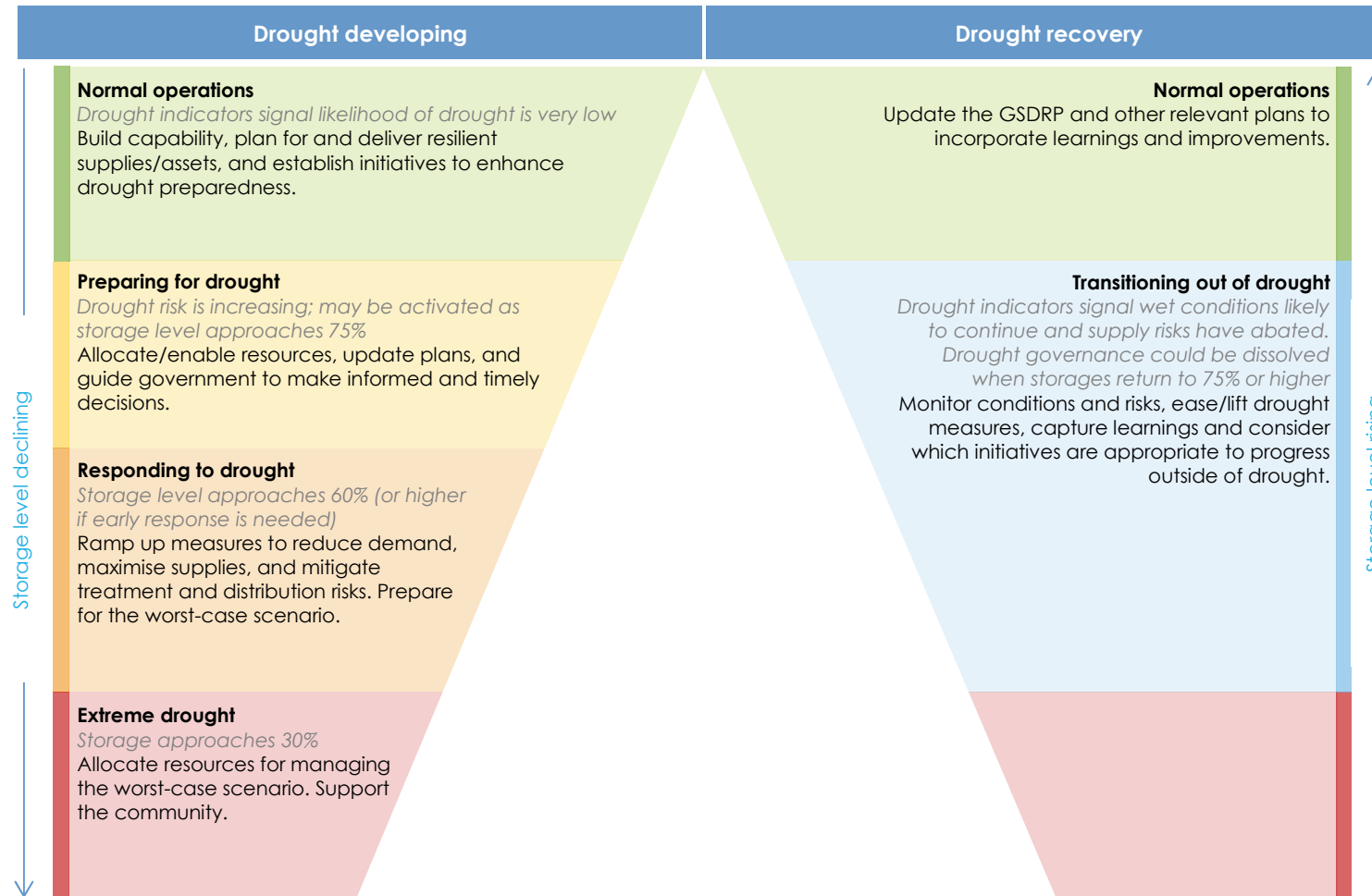


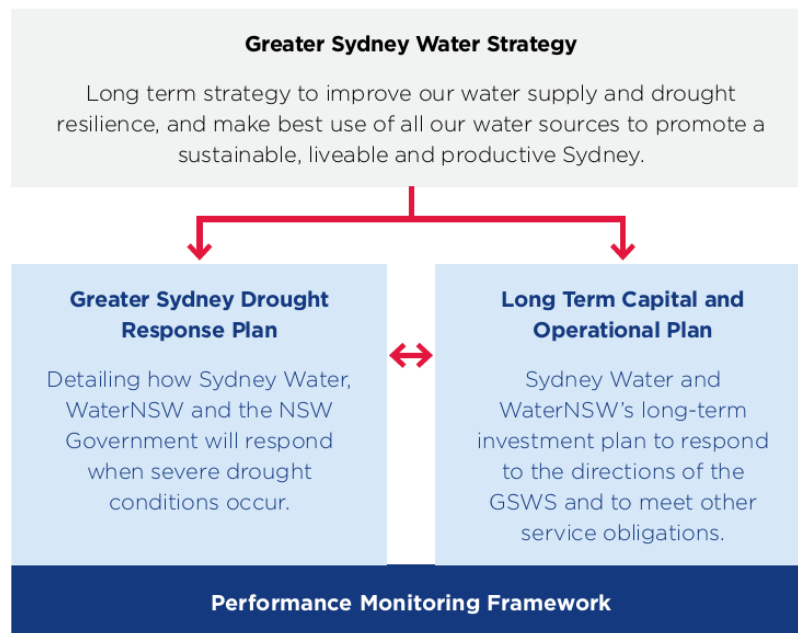
Table 3: The GSDRP plan on a page

Stage	Governance	Demand-side	Supply-side
Normal operations	<ul style="list-style-type: none"> Maintain the GSDRP and track progress of commitments. Monitor drought indicators to guide decisions and actions and when to activate the preparing for drought stage. Inform IPART pricing proposals to enable delivery of drought response measures Undertake extreme drought scenario planning. 	<ul style="list-style-type: none"> Maintain a water conservation program and implementation plan for ramping up various initiatives. Investigate options for future restriction regimes and develop an implementation plan. 	<ul style="list-style-type: none"> Progress the planning and delivery of rainfall independent supply, including drought-critical infrastructure projects. Exercise critical drought assets and optimise storage balancing in the system. Expand capability to forecast and manage source water quality in drought. Sydney Desalination Plant 1 (SDP1) to operate in line with operating rules.
Preparing for drought	<ul style="list-style-type: none"> Activate drought governance structure (Figure 3). Review and update drought action plans. Drought Executive Committee (DEC) to advise the Minister and Cabinet on drought response measures. Continue monitoring drought and supply risks. Develop and implement a communications plan. 	<ul style="list-style-type: none"> Review and refine plans for scaling up water conservation measures in line with drought pricing. Inform the DEC's advice to government on demand restrictions regime. Implement behavioural change campaign and education program to support the delivery of water conservation program and restrictions implementation. 	<ul style="list-style-type: none"> Update and execute implementation plan for delivery of new supplies. Progress works to ensure critical assets for drought operations are reliable. Commence Shoalhaven transfers at 75% total storage (or earlier, subject to Ministerial approval). Support SDP1 ramping up output to 250ML/d. Review scheduled maintenance and outage plan at critical sites and bring forward or delay works based on conditions.
Responding to drought	<ul style="list-style-type: none"> Manage and execute the drought response action plans. Sydney Water to take lead on drought communications, supported by other agencies. Establish an extreme drought working group as storages approach 50% and define inter-agency roles, governance structure and emergency measures in extreme drought. By 40% storage, the DEC to advise the Minister and Cabinet on further demand restrictions and other measures. 	<ul style="list-style-type: none"> Implement and adapt plans to ramp up water conservation measures. Implement the water restrictions regime <ul style="list-style-type: none"> Level 1 anticipated at 60% Level 2 anticipated at 45% Level 3 anticipated at 35% Develop a plan for extreme drought measures. Monitor and evaluate restriction effectiveness. 	<ul style="list-style-type: none"> Continue to progress the delivery of new supply infrastructure. Complete the full testing and commissioning of Warragamba DWPS. Ensure all critical assets for extreme drought operations are ready and reliable. Transfers from Shoalhaven, as per current (or Minister-approved) rules. SDP1 to operate at full capacity (250 ML/d). Targeted water quality monitoring to inform operational decisions.
Extreme drought	<ul style="list-style-type: none"> Activate the extreme drought governance structure. Manage and execute the extreme drought response plans. Drought monitoring to support decisions, on the need to implement tougher measures. Work with government's emergency control centres and support the Minister to provide clear information and communication. 	<ul style="list-style-type: none"> Adapt water conservation plan targeting high risk nodes; support the community. Implement further water restrictions (if approved) <ul style="list-style-type: none"> Level 4 anticipated at 25% Level 5 anticipated at 15% Monitor and evaluate restriction effectiveness. 	<ul style="list-style-type: none"> Continue to progress the delivery of new supplies. Operate the Warragamba Dam deepwater pumping station. Transfers from Shoalhaven as per current (or Minister-approved) rules. SDP1 to operate at full capacity (250 ML/d). Enable rapid response to asset outages/failures. Increase water quality monitoring in dams and network to inform forecasts, risk assessments, and operational decisions.
Transitioning out of drought	<ul style="list-style-type: none"> DEC to advise the Minister and Cabinet when to lift drought measures, based drought monitoring and water quality risks. DEC to decide when to dissolve drought governance. Conduct reviews, capture data and lessons learned. Start updating the GSDRP and other relevant plans. Clearly communicate water quality concerns/risks. 	<ul style="list-style-type: none"> Scale back water conservation programs. Lift restrictions in line with the Minister or Cabinet approval. 	<ul style="list-style-type: none"> Review and identify infrastructure projects to progress post-drought. Develop and execute an operational plan to facilitate a smooth transition to normal operations. Resume deferred maintenance works, if conditions allow.

How does the GSDRP fit in with the Greater Sydney Water Strategy (GSWS)?

The GSDRP is aligned with the NSW Government’s vision for Greater Sydney (Figure 5) and meets Sydney Water and WaterNSW operating licence requirements. The GSWS sets a coordinated direction for our city, underpinned by priorities and requirements for service delivery.

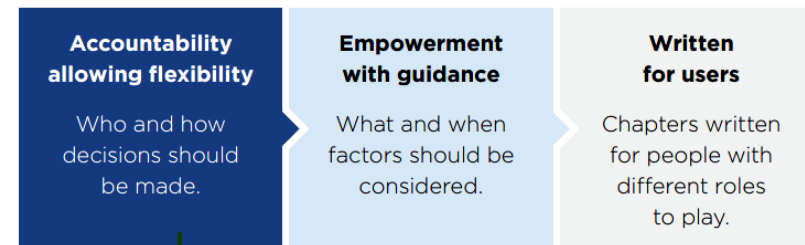
Figure 5: Strategic context



How will we keep the GSDRP relevant?

The scope of the GSDRP is to provide guidance on how Sydney Water, WaterNSW and the NSW Government should respond to a drought if one was to occur now. The duration and severity of a drought will govern if, when, and what measures should be acted on. It is also important that there is alignment across the three agencies on the approach to managing drought, such as who is responsible, and how decisions are made before a drought commences.

With appreciation of these needs, the GSDRP has been shaped by the following philosophy:



This means the plan will remain relevant, noting that it will be reviewed annually and updated as required, including when additional rainfall-independent supplies are constructed and to reflect changes to policies, processes and knowledge that help meet Greater Sydney’s long term water needs.