



WaterNSW Research Strategy



Introduction and Context

WaterNSW undertakes **research within a dynamic operating environment that presents numerous opportunities and challenges in delivering our core functions** and meeting the needs of our customers and stakeholders, both now and into the future. As a state-owned bulk water supplier, WaterNSW serves a diverse mix of customers and sectors of the community, managing water alongside other government agencies for our shareholders: the NSW Treasurer and the Minister for Finance; for our portfolio Minister: the Minister for Water; and with oversight from several regulatory bodies.

Research into the health of the Declared Catchment Areas has been a core responsibility of WaterNSW since its establishment under the WaterNSW Act 2014. This role, inherited from its predecessor, the Sydney Catchment Authority, arose as part of measures introduced to protect and enhance the quality and quantity of water in Sydney's Drinking Water Catchment following the 1998 Sydney water supply boil-water incident.

Recently, this scope was expanded in Clause 33 of the WaterNSW 2024–2028 Operating Licence to include **catchment and river health research across its statewide area of operation**. The Licence also requires WaterNSW to develop a strategy for an ongoing research program for catchment health and downstream river health, called the "Research Strategy". This document is designed to meet this requirement.

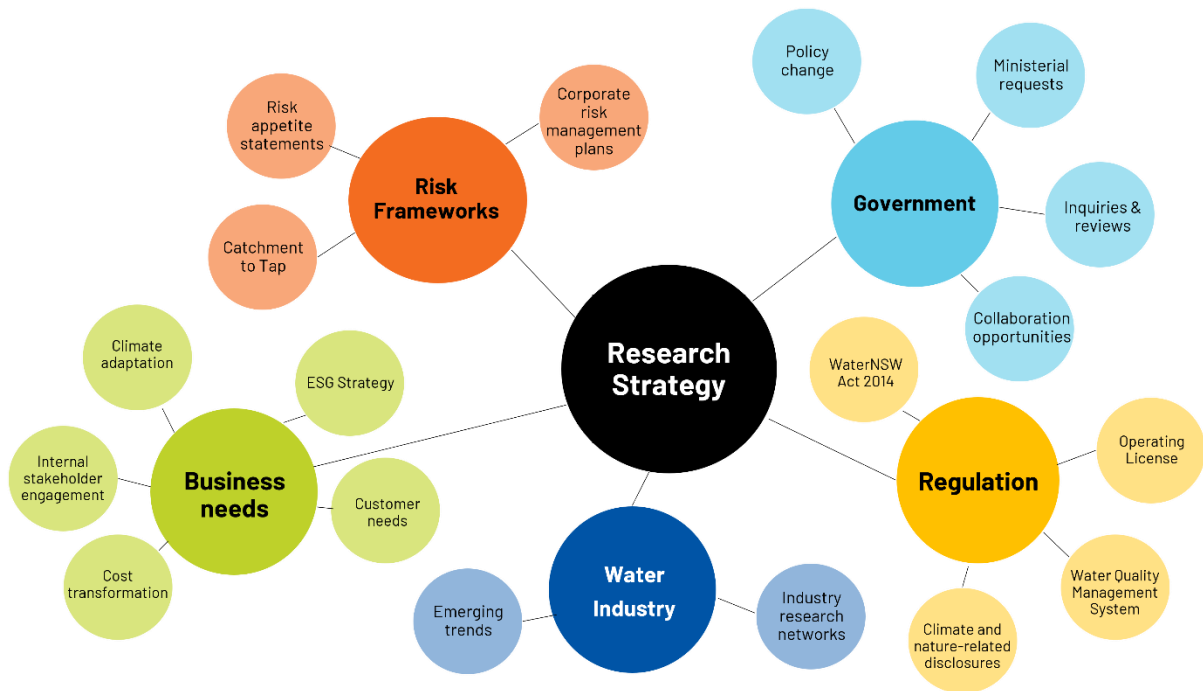
This Research Strategy and its associated research program consider priority catchment and river health issues, water quality for the protection of public health, and water security. The Research Strategy also considers the **cost of research** and **opportunities to collaborate with other agencies to undertake research that enables improvements in catchment and river health outcomes**. These are also aligned with requirements of the Operating Licence.

Research is also a key component of the Catchment to Customer risk management approach, as required by the Australian Drinking Water Guidelines and reflected in WaterNSW's Water Quality Management System (WQMS). It forms an integral part of the context underpinning this Research Strategy.

The Research Strategy is designed to **drive research and innovation that meets operational and strategic needs** identified through our business risk frameworks, strategic plans, and consultations with our customers and stakeholders. The Science Program is the key delivery mechanism for WaterNSW's research program and is continually updated to maintain alignment with the WaterNSW corporate strategic priorities:

The themes and priorities in this strategy also consider **emerging science, technology, trends, and issues relevant to the water industry, water governance, and natural resource management in New South Wales**, such as changing policies and legislation, government inquiries, and broad-scale economic, social, environmental, and technological trends.

This Research Strategy will be reviewed when the **Corporate Strategy** is updated in 2026 to ensure it remains fully aligned with business objectives. The ability to achieve the full objectives of the Research Strategy is strongly dependent on availability of funding. Considering the current **constrained IPART Rural Valleys Determination**, mechanisms have been articulated within the Strategy to ensure flexibility in setting the scope and priority of the Research Goals.



What is research?

The Australian Research Council defines research as the **creation of new knowledge and/or the use of existing knowledge in a new and creative way to generate new concepts, methodologies, inventions and understandings**. This could include the synthesis and analysis of previous research to the extent that it is new and creative.

Generally, research is considered a process of investigation where the outcomes are uncertain. Research can also be categorised using the Organisation for Economic Co-operative Development (OECD; 2015) definitions:

- **Basic research:** experimental or theoretical work to understand the underlying principles of phenomena and observable facts, without aiming for a specific application.
- **Applied research:** original investigation undertaken to acquire new knowledge directed primarily towards a specific, practical aim or objective.
- **Experimental development:** systematic work, drawing on knowledge gained from research and practical experience, often producing extra knowledge. This is directed to producing new products or processes or improving existing products or processes.

The Research Strategy requires the development of a Science Program that focuses on **applied and experimental research** that is prioritised towards achieving targeted business outcomes. This optimises tangible research impact and innovation for WaterNSW.

Aims and Priorities

The WaterNSW Research Strategy aims to **build industry-leading knowledge, insight, and capability** that enables WaterNSW to support catchment and river health while fulfilling our purpose of providing water when and where it matters.

Shared Objectives across Geographic Priority Areas

In alignment with WaterNSW's functions under WaterNSW Act (2014) and requirements of our Operating Licence, this Research Strategy identifies **geographic priority areas where targeted research investment can deliver the greatest impact**. These areas reflect where WaterNSW is best positioned to drive meaningful improvements in catchment and river health through evidence-based research and collaboration.






Greater Sydney's Drinking Water Catchment remains a key geographic priority, given WaterNSW's statutory responsibility for managing, protecting, and enhancing water quality, improving water security, and ecosystem health (and, in turn, biodiversity) in this declared catchment. Research in this area directly supports our obligations under both the Operating Licence and the WaterNSW Act (2014).

Beyond Greater Sydney, regional research priorities have been identified based on the significance of the catchment and downstream river health issues, which create inter-related and cumulative impacts of WaterNSW's operations—such as cold-water pollution, barriers to fish passage, and cyanobacterial blooms. The nature and scale of these impacts vary in the upper, middle, and lowland reaches of the large, regulated valleys in regional NSW. Our priorities consider the **opportunities to collaborate with other agencies** and leverage existing research programs and investments to **support areas where funding is available**. We will also put additional effort into seeking grant funding for our Potential Research Goals, where there is a 3rd party that is also interested in that outcome, eg Commonwealth or NSW DCCEE.

This Research Strategy confirms the key regional priority sites should include the Menindee Lakes system, the Hume Dam, the Pindari Dam, and their downstream river reaches. These locations represent geographic priority areas where there are **strategic opportunities to translate research into water security and water quality improvements and long-term environmental (and subsequent biodiversity) outcomes** across NSW.

Research Themes

This Strategy contains several Potential Research Goals which were **prioritised by considering their business criticality, opportunities for water security, water quality and environmental/ biodiversity benefits**, stakeholder alignment, and internal capability and external stakeholder collaboration opportunities. Further prioritisation of work within and between these Goals will be subject to available funding, especially noting the current constrained IPART Rural Valleys Determination. Themes of high strategic significance are outlined below, while some agility is reserved within the research portfolio to address emerging issues.

 <p>Sustainable Assets</p>	<p>Understand how WaterNSW assets can be managed to maximise co-benefits and mitigate adverse impacts to customer, community, cultural, and ecological values.</p>	
	<p>Benefits:</p> <ul style="list-style-type: none"> Identify & promote additional co-benefits of our operations. Enhance community wellbeing & amenity. Improve waterway health & biodiversity. Protect & enhance condition of culturally significant sites & values. 	<p>Priority Areas:</p> <ul style="list-style-type: none"> Reservoir & weir management. Bushfire resilience on land assets. Ensure high-quality water & water security from our water supply schemes in Greater Sydney & Fish River.
 <p>Efficient Monitoring</p>	<p>Accelerate the development and uptake of emerging technologies including exploring the use of AI that can improve the efficiency of water monitoring.</p>	
	<p>Benefits:</p> <ul style="list-style-type: none"> Optimise investment for monitoring activities. Improved safety outcomes & water quality. Enhanced data quality to meet customer & strategic planning needs. 	<p>Priority Areas:</p> <ul style="list-style-type: none"> Water monitoring technologies. Cyanobacteria monitoring & management. Advanced forecasting analytics including AI and Machine Learning.
 <p>Proactive Risk Assessment</p>	<p>Extend the evidence base that informs proactive source water risk assessment and decision making.</p>	
	<p>Benefits:</p> <ul style="list-style-type: none"> Identify emerging risks & inform mitigation options. Reduce uncertainty to improve risk assessment & response. Reduced public & ecological health/biodiversity risks. 	<p>Priority Areas:</p> <ul style="list-style-type: none"> Emerging contaminants of concern that may affect public & ecological health. Climate change influences on water security & quality. Advanced analytics for quantifying and reducing uncertainty.
 <p>Healthy Sydney Catchment</p>	<p>Understand how catchment interventions can more effectively reduce source water pollution and protect the health of the Sydney Declared Catchment.</p>	
	<p>Benefits:</p> <ul style="list-style-type: none"> Improved biodiversity & source water quality, security, & supply reliability. Lower treatment costs. Maximise value from catchment management interventions. 	<p>Priority Areas:</p> <ul style="list-style-type: none"> Manage pollution sources. Understand catchment health drivers & monitoring. Mining impacts on water quality & security.
 <p>Long-term Resilience</p>	<p>Inform long-term transformation pathways towards a climate-resilient and nature positive business.</p>	
	<p>Benefits:</p> <ul style="list-style-type: none"> Reduced carbon emissions & biodiversity loss. Build more resilient water systems. Improve outcomes for communities. 	<p>Priority Areas:</p> <ul style="list-style-type: none"> Climate adaptation. Integrated systems management. System connectivity, dynamics, & capacities. Nature-based operations.

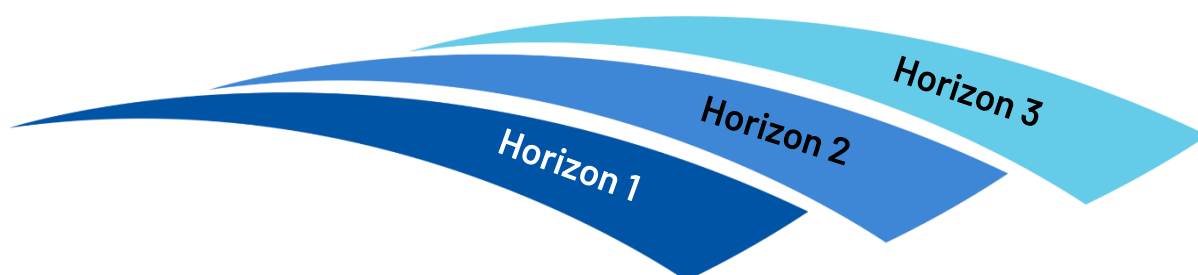
Research Strategy Implementation

This Research Strategy will be implemented by **WaterNSW's 5-year Science Program**, which **translates strategic priorities into actionable research outcomes**. To enable flexible delivery of the Science Program and adapt to evolving business priorities, emerging risks, budget constraints, and opportunities, we use challenge statements aligned with 10-year strategic business outcomes to guide research along clear research-to-impact pathways.

Strategic research objectives are expressed as research “challenge statements” designed to generate solution-focused projects aligned with core business needs. A 10-year future vision provides the strategic anchor for these challenges, ensuring research investments contribute to long-term outcomes. The **research target expresses the role research plays in meeting the challenges to move towards the future vision**. The challenge statements have been developed by assessing strategic needs, risk frameworks, and the research capability within WaterNSW and its network partners.

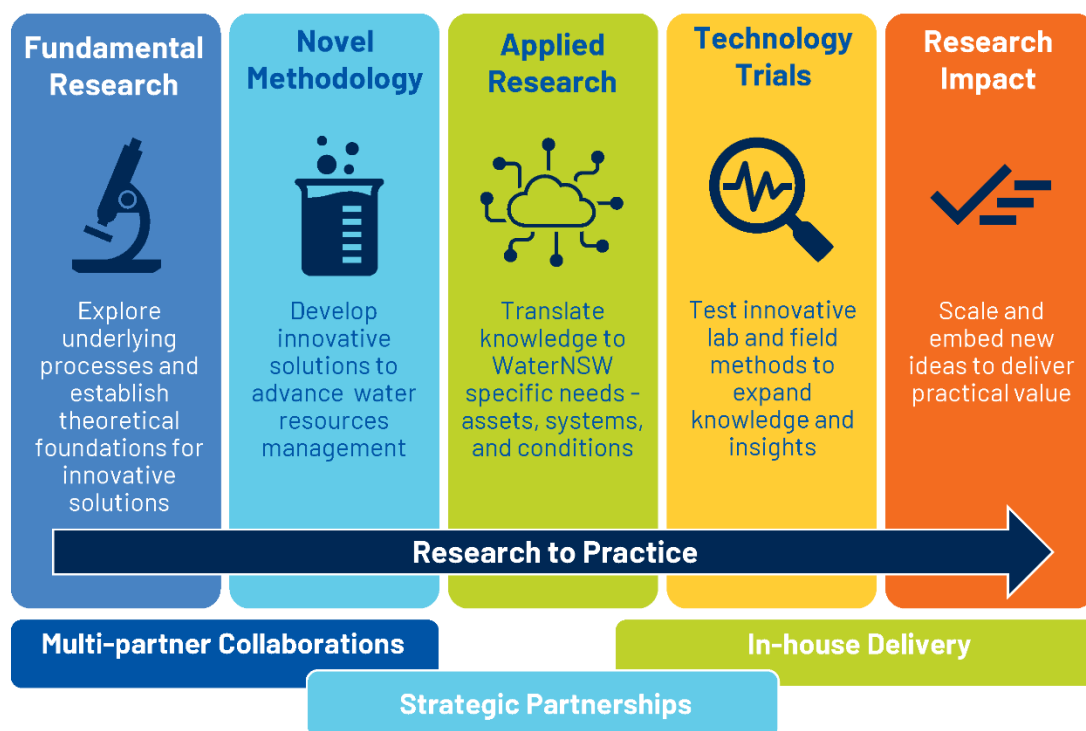
Shorter-term research targets, spanning 1 to 5 years form the foundation of the Science Program, ensuring steady progress toward generating the knowledge required for long-term transformation and risk mitigation. A **flexible horizon approach is applied to prioritise projects** for inclusion in the Science Program as research priorities and funding levels will vary according to regulatory drivers, partnership opportunities, grant success, and internal resources. Under the current constrained IPART Rural Valleys Determination, a risk and opportunity assessment will be used to determine which projects can be initiated to make the best use of available resources to make progress towards the Research Goals within the 5-year Science Program.

As new scientific knowledge and technology emerges and business priorities evolve, these research targets will be periodically reviewed and refined. This Horizon-based approach provides a structured yet adaptable framework for advancing all identified priorities. It accommodates the scale and complexity of both research and business needs, enabling a **staged progression that remains responsive to change**.



Enabling Research

There are multiple enablers that allow WaterNSW to deliver high-impact research and successfully translate research outcomes into practice. This Research Strategy requires our enabling processes and infrastructure to ensure that we **maximise the value realised from research** by making the most of our **in-house technical capability**, while leveraging the **specialist expertise of our extensive network of research-delivery partners**.



Multi-partner Collaboration

This Research Strategy commits WaterNSW to seek and explore collaborative investment opportunities in research with other water utilities and government agencies. This delivers **cost-sharing savings and integration benefits**. Where there are broader-industry benefits aligned to WaterNSW's research needs, **multi-partner collaborations** are an effective investment strategy. Water Research Australia projects and Australian Research Council Linkage Grants are examples of multi-partner collaborations that can deliver on research where shared objectives are held with other parties.

Strategic Partnerships

To ensure impact for WaterNSW-specific research needs, **bespoke partnerships** are preferred. While project-based, short-term contracts are preferred to engage unique research skills for specific project needs, **long-term collaboration with research institutions enables more effective research partnerships**. Research outcomes can be maximised through longer-term partnerships with specialised research providers as long-term partnerships provide the time to build constructive relationships and understand each other's needs. WaterNSW can offer

longer-term financial support through an EOI process for research groups that provide the right capability and skills aligned to high-priority research objectives that cannot be resourced in-house and there are available funds to out-source this work.

In-House Delivery

This Research Strategy commits WaterNSW to prioritise **implementation and translation of research by internal research staff** that understand business needs and processes, maintain relationships across the business and research sector, and can lead the delivery of research and translation activities. This team **manages research collaboration activities** across the research spectrum and works with stakeholders and colleagues to **translate and embed outcomes of research supporting a research-to-practice culture**.

In addition, access to **expert scientific advice is essential** to support many functions across the business, and that requires the in-depth, business-relevant knowledge that in-house expertise provides.

Technology & Analytics

There is a **growing role of data-driven modelling and advanced analytics such as machine learning and AI** in solving problems where there is a large statistical component, or if the scale of the data is such that it demands it. Keeping abreast of technology advancements is therefore critical to delivering and implementing research outcomes. Conversely, modelling and data analytics are also limited to the quality and quantity of data available for analysis. Research and innovation in land and water **monitoring increases the opportunity of insights into how to improve the quality of data** and opportunities to **collect larger amounts of data through new monitoring technology**. This Research Strategy supports and promotes monitoring and modelling innovation.

Industry & Research Networks

WaterNSW engages actively in a range of industry and research networks that allow us to **stay up to date with emerging issues and the latest scientific and technical/technological developments** (e.g., **Water Services Association of Australia (WSAA), Water Research Australia, and the NSW Monitoring and Modelling Hub**). In these networks, we contribute to and benefit from specialised communities of practice around the country. Unlike partnering on individual research projects, these networks **improve research efficiency by reducing the risk of duplication** across the water industry.

Research Translation and Pathways to Impact

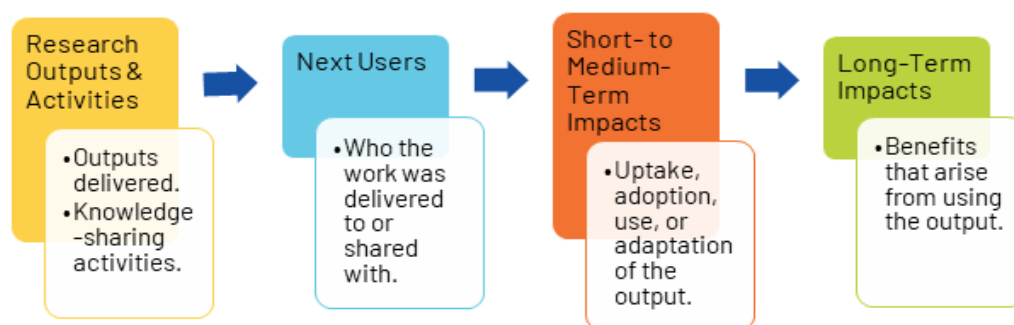
Monitoring and Evaluation Cycles

Monitoring and tracking of the Science Program is an integral activity to ensure projects continue to align with the strategic research objectives and the future-state vision statements. Monitoring and review occur with different stakeholders across the program life cycle.

Monthly	Project progress and health reviewed across the portfolio within the managing business unit.
Quarterly	Program portfolio highlights and risks assessed and shared with management and stakeholders.
Annually	Program portfolio achievements and health reviewed and reported to the Board.
5 years	Program outcomes assessment and research priorities systematically reanalysed.

The WaterNSW Research Impact Framework

WaterNSW's approach to research impact management is grounded in the belief that **understanding the value of research requires tracking how research translates into real-world benefits**. Our process for planning, monitoring, and evaluating impact is based on a theory of change or program logic model. In our model, we hold users of our research outcomes and outputs central to impact pathways, whereby most of our research outputs are taken up by intermediate users leading to short- to medium-term impacts, which ultimately result in long-term impacts or benefits for business, customer and community.

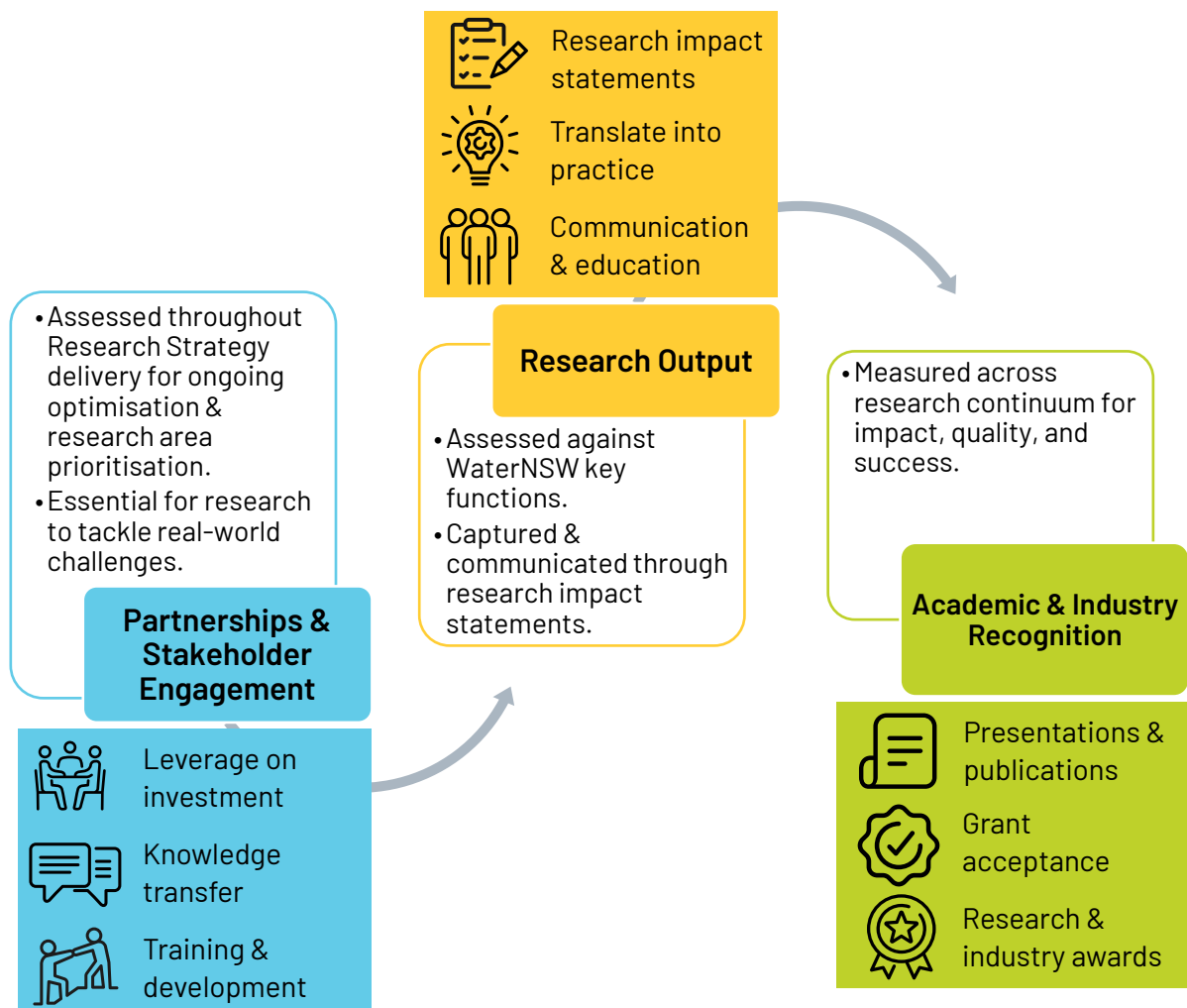



To enhance our understanding and management of how we implement impact pathways to translate our research into benefits for WaterNSW as well as the community, environment, and our customers, a **research impact framework** is applied to ensure that research at WaterNSW is impactful, relevant, and effectively translated into real-world benefits.

Measures of Success

This Research Strategy will be assessed against performance metrics in three key areas of success. The metrics selected will ensure that the Research Strategy is maintained and implemented in a manner that **produces rigorous, high-quality research that is cost-effective, fit-for-purpose, and meets the needs of our business, customers, stakeholders, and community.**

Immediate research benefits are realised during the research process itself, while future benefits span **business, knowledge, customer, community, and environmental** outcomes. WaterNSW's research program prioritises creating immediate knowledge and business benefits that enable longer-term gains for customers, communities, and the environment through the practical application of research outcomes. These benefits are measured through research impact assessments, and anticipated impact will guide future project prioritisation and delivery.





We're the people taking
care of the state's water
at the source – capturing,
storing, delivering.

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