

In the middle of the river: Observations on the drivers, successes and failures of stream and catchment management

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Key points

- Effective catchment management depends as much on governance and stakeholder values as on science and engineering.
- Technical evidence alone rarely drives better decisions unless it is matched by influence, funding, regulatory support and institutional coordination.
- Progress is possible when catchment concerns are embedded early in planning and policy.
- Water quality, flood resilience and catchment health are often undervalued compared with growth, infrastructure and water supply priorities.
- Long-term success requires persistence, cross-sector collaboration and the ability to connect catchment outcomes to broader community benefits such as liveability, resilience and wellbeing.

Abstract

Effective stream and catchment management is shaped by how people connect with, understand and value waterways. Achieving positive long-term outcomes for both the environment and community requires influencing management approaches, which can be challenging where catchments and waterways may not be prioritised or considered in a broader context. Addressing these challenges involves recognising stakeholder perspectives and motivations, which directly affect management strategies and outcomes.

A focus on understanding the underlying opinions and positions of key stakeholders helps overcome structural barriers to optimal management and improves targeted efforts to influence or educate. Each stakeholder contributes a vital perspective, including aspects such as commercial viability, liveability, sense of place, and water quality outcomes. Persistence is crucial for lasting change, and success in stream and catchment management depends on identifying and addressing stakeholder drivers from the outset. Although certain areas, like Wianamatta-South Creek in Western Sydney, have shown positive outcomes, there is still progress needed to ensure that catchment concerns are integrated into planning policy and water resource regulation. For instance, water quality is not always adequately considered in relation to water security, nor are the advantages of catchment management on reducing impacts of flooding.

Collaboration has been central to effective stream, catchment and water resources management with our collective motivation to achieve lasting benefits for both the environment and the community. Much of our effort in stream management occurs during early stages, such as influencing regulations and securing adequate funding. Knowing stakeholders' starting points is just as important as technical expertise for successful and balanced project outcomes.

Keywords

Catchment governance, stakeholder engagement, water policy, regulatory reform, stream management

Introduction

Effective stream and catchment management sits within a complex web of values, incentives and responsibilities. Technical knowledge is essential, but it is rarely enough on its own. Waterways are

shaped as much by public expectations, institutional boundaries and political choices as by hydrology or engineering. Decisions about catchments are constantly weighed against other pressures, and programs are under-funded or even absent. For example, recent changes to the WaterNSW operating licence saw their remit for catchment research expand from the declared catchment in Greater Sydney to a broader state-wide role. This was one of several increases to their previous obligations, but the funding determination was arguably not commensurate with these changes. Currently we see housing, growth and affordability being the primary focus of all three tiers of government, across all jurisdictions, with planning reform focused on streamlining approvals, for example:

- NSW Planning System Reforms
- National Planning Reform Blueprint (National Cabinet)
- Victoria Planning Amendment (Better Decisions Made Faster) Act 2026
- Queensland Housing Availability and Affordability (Planning and Other Legislation Amendment) Act 2024

If outcomes for both communities and ecosystems are to improve, those in stream management must begin with a clear understanding of these competing drivers, rather than relying upon or assuming that better science, clearly demonstrated impacts and options will produce better decisions.

Seeing the system clearly

Know your system! A basic premise of effective environmental management of any kind is to start by understanding the system and managing accordingly. Unfortunately, it is too often the case where inadequate data, inadequate understanding or constraints prevent this from occurring. For example, when thresholds for management are based on different systems, as has been the case with stormwater management and generic MUSIC modelling guidelines, or when ANZECC guidelines were applied for measuring in-stream water quality, without the intended risk-based assessment.

Stakeholder perspectives therefore matter enormously. Each brings a potentially legitimate but incomplete view of what a healthy catchment should provide: liveability, amenity, sense of place, flood resilience, public health, biodiversity, commercial viability, and in the case of rivers, potential to contribute to reliable water supply. Problems arise when these perspectives are managed in isolation: through separate agencies, funding streams and policy instruments. Without buy-in from varying levels of decision-makers and influencers (often respected officer-level staff across agencies) water quality becomes a downstream issue, flood management an engineering problem, and water security a supply challenge, even though in practice they are intertwined and our streams and catchment suffer. A stronger approach recognises these interdependencies early and challenges the motivations, assumptions and institutional constraints that shape decisions before positions harden and opportunities for mutually beneficial solutions (or win-win solutions) are diminished or lost.

Where progress meets constraint

Governments have increasingly acknowledged the need to integrate land use planning with water cycle management. In Wianamatta–South Creek in Western Sydney, significant progress has been made on water cycle management, stormwater targets and cumulative flood impacts — a shift towards thinking at catchment scale rather than council boundary or project scale.

Wianamatta-South Creek is a naturally ephemeral waterway and a tributary to the Hawkesbury-Nepean River. As part of accommodating economic and population growth in Greater Sydney, the catchment has changed from a dominantly rural setting to increasingly developed, including Sydney's new third airport, industrial areas and significant urban expansion. To ensure this development was consistent with the Greater Sydney Commission's vision of this catchment as the heart of a Western Parkland City (detailed in the Greater Sydney Region Plan – A Metropolis of Three Cities (2018)), requirements to protect waterways, establish a blue-green grid and capture water and energy flows in a circular economy were identified.

To meet these intended outcomes, work was undertaken to determine the acceptable impacts on waterways (e.g. Urban Streamflow Impact Assessment, Kermode et al (2021); Wianamatta South Creek Cumulative Impact Assessment (Rev E), 2023), set targets for acceptable flows (Wianamatta-South Creek stormwater management targets, (NSW DPE, 2022a), determine delivery pathways (e.g. Mamre Road Precinct Integrated Stormwater Development Servicing Plan, Sydney Water, 2024) and update relevant planning policy, legislation (e.g. State Environment Planning Policy Sydney Water (Stormwater Drainage Areas) Order 2011 (2012 SI 292), plans (e.g. *Western Sydney Aerotropolis Development Control Plan 2022 – Amendment 1*, NSW DPHI 2022), and guidance (e.g. *Technical guidance for achieving Wianamatta-South Creek stormwater management targets*, (NSW DPE, 2022b).

The establishment of stormwater targets and more specific flood policy shows what is possible when catchment concerns are embedded in mainstream planning rather than treated as an afterthought. Yet even where progress is evident, a broader challenge remains; policy and investment decisions do not always value water quality, flood mitigation and catchment health ubiquitously, or as highly as other forms of augmentation, servicing and growth. Examination of current regulatory settings in this catchment highlights that gaps still remain in the governance and implementation of this scheme, such as major transport-related or nationally significant projects being excluded from stormwater targets.

In Greater Sydney more broadly, long-term water strategy settings emphasise resilience and rainfall-independent water supply, but funding decisions do not necessarily reflect policy, and water quality and catchment conditions can still be overshadowed by yield and infrastructure priorities or overarching budget constraints.

Similar tensions are visible elsewhere. Along South Australia's coastline, persistent algal and water quality issues have occurred from March 2025, largely resolving by February 2026 with exception to the Eyre and Yorke Peninsulas which remain in bloom as of July 2026. This has shown how readily environmental warning signs can sit outside regulatory and strategic settings, despite their consequences for communities, ecosystems and public confidence. Together, these examples point to a wider lesson: success depends not only on sound hydrology, modelling or design, but on governance systems that assign responsibility clearly and create incentives to act before problems become crises (Figure 1).



Figure 1 The catchment management puzzle – components required for advancing outcomes

What about the science?

The science itself has improved steadily over recent decades, but there has been far more rapid advancement in our ability to characterise and analyse scenarios. Data are richer, models are more sophisticated, monitoring is more comprehensive, and our ability to trace system behaviour across climate, catchment and water quality processes is far stronger. Yet this growth in capability has coincided with a decline in public trust and a limit to the capacity of scientists, engineers and technical specialists to communicate with and be understood by many lay people in the community. Scientific findings now compete in a noisier, more fragmented information environment, where complexity can be mistaken for uncertainty and evidence can be filtered through ideology, fatigue or mistrust of institutions. Recent conversations with a flood response agency highlighted that they were struggling to gain traction to support communities with preparedness, despite these communities being directly impacted by recent significant flooding. For stream and catchment management, this creates a double challenge: not only generating sound knowledge, but ensuring that knowledge is intelligible, credible and relevant to the communities and decision-makers whose support is essential for action.

Conclusions

Much of the most impactful work in stream and catchment management happens long before any project is visible on the ground or in maintaining and operating existing assets, long after construction. Consistent approaches and persistence are needed throughout planning, design, construction, commissioning, operation, maintenance and monitoring phases. At the front end, framing policy, influencing regulation, securing funding, clarifying accountability and building shared understanding across disciplines and institutions are critical. At the tail end, success also relies on educating and involving communities to, for example, retain and utilise their rainwater tanks. These efforts are often slow, contested and largely invisible, but it is where durable outcomes are made possible. Effective teams combine technical credibility with the patience to understand where others are starting from and the discipline to keep linking local waterway issues to broader public outcomes. When practitioners can connect catchment health to community wellbeing, place, resilience and long-term service delivery, they are far better placed to build support for action. In that sense, good catchment management is not simply about working at the headwaters or the endpoint of a system. It is about working in the middle of the river: navigating competing interests, connecting fragmented responsibilities and steadily creating the conditions for better outcomes.

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