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**Article:**

Broadhead, A.T. and Lerner, D.N. (2013) *www.daylighting.org.uk: case study website supporting research into daylighting urban rivers*. *Hydrological Processes*, 27 (12). pp. 1840-1842. ISSN 0885-6087

<https://doi.org/10.1002/hyp.9781>

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# **www.daylighting.org.uk: case study website supporting research into daylighting urban rivers**

Adam T. Broadhead and David N. Lerner

Catchment Science Centre, Kroto Research Institute, University of Sheffield, Broad Lane, Sheffield, UK.

In many towns and cities around the world, watercourses flow in culverts for great lengths, barely seeing daylight and almost completely forgotten by the people living there. Culverts were often constructed to hide polluted watercourses that had become an eyesore, to control flood risk, and – still today – to maximise development space for transport links or buildings. The Environment Agency's Detailed River Network map lists tens of thousands of culverts in England and Wales; in the United States over 3.6 million linear metres of culverts are estimated to be installed each year (Federal Highway Administration 2006).

Many culverts have insufficient capacity to cope with increasingly flashy urban catchments, and are prone to blockage and flooding. The consequences can be severe: in September 2012, a culvert collapsed and washed away the foundations of a block of flats in Newcastle, UK, revealing how close they had been built to the hidden watercourse. In addition, culverts are widely acknowledged to impact fish passage and aquatic habitats. This is reflected in legislation such as the EU Water Framework Directive (Directive 2000/60/EC) and in recent culvert design guides (Balkham et al. 2010).

Over the last 20 years, there has been a movement towards daylighting (or deculverting), removing the culverts and restoring watercourses to a more natural condition. Not only can this be cheaper than repairing or replacing ageing culverts, but proponents often claim that open watercourses can bring many environmental, social and economic benefits (e.g. Pinkham 2000). Daylighting projects have been undertaken or proposed across Europe, North America, Australasia and South-East Asia. It has entered specific policies in the UK (CIWEM 2007, Environment Agency 2010, SEPA 2006), and in the United States daylighting is recognised within the vocabulary of Green Infrastructure (EPA Office of Wetlands Oceans and Watersheds 2010) and river restoration (Federal Interagency Stream Restoration Working Group 1998).

Figure 1 gives a flavour of daylighting examples from around the world. An open watercourse can be an attractive part of an urban landscape; this can be reflected in land values, and is why water features often play a key part in publicly or privately funded developments or urban regeneration schemes. A daylighted watercourse receives sunlight and so supports aquatic and riparian habitats, enabling fish passage through a blue corridor. It can also promote better watercourse stewardship and help to identify pollution. Current research even suggests improved water quality by increased de-nitrification in daylighted watercourses compared to culverts (Dr Paul Mayer, United States EPA, pers. comm., February 2013). Open rivers have also been shown to combat the urban heat island effect (Hathway and Sharples 2012). In many cases culvert removal can reduce flood risk when combined with SuDS or flood storage wetlands. Public access to open green space, water and nature also feature repeatedly as drivers for daylighting rivers in urban areas.

However, the objectives and outcomes of daylighting projects are rarely published, which makes it difficult to evaluate their true effectiveness, to determine the best methods to use or to provide quantitative evidence to encourage future projects. A review of the benefits of

daylighting (Wild et al. 2011) found just 36 international case studies where objectives and outcomes had been recorded and published, and mostly these comprised anecdotal, incomplete evidence. The paper concluded: “Disentangling the various outcomes of deculverting, whether they be benefits to the society, environment or economy, will lead to a far deeper knowledge of causes and effects” (Wild et al. 2011: 418). Such an assessment is essential if we are to develop a business case to encourage planners and developers to undertake daylighting, and for this to move from an opportunistic to a strategic activity around the world. At the moment, we simply do not understand the many impacts of culverts, nor can we say for certain that daylighting actually delivers the claimed improvements.

At the Catchment Science Centre, we have developed [www.daylighting.org.uk](http://www.daylighting.org.uk) in response to this research need. This map based website of international daylighting case studies records the project drivers, costs, and the environmental, social and economic objectives and outcomes. Practitioners are encouraged to enter their own case study details and add to our findings.

We are currently working with the Environment Agency in England and Wales to develop this into a comprehensive “centre of excellence” resource. We hope this will be used to inspire and inform policy makers, planners and the public about daylighting their lost urban rivers. Critically, it will also provide researchers with much needed case study data to develop a robust assessment of the benefits and costs of daylighting, essential to underpin any future policies around the world.

We hope you share our belief that disseminating the results of deculverting projects will help deliver improved practices and policies to promote deculverting. Daylighting offers something for researchers and practitioners from diverse disciplines to get involved in: ecology, flood risk, hydrology and fluvial morphology, urban planning, socio-economics and more. We anticipate that this project will promote cross-disciplinary research and collaboration for managing water in urban environments.

Daylighting our many lost urban rivers is an exciting challenge and opportunity, and a call for those interested in deculverting to leap into action!

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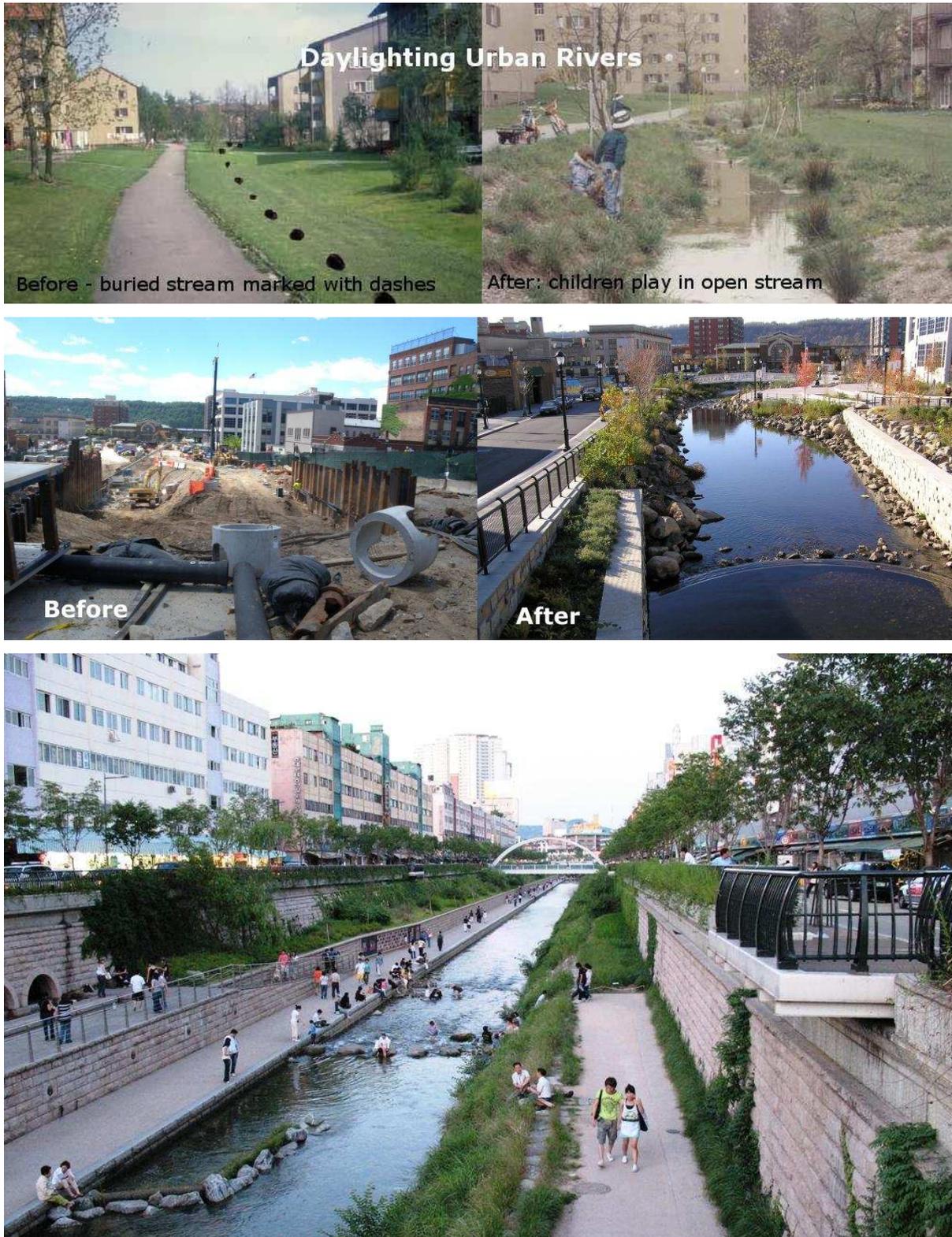
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**Figure 1** Daylighting urban rivers. Above: a daylighted stream through a residential area in Zurich, Switzerland, with naturalised banks and access. Middle: daylighting the Saw Mill River, Yonkers, NY, for economic regeneration. Below: the Cheonggyecheon in Seoul – one of the largest river daylighting projects attempted. A downtown highway was removed, revealing the buried river, regenerating the CBD and providing recreation space. Top left and right image courtesy of Markus Antener, ERZ Zurich; middle left image by Jim.henderson, Wikipedia, Creative Commons; middle right image by Anthony22, Wikipedia, Creative Commons; bottom image by madmarv00, Flickr, Creative Commons.