



CRC for  
Water Sensitive Cities



Program A: Society | Project A1.2 | Project duration: January 2013 – January 2017

# Valuation of economic, social and ecological costs and benefits of strategies and systems for water sensitive cities

## Overview

Over the past five years water utilities in Australia have made substantial investments in a range of different technologies, such as dam expansions, construction of desalination plants and water recycling projects, to supplement water supply to urban areas. In total, the capital investment in water augmentation projects over the period 2005/06 to 2011/12 by Australia's largest water utilities is estimated by the Productivity Commission to have been around \$30 billion. Both industry and government require clear evidence about the full range of costs and benefits of investments in new systems and infrastructure before they can wisely invest.

This project will estimate the costs and benefits of strategies and systems for water sensitive cities (WSC) and provide best practice guidelines for the integrated economic evaluation of existing and new approaches to water infrastructure investment. An economic analysis of costs and benefits, including those related to energy, carbon, environmental and social factors, will be undertaken for water sensitive infrastructure in greenfield and retrofitting scenarios. This analysis will also take into account a variety of water sources such as recycled water, stormwater and dam water for different water needs; centralised and decentralised water supply systems; and new water sensitive technologies.

## Key outcomes

This project will provide industry and government with new knowledge and tools to make sound water infrastructure investment decisions that strike the best balance between economic, social and environmental outcomes. There are very few studies in Australia or internationally that focus on the issues that will be addressed in this research project which include understanding:

- the economics of water conserving technologies and infrastructure for urban areas
- an economically optimal mix of water sources
- the benefits of improving urban liveability through enhancing water sensitivity
- the incorporation of non-market values when calculating costs and benefits
- the use of a real options decision framework.

This research project will fill a number of key gaps in the water economics literature.

## Key findings: How valuable are living streams?

A case study investigated the replacement of parts of a main drain with a constructed stream in a suburb in Perth. The study examined what benefits local residents can gain from replacing traditional concrete main drains with constructed living stream infrastructure.

Early findings showed that the conversion of a traditional main drain to a constructed stream resulted in an increase in the price of houses in close proximity to the restored drain. Given the conversion involved extensive earth works and time for the vegetation to become established, the increases in house prices did not appear until about four years after the restoration project was initiated. The study also showed that within 200 metres of the restoration project house prices were raised by between \$17,000 and \$26,000 per house. This effect was in addition to the general trend of increasing house prices in the area.

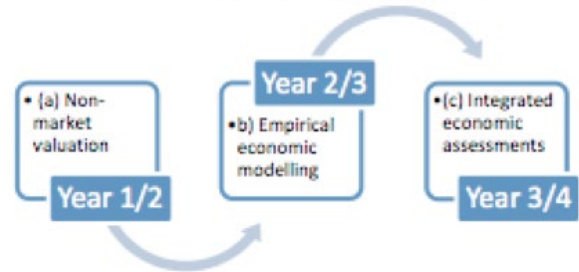
In general, different types of drainage infrastructure also result in external costs and benefits that are associated with the specific drainage project such as recreational benefits from water quality improvements. It was found that only when the full range of project-related and external costs and benefits of a restoration project is being considered, traditional main drains may after all not be the cheapest option for drainage infrastructure.



Living stream case study area (© SERCU)



Figure 1. Project workflow



## Project design

To estimate the costs and benefits of strategies and systems for WSC, the project uses various types of economic analysis exploring five common interrelated issues associated with delivering WSC. These issues are the:

- costs and benefits of investment in water sensitive infrastructure
- costs and benefits of alternative systems for combining portfolios of water from different sources, including recycled water, stormwater, groundwater, desalinated water and dam water
- relative costs and benefits of centralised and decentralised systems for water supply
- economic viability of new technologies and systems which are being researched by the CRC for Water Sensitive Cities (CRCWSC)
- economic impacts of low probability events and the economics of options to reduce these impacts.

These issues will be assessed using the following types of economic analysis:

- non-market valuation to estimate the values of environmental and social benefits such as waterway health, urban biodiversity and liveability
- empirical economic modelling to identify optimal investment and management strategies and to estimate impacts
- integrated economic assessment.

In the field experiments, 981 owner-occupied households in four councils across metropolitan areas in New South Wales and Victoria were interviewed and data on their income and demographic characteristics was collected. These councils are all comparable in terms of their socio-economic make-up, yet differ in terms of their history of heavy rainfall and flash flooding events.

## Outlook

This project is strongly linked to the CRCWSC Project A1.1 (Economic evaluation of cities as water supply catchments and Project A1.3 (Economic incentives and instruments). The combined outcomes will provide decision-makers with expert advice and better tools and frameworks to assess new technologies and undertake integrated modelling of complex factors when making investment decisions regarding water sensitive infrastructure that will generate a net welfare gain.

The outputs will include specific guidelines for economic evaluation of water sensitive infrastructure systems and technologies that can be used by water utilities, state and local planning authorities, and water service providers.



## About the Cooperative Research Centre for Water Sensitive Cities

The Cooperative Research Centre for Water Sensitive Cities (CRCWSC) brings together interdisciplinary research expertise and thought-leadership from Australia and the world to address current urban water management challenges facing our cities and regions. In collaboration with over 80 research, government and industry partners, it develops and synthesises knowledge into powerful tools and influences key players aiming to achieve sustainable, resilient and liveable water sensitive cities.

### Further information

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