What are source water catchments worth: The economic benefits and values for South East Queensland

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Key points

- Source water catchments provide a range of ecosystem services and benefits to utilities and broader society.
- Utilities play a key role in catchment management, providing benefits to its operations, customers and broader stakeholders.
- Catchment profiles were developed for all 15 source water catchments in South East Queensland to identify and communicate the range of economic benefits and values internally and externally.
- These values can inform catchment management funding and decision-making processes including internal catchment management strategy, business case development and regulatory submissions.

Abstract

Source water catchments underpin the reliability, affordability and quality of South East Queensland's drinking water supply, yet their full economic contribution is often underestimated in planning and regulatory processes. Despite previous efforts to quantify individual benefits, there was no consolidated, decision-ready assessment that captures the breadth of economic values supported by source water catchments. This project addresses that gap by applying a modified ecosystem services framework tailored to internal frameworks and investment planning, to enable the identification, categorisation and economic valuation of key benefit streams across individual catchments. The analysis reveals significant economic value associated with healthy, well-managed catchments, spanning avoided treatment costs and health impacts, recreational use and broader societal benefits. These findings provide a robust evidence base to strengthen cost–benefit assessments, guide strategic investment in catchment management, and support clearer communication of catchment importance to internal decision-makers and the State regulator. The work demonstrates how a structured economic valuation approach can help catchment managers more effectively prioritise interventions and secure funding for long-term catchment health in a changing climate.

Keywords

Source water catchments, ecosystem services, water quality, recreation, estate management, economic values

Introduction

Source water catchments are critical natural assets within bulk water supply systems. They influence the quality, reliability and treatability of raw water before it reaches downstream treatment infrastructure, while also supporting a broader range of environmental, recreational and social benefits. In practice, however, the contribution of catchments to utility performance and community wellbeing is often under-recognised in planning, funding and regulatory processes. This is partly because many catchment benefits are dispersed across different service areas and stakeholders, occur over varying timeframes, or are not directly observed through market transactions.

For water utilities, this creates a practical challenge. Investments in source protection, recreational access and estate management can generate measurable benefits for operations, customers and the wider community, yet these benefits are rarely brought together within a single decision-ready framework. This project explores the development of a framework for identifying and quantifying values in Seqwater's source water catchments in South East Queensland. The project is ongoing, so the focus of this paper is on the framing, methodology and early insights from the evidence review rather than final quantified results, which may form part of the presentation during the conference. The intent is to demonstrate how a structured valuation approach can support catchment strategy, business case development and communication with internal and external decision-makers.

Fundamentals of ecosystem services

The project adopted a modified ecosystem services framework to identify the links between catchment assets, the services they provide and the economic values that may be estimated for decision-making. Ecosystem services describe the contributions that ecosystems make to human wellbeing by supporting, regulating and enabling social, economic and environmental outcomes (Millennium Ecosystem Assessment, 2005). The Common International Classification of Ecosystem Services (CICES) provides a standardised framework for identifying, classifying and organising these services in a way that supports environmental assessment, natural capital accounting and decision-making (Haines-Young & Potschin, 2018). CICES is widely used in policy, planning and applied valuation contexts because it offers a consistent typology that links ecological processes to benefits experienced by people.

CICES is structured around a cascade model (Figure 1), which distinguishes between ecosystem structures and processes, the services they generate, the benefits derived by people, and the values associated with those benefits (Potschin & Haines-Young, 2016). Importantly, the framework focuses on final ecosystem services—services that directly contribute to human wellbeing—rather than intermediate ecological processes. This distinction is critical for economic valuation, as it helps reduce the risk of double counting when multiple services are assessed or aggregated (Haines-Young & Potschin, 2010; Bateman et al., 2011).

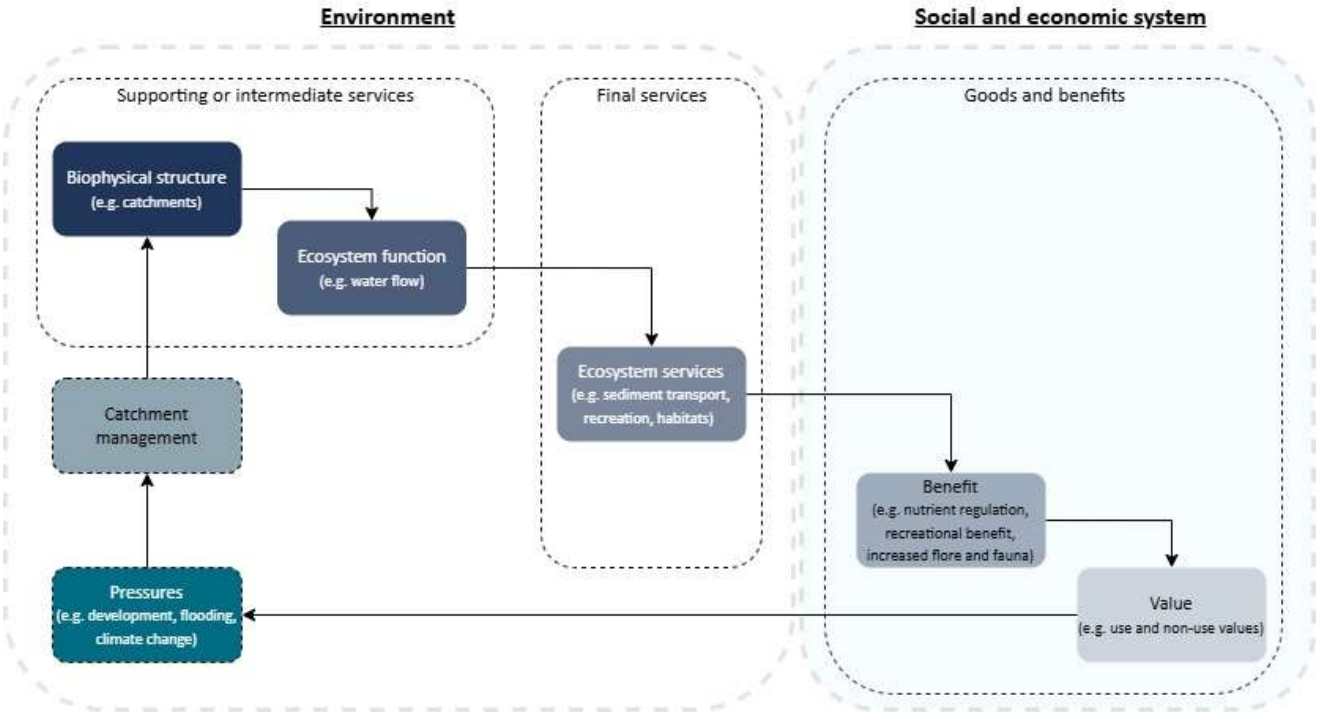

Figure 1 Example of a cascade model for source water catchments

At its highest level, CICES classifies ecosystem services into three broad categories (Haines-Young & Potschin, 2018):

- **Provisioning services**, which relate to material and energy outputs from ecosystems that are directly used by people, such as freshwater supply, food, fibre and raw materials.
- **Regulating and maintenance services**, which describe the ways ecosystems regulate environmental conditions and sustain system functioning, including water purification, erosion control, climate regulation, flood attenuation and disease regulation.
- **Cultural services**, which encompass the non-material benefits people derive from ecosystems through recreation, aesthetic appreciation, cultural identity, education and spiritual enrichment.

Each category is further disaggregated into classes and subclasses, allowing ecosystem services to be identified at a level of detail appropriate to the decision context. This hierarchical structure enables flexibility: services can be assessed at a high level for strategic communication, or at a more detailed level to support project appraisal, valuation and prioritisation (Haines-Young & Potschin, 2018).

In applied settings such as catchment management, the CICES framework is often adapted to reflect organisational responsibilities and decision needs. Rather than applying the full typology, services may be grouped into functionally meaningful categories that align with management objectives, while still retaining the core CICES logic of linking ecosystem condition to human benefits. This adaptability makes CICES particularly suitable for utility and infrastructure planning contexts, where natural assets support both operational outcomes (such as source water protection) and broader public values (such as recreation and environmental stewardship) (Potschin & Haines-Young, 2016; United Nations, 2021).

This framing was selected because it provided a practical way to connect biophysical functions with utility and community benefits, while also recognising that catchment investments can generate both direct operational value and broader public value.

Adapting the ecosystem services framework

The CICES framework was adapted to appropriately identify the range of ecosystem services and values relevant to source water catchments in South East Queensland. This involved simplifying the framework to identifying the:

- **assets**—primarily the source water catchments (not catchments more broadly) and associated recreation and estate areas
- **services**—defined as source water supply, recreation and estate, aligning with the work areas within Seqwater's catchment management business area
- **values**—focused on overarching values of each service category, supported by more granular values by benefit type, quantified using market and non-market valuation.

Under this hierarchy, the Baroon Pocket Source Water Catchment is an asset that supplies source water, which generates economic value based on the regulated value of allocations. Concurrently, the management of the catchment can reduce sediment risk, which can be valued through avoided water treatment costs that would otherwise be required to achieve the same level of sediment reduction. Similarly, the catchment provides recreational services to local visitors from outdoor recreation, including walking, hiking, on-water activities, fishing, and passive recreation (e.g., picnicking). Finally, the catchment provides benefits within its overall estate in the form of land available for grazing and horticulture—which generate market values—and conservation—which provides non-market values. The challenge in decision-making is to balance and tradeoff these values, having regard to an overall service provider's objective of ensuring safe reliable drinking water and objectives of other stakeholders that may align with recreation and estate benefits.

This adapted framework is presented in Figure 2.

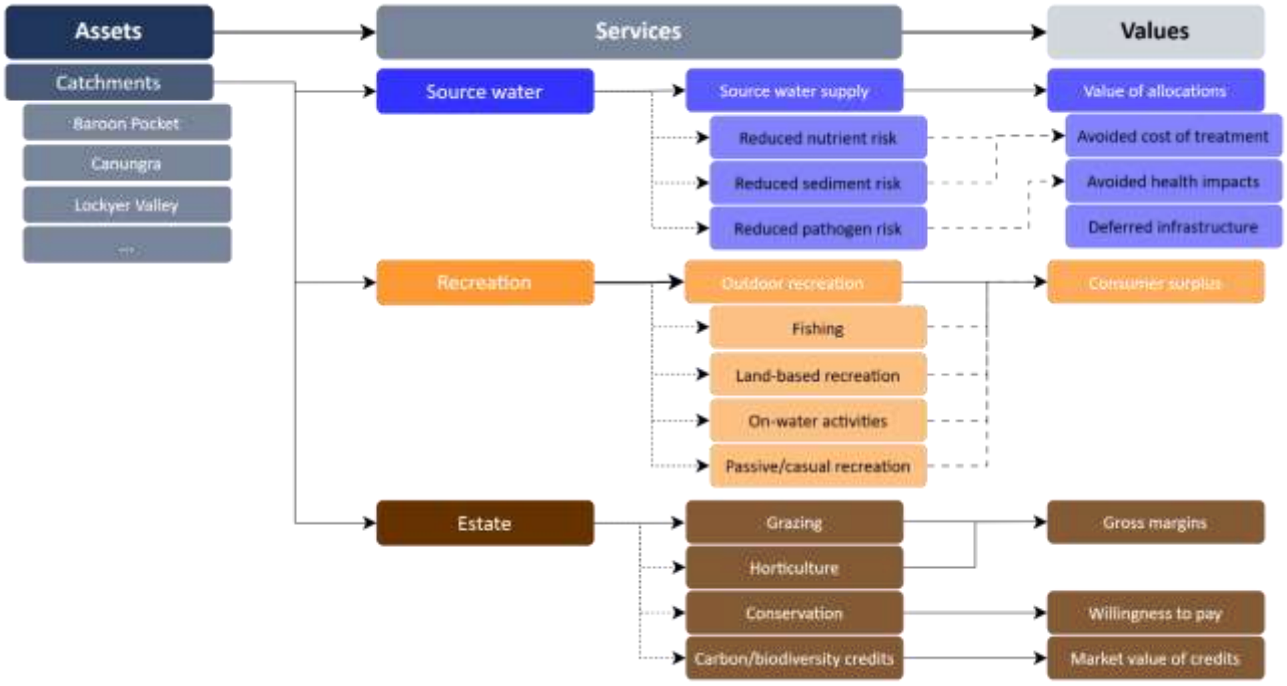

Figure 2 Adapted ecosystem service framework for South East Queensland catchments

Evidence base and valuation approach

The methodology combined a structured desktop review with development of catchment profiles and preliminary valuation pathways. The evidence base included internal planning and operational documents, such as source water catchment asset management plans, recreation asset management plans, source water protection strategies and land asset classification documents, as well as spatial data, external literature and valuation studies relevant to Australian catchments and ecosystem service contexts. These materials were used to establish the assets in scope, clarify the service pathways most relevant to South East Queensland, identify the beneficiaries of those services, and assess the suitability of different valuation methods. A summary of the valuation approaches is presented in the table below.

Table 1 Summary of valuation approaches

Service*	Description	Valuation approach	Data source
Source water supply			
Source water supply	**Key value provided by source water catchments**	**Market value of volume of water allocation to water treatment plant**	**Water allocations provided by Seqwater Value based on regulated bulk water price as proxy**
Reduced sediment risk	To inform value of catchment management	Market value of avoided treatment costs	McMahon et al., (2024)
Reduced pathogen risk	To inform value of catchment management	Market value of avoided health impacts based on Disability Adjusted Life Years (DALYs)	Smart et al., (2022)

Service*	Description	Valuation approach	Data source
Recreation			
Outdoor recreation	**The overarching value of outdoor recreation associated at the catchment**	**Non-market value of recreation visitation, assuming all visitation is for outdoor recreation. This value is supplemented with values for specific activities like on-water recreation and fishing.**	**Visitation based on annual traffic count data provided by Seqwater Value based on a triangulation of MJA (2018), Pelletier et al., (2021), Heagney et al., (2019) and Mcleod et al., (2021)**
*Estate***			
Grazing	The economic value from grazing on Seqwater and third-party owned land in the catchment to demonstrate the benefit from broad catchment management	Market value using gross margins for grazing activities in the catchment area	Spatial land use from Queensland Government (2022) Gross margins from AgriFutures Australian (2021) and Queensland Government (2018)
Horticulture	The economic value from agricultural production on Seqwater and third-party owned land in the catchment to demonstrate the benefit from broad catchment management	Market value using gross margins for a range of crops produced in the catchment area	Spatial land use from Queensland Government (2022) Gross margins from AgriFutures Australian (2021)
Conservation	Societal value of conservation of biodiversity on land designated for protection or conservation	Non-market value using stated willingness to pay	Spatial land use from Queensland Government (2022) Non-market value from Rolfe et al. (2001)

* Values in bold represent key reference values for each service category.
** No key reference value was presented for estate given the inability to identify an aggregate service within the category.

Assessing risks to values

A rapid risk assessment approach was also developed to illustrate the risk to values. The intent of this was to provide a quick summary of risks for strategic communication and management, such as to develop the service need for a program level business case, work with Natural Resource Management (NRM) groups to investigate individual risks in greater detail, and engage with partnering stakeholders like State and local governments, local Councils to co-invest in interventions. The key risk factors that were investigated as shown below.

Table 2 Key risk factors that were investigated

Risk factor	Description	Approach
Land condition	To demonstrate the risks to waterways based on riparian buffer condition where a lower vegetation cover is higher in risk	Spatial assessment of vegetated riparian buffers (within 50m) of waterways using Queensland Statewide Landcover and Tree Study (SLATS) data (Queensland Government, n.d.) converted to a 0-5 score (i.e., 0 represents 80-100% vegetation coverage and 5 represents 0-20% coverage).
Recreational use	Given the potential competing land use impacts of recreational use and catchment health where higher recreational use creates higher risk	Based on the relative recreational use density using annual traffic count data divided by catchment area, compared across catchments where 1 represents the bottom quintile of and 5 is the highest.

Risk factor	Description	Approach
Land use trends	To demonstrate the risk to catchment health based on trends of land use conversion	An expert assessment using a range of spatial data and local planning strategies where 0 would represent to material land use risk and 5 would represent high risk from land use change.
Climate change	To illustrate the risk of climate change on catchment health	A qualitative assessment of spatial data of the catchment overlayed with Queensland Future Climate data (Trancoso et al. 2024) for precipitation and fire risks, where a score of 0 represents minimal or no risk and 5 represents high risks.

Key output

The primary output developed for this project is a catalogue of catchment profile 'cards' developed in a Microsoft Excel database. An illustration of this card is provided in Figure 3 below.

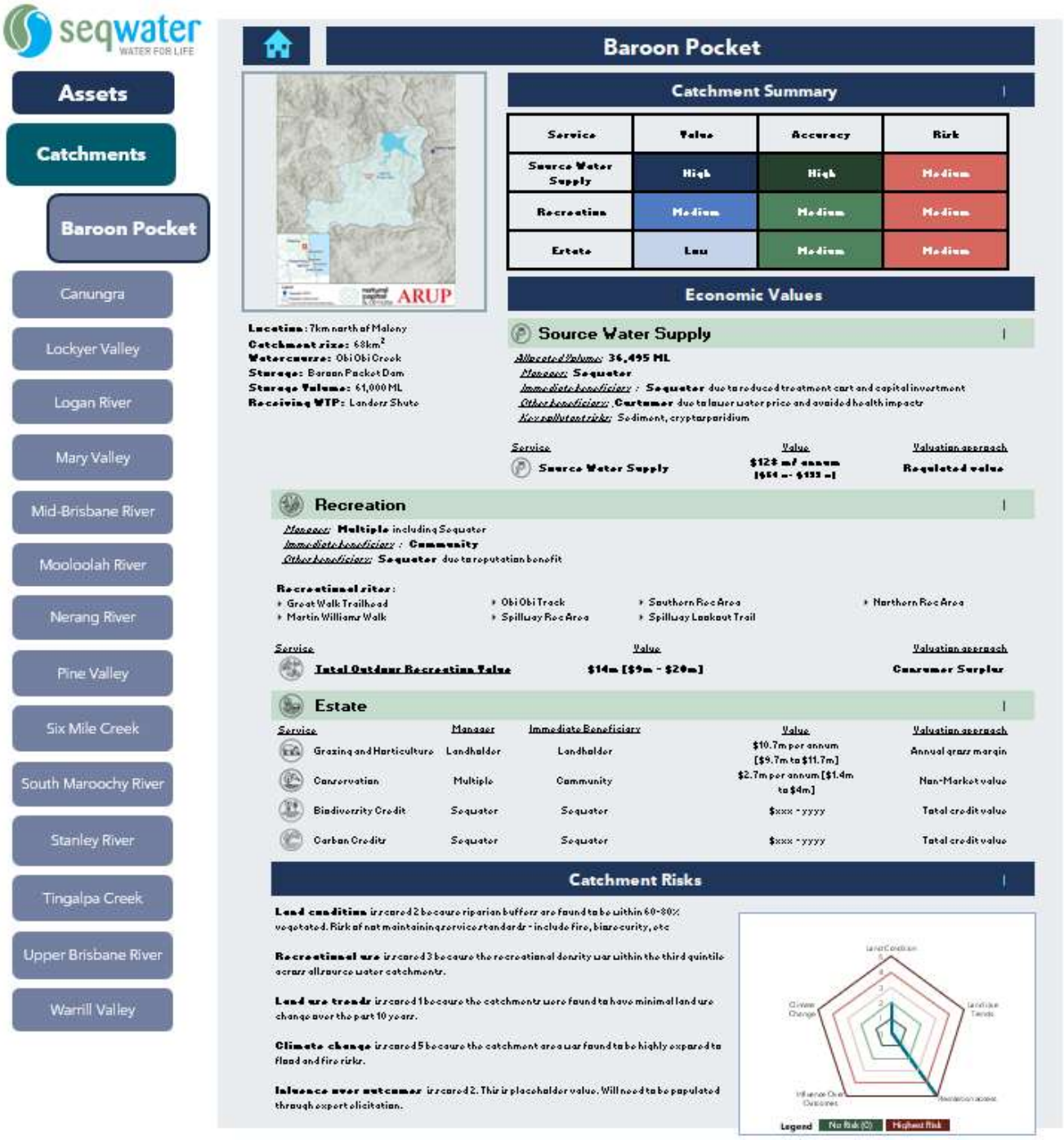

Figure 3 Source water catchment card example (Baroon Pocket). Note: any values in this profile card are placeholders only and do not represent actual values

These catchment cards were designed to catalogue and present values for each catchment, and the potential risks to services and values to inform strategy, investment and partnerships. The cards also displayed confidence of the values based on underlying data, which could be improved over time as new data and modelling becomes available.

Conclusions

Source water catchments generate a wide range of benefits that extend beyond their immediate role in supplying raw water to treatment plants. Through this project, an approach was developed to identify, organise and value those benefits within a decision-making context for Seqwater. Although the project is still in progress, the framework already demonstrates how catchment management benefits can be more clearly articulated across source water supply, recreation and estate management. By translating these benefits into a structured evidence base for planning and investment, the work is intended to support stronger business cases, more transparent prioritisation and clearer communication of the value of catchment assets to regulators and other stakeholders.

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