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CATCHMENT MANAGEMENT INVESTMENT STANDARD

AN OVERVIEW OF THE KEY FINDINGS FROM THE 'SOURCE CATCHMENTS AS WATER QUALITY TREATMENT ASSETS PROJECT'

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ABSTRACT

A Catchment Management Investment Standard (the Standard) has been developed to assist water utilities to build stronger business cases for catchment management as a viable alternative to more traditional, capital-intensive investments.

The Standard provides users with a summary of key steps and practices needed for a robust and evidence-based investment in source catchment management activities. The Standard is supported by a number of tools.

This new standard was informed by a 'Rapid Stocktake'. This encompassed a high-level assessment of key lessons from catchment management initiatives and programs in the United States and Australia, including case studies of key catchment management issues.

The Standard was developed in close collaboration with water utilities in Australia and the United States.

BACKGROUND

The Water Services Association of Australia (WSAA) is the peak industry body representing the urban water industry. WSAA members provide water and sewerage services to more than 20 million customers in Australia and New Zealand, and many of Australia's largest industrial and commercial enterprises.

The Water Research Foundation (WRF) is an internationally recognised leader in water research that sponsors cutting-edge research and promotes collaboration. WRF research provides industry insights and practical solutions to the most complex challenges facing the water community both today and into the future.

In late 2013, WSAA and WRF members identified a common industry need to develop a better methodology to help write business cases for investment in catchment management of drinking water supply sources. As a result, the Source Catchments as Water Quality Treatment Assets Project was born.

INTRODUCTION

Water utilities undertake catchment management for a variety of reasons. Catchment management programs may be a regulatory requirement to complement conventional water treatment, or they may be voluntary. Some utilities consider them an investment that can provide non-traditional and often additional non-monetised environmental and social benefits. Regardless of the driver, water utilities need to understand how catchment management programs can be incorporated into an infrastructure investment decision-making process.

In an economically regulated environment where consumer affordability is paramount and where the regulator puts the burden of proof on the water provider to illustrate successful mitigation of water quality risk, there are two critical challenges:

1. How can a sound business case be made for investment in catchment management as a water quality 'treatment' option, using best practice approaches in triple bottom line cost benefit evaluation?

2. How can it be demonstrated, in the geographic context of the catchment under consideration, that mitigation measures can be successfully implemented and water quality improvement achieved?

With these two critical challenges in mind, WSAA and WRF have undertaken the 'Source Catchments as Water Quality Treatment Assets Project' on behalf of their members.

This paper provides an overview of the key findings from the project and, in particular, the development of the Catchment Management Investment Standard (the Standard).

METHODOLOGY/ PROCESS

We analysed a number of issues when preparing the Standard, including: 1) water industry drivers for catchment management; 2) critical catchment management program success factors; 3) critical barriers to catchment management implementation; and 4) how a business case is built.

This included governance, institutional and associated regulatory requirements, and the tools being used to make a business case. The findings from this analysis were combined with investment standard logics and frameworks to prepare a draft Standard. We then tested the draft extensively with water utilities to ensure it aligned with current best practice catchment management and would be of use.

RESULTS

The Standard provides users with a summary of the key steps and practices that should be completed to develop a robust and evidence-based investment in source catchment management. The Standard meets regulatory investment standards and aligns with investment prioritisation frameworks commonly applied within water businesses.

The Standard supports water utilities to:

- Design new catchment management investments to maximise economic, social and environmental outcomes;
- Prioritise catchment investment proposals;
- Monitor and measure the delivery of catchment management benefits and costs.

This helps water utilities across Australia and the United States to:

- Clearly articulate why an immediate source catchment management intervention is needed;
- Demonstrate the investment logic – the economic, environmental and social costs and benefits of source catchment management measures, and the level of certainty that defined outcomes will be delivered;
- Show how these costs and benefits change under different conditions, e.g. in protected and impaired multi-use catchments.

The development of the Standard was informed by a Rapid Stocktake, which drew on published information along with detailed discussion with project participants.

Rapid Stocktake

The Rapid Stocktake covered topics such as:

- Defining source catchments
- The multi-barrier approach
- The scope of catchment management activities
- Water industry drivers for catchment management
- Success factors
- Stakeholder participation
- Barriers to implementation
- Building the business case.

It is important to note we discovered language differences between different jurisdictions and even between people working in the same business. We defined key terms and the scope of the activities to provide a common basis for understanding.

We then reviewed the critical success factors for catchment programs. We drew upon key reports including Path to Protection – Ten Strategies for Successful Source Water Protection (Ernst & Hart, 2005); Developing a Vision and Roadmap for Source Water Protection for US Drinking Water Utilities (Sklener *et al*., 2012); and Inquiry into Catchment Management (Department of Environment and Heritage, 1999).

A common theme throughout the literature and in the interviews with water utilities undertaken was the importance of influencing key decision makers and communities of practice (Table 1). For example, in terms of the organisational context, we found that high-level Board support and resourcing was required to establish a sustainable catchment management program. Unfortunately, most Boards have a majority of members with financial/ legal/ engineering backgrounds with few source protection subject experts.

We also found that the Executive must be fully engaged and supportive for a program to succeed. Strong leadership is required, particularly in relation to expenditure on third-party land or assets.

Each state in Australia has differing legislative approaches. Most planning is focused on quantity and not quality of water. There is limited regulatory support for catchment management in some states and a heavy reliance on guidelines with limited statutory impact.

Importantly, we noted the drinking water customer was another stakeholder group of growing importance to the industry. Their support is essential if a catchment management program is to be successful in the long term.

Barriers to successful catchment management identified were:

Capital bias Water utilities are generally encouraged to achieve financial efficiency – decrease their Opex and grow their regulatory capital value – i.e. increase their Capex, as this is how their income is derived, which has a significant influence on business planning. As the majority of catchment management investments are treated as Opex the capital bias is a significant disincentive to the establishment of a catchment management program.

Off-balance sheet bias Catchments can be regarded as an important asset in the water supply system, but in many instances are not included in the financial calculation of the business. This oversight means that there is a reluctance to invest in their protection and maintenance in a similar way to built assets.

Engineering culture Engineering solutions provide a well-defined outcome, whereas catchment solutions can be uncertain and difficult to quantify. Implementation of catchment programs requires recognition of this.

Table 1. Key decision-makers and communities of practice.

	Influence level
Politico economic context	Policy-makers
	Legislators
	Regulators
Organisational context	Board
	Executive
	Middle Management
	Staff
Catchment context	Catchment organisations
	Catchment industries
	Landholders
Community context	Catchment community
	Drinking water customers

Knowledge and skills gaps Many utilities have catchment management knowledge gaps within key stakeholders and internal decision-makers. There is also a lack of financial resources or technical knowledge needed to advance catchment management programs in many utilities.

Long and lagged timeframes The timeframes associated with catchment management are also a key barrier. Natural infrastructure tends to provide benefits over a very long time period (i.e. decades or centuries), whereas man-made capital provides benefits in the near term (years to decades). It is also important to note that natural infrastructure appreciates in value over a long period of time, whereas built capital depreciates relatively rapidly.

Aerial view of Brisbane's main water treatment plant, Mt Crosby.

We also undertook a number of case studies to benchmark Australia and the United States in an effort to identify success factors and make recommendations for how the industry could develop a better understanding of catchment management importance. These case studies focused on land use planning, engaging customers and legislation.

For example, in the case of land use planning, we compared the efforts of New York City and Sydney. We found successful water utilities had:

1. Deep engagement with local government;

2. Provided extensive information on the issues to support councils;

3. Allocated resources to manage impacts of land use planning on their business;

4. Resourced external agencies to manage land use appropriately;

With regard to engaging with customers about catchments, we compared the customer engagement efforts of the Whitefish Water Department in the United States and Melbourne Water, a water utility in Australia. Both organisations have been very successful in customer outreach activities. In particular, Melbourne Water used an innovative 'willingness to pay' survey technique to help identify investment priorities over five years, and the overall level of investment supported by its customers.

Source catchment legislation in the United States and Australia differs greatly. The United States has the *Clean Water Act* and *Safe Drinking Water Act,* which provide a legislative head of power for catchment management efforts. It does not guarantee that everyone has a successful catchment management program, but it does assist by clearly defining the requirement for a program. In contrast, Australia has different legislation in different states and does not have a national legislative head of power for source protection activities. This has led to a multitude of different approaches in different states, some of which have been successful, others less so.

CATCHMENT MANAGEMENT INVESTMENT STANDARD

What Is The Standard?

The Standard is designed for use by agencies and organisations who manage source catchments, especially impaired multi-use catchments.

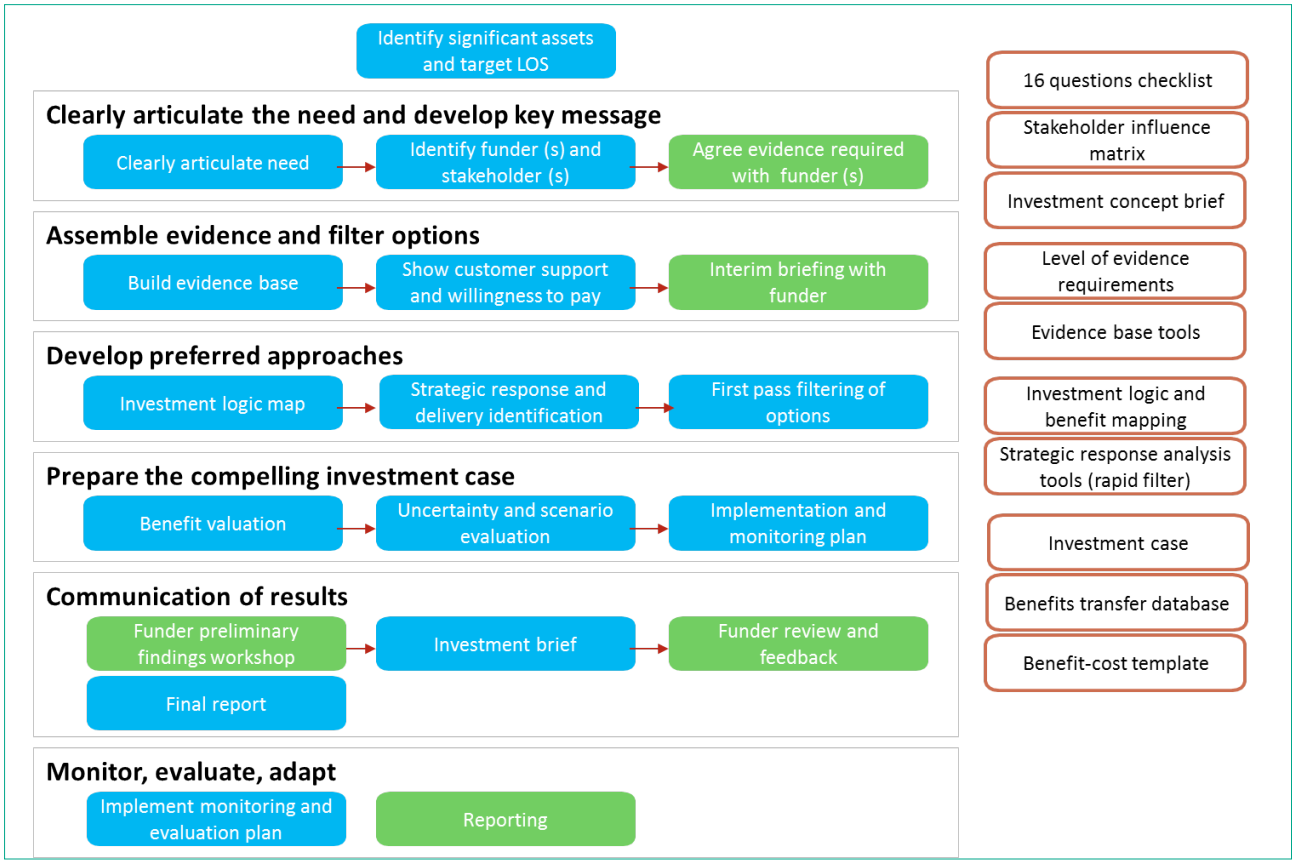
It is supported by a toolbox of practical resources (templates, examples, case studies, evidence databases and other guidance). The resources have been developed with the support of industry stakeholders.

Context For Using The Standard

To use the Standard effectively, a good level of understanding about source catchments, their processes, and the major components of a source catchment management plan is required. A basic understanding of stakeholder engagement and benefit-cost analysis is also required.

Many utilities have in place, or are developing, source catchment plans and investment strategies.

Our literature review and experience shows these operate at varying levels of scale, scope and specificity.



Investment Standard steps and supporting tools. Interaction with the program funder has also been highlighted in green.

The Standard is intended to complement and bolster existing strategies, not replace them. Existing plans and strategies can be adapted as appropriate. Utilities can use the Standard as a building block for developing and implementing source catchment investment plans, including in source catchment investment plans that address impaired or threatened waterbodies.

How To Use The Standard

The 11 key steps in the Standard, and why they are required, follow. The Standard is suitable for investments and decisions of any level of complexity or regulatory background. Irrespective of complexity, all catchment management investment decisions can follow the same basic sequence of enquiry. The process and tools are suitable for shaping new investments, prioritising investment proposals, developing new source catchment management policy, and monitoring and measuring the benefits of delivery.

1. Identify significant assets and set minimum and target levels of service (develop a Strategic Asset Management Plan [SAMP]): A clear and logical basis for investment, based on its contribution to agreed or desired outcomes, is critical in driving efficient and accountable source catchment investment and management.

2. Clearly articulate the need (problem definition): From the outset of a proposal, water utilities need to be able to articulate a clear vision of why the decision to fund a catchment management activity is being considered.

3. Identify the funder(s) and stakeholder(s), develop a constituency and build partnerships: Developing a constituency to champion the cause and provide resources and technical support is a key success factor.

4. Agree on the level of evidence the investor wants to approve the investment: It is well understood that sources and their associated risk to value of assets vary greatly. The level of evidence required for the investment case should align with the value at risk.

5. Assemble the evidence base (define and identify high value assets): It is necessary to describe and document the source water system to develop an understanding of the impacts seen in the catchment, identify possible causes and sources of the impacts, and subsequently quantify the pollutant loads.

6. Show community support and willingness to pay: This step is critical if the catchment investment is delivering for drinking water and other asset objectives (for example, other values of water may also be appropriate, e.g. ecological needs, waterway condition) that go beyond regulatory/legislative minimum requirements.

7. Prepare an investment Logic Map: An Investment Logic Map is just that, a 'map'. It aims to communicate the investment story that you are preparing on a single page using language and concepts that are understandable to a layperson.

8. Identify strategic responses: Most catchment management interventions focus on hard or soft infrastructure investment. Other interventions, e.g. non-asset solutions, can be used and delivery mechanisms should be fully mapped out.

9. Do a first-pass filtering of the long list of strategic responses and get investor sign-off on the short list: The number of ways that a catchment management issue can be addressed is potentially extremely large. Even limiting the focus to assets of high significance still leaves a long list of possibilities. This step could involve broader stakeholder consultation to discuss a potential suite of options if required.

10. Prepare the compelling investment case: The investment case is the final recommendation put forward to the investor. The investment case can be for a program of works or for individual projects.

11. Monitor, evaluate, adapt: Typically, all hard infrastructure assets of a water utility have been included in asset registers and associated asset management plans. Asset condition and risk assessment are frequently used to assist in managing assets, in investment planning and prioritisation, and to guide the implementation of asset maintenance and replacement programs.

Such robust asset management approaches should equally be applied to catchment assets such as land and water to help demonstrate that they are being comprehensively and consistently managed.

It is not possible to describe all the key steps of the Standard in detail here; however, as an example we provide 'Step 1, Identifying Significant Assets and Set Minimum and Target Levels of Service (develop a strategic asset management plan [SAMP]).

The purpose of a SAMP is to define asset performance requirements, what is being done to meet these requirements, and how service levels will be sustained.

The SAMP includes Levels of Service (LoS) for drinking water and other asset objectives (for example, other values of water may also be appropriate e.g. ecological needs, waterway condition).

For each of these key assets, a SAMP should clearly distinguish between LoS and their drivers (McInnes *et al*., 2010):

- Regulatory or operating license drivers that are in place to meet minimum standards and obligations with respect to service provision (e.g. water quality standards);
- Broader environmental or social requirements or constraints associated with the delivery of minimum services (e.g. other catchment and river health obligations);

Table 2. Example of customer, planning, tactical and operational levels of service for water supply.

Customer	Reliability of safe water supply not to exceed an outage of more than six hours.
Planning	Water supply needs for current and 10-year future capacity of the township. This would be measured through performance metrics. For example, a minimum of 4ML/day based on projected usage for a peak summer day.
Tactical	For a water aqueduct: • Minimum hydraulic capacity 4ML/day for 99.8% of the time. • Maximum duration of low flow not to exceed six hours. • Safe to operate and maintain. • Durability to be able to perform their required functions for at least their nominated design life. • Will not endanger the public or cause unnecessary disruption. • Minimise contamination risk. • Meet or better the water leakage loss target.
Operational	Secured from unauthorised access and tampering. • Maintained to remove debris and flow conveyance. • Performance condition greater than 3 requires intervention. • Safety assessed using HAZID process. • Outage for maintenance not to exceed six hours. • Leakage reported and rectified where practical.

Table 3. Example of tactical levels of service for closed catchments.

Catchment programs based on Assets/Threats	Minimum/Basic Level of Service
	Identify, analyse, evaluate and treat bushfire risk to water resource assets.
Recovery	Recover from the impact of bushfires and severe weather events.
Roads	All infrastructure roads functioning all year. All essential roads open and functional during the fire season. All important roads open and functional during the fire season.
Access	Exclude unauthorised access within the fenced reservoir areas. Limit and control authorised access to essential visits only.
Pest Animals	Target pest animals to protect water quality in the catchments.
Runoff	Improved quality of runoff from rural land in the catchment.

Farmland erosion in Brisbane's drinking water catchment.

- The provision of services to a standard exceeding a minimum regulatory requirement where there is evidence that this is efficient and customers are willing to pay for this higher level of service.

The SAMP can identify both minimum LoS and desired LoS. Where the desired LoS exceeds the minimum LoS it needs to be clear why this is the case. It should include (or reference where appropriate) the core information that justifies the recommended source catchment asset management activities so that:

- Each source catchment can meet its specific levels of service;
- Managers can manage asset risks for each source catchment to a reasonably practicable and acceptable level;
- Managers can endeavour to optimise investments in its source catchment assets;
- Managers can meet legislative, customer, and stakeholder requirements.

Tables 2 and 3 are examples of a level of service; one for water supply, one for closed catchments.

CONCLUSION

The Source Catchments as Water Quality Treatment Assets Project was born in response to a need for a better methodology for the development of business cases for the management of drinking water catchments.

The key product from the project is the Catchment Management Investment Standard.

It was developed in close collaboration with water utilities from both Australia and the United States to enable stronger business cases for catchment management as a viable alternative to more capital-intensive (traditional) investments.

To inform its development, a high-level assessment of key lessons from catchment management initiatives and programs in the United States and Australia (including case studies of issues such as land use planning, legislation and connecting with customers) was undertaken.

Gravel extraction in Brisbane's drinking water catchment.

The Catchment Management Investment Standard provides users with a summary of the key steps and practices that need to be completed to develop a robust and evidence-based investment in source catchment management activities. It is hoped the Standard will provide invaluable help to water utilities in Australia and in the US.

The Catchment Management Investment Standard reports are available online at: *www.wsaa.asn.au/publication/source-catchments-water-quality-treatment-assets*

Webcast with the authors explaining the Standard is also available at: *event.webcasts.com/starthere.jsp?ei=1100270"*

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