

Blue Health: Water, Health & Well-being – Sustainable Drainage Systems

Introduction

There is increasing interest in exploring the health and well-being impacts of water in the environment (blue health), including the potential of Sustainable Drainage Systems (SUDS) to enhance amenity for residents. Blue health research is relatively new, and the purpose of this project was to review the literature and draw together any research evidence about the health impacts of SUDS.

SUDS use soft features such as green roofs, permeable paving, swales¹, infiltration strips, ponds and detention basins² to manage surface water. They have three main objectives: to treat water and improve water quality; to reduce flood risk by providing storm water retention and detention; and to enhance amenity. SUDS have been required in most new developments in Scotland since 2006. Although there has been relatively little research carried out into the wider benefits of SUDS, this project has reviewed the research which is available and drawn conclusions.

Key Points



The review of existing literature reveals that the term ‘amenity’ is often used to characterise the potential benefits residents could find in a SUDS project whether it concerns aesthetic improvements, access and community benefits or potential for public education and awareness (CIRIA, 2007; Ellis et al., 2004).

In terms of public perceptions of SUDS features, the review reveals that residents appreciate green roofs (in high density areas), and rainwater harvesting from their own roofs but not other sources. There is limited research evidence about the amenity and aesthetic value of SUDS.

The research that does exist points to residents valuing ponds more than swales. This appears to be particularly the case

where ponds are attractive to wildlife – e.g. ducks and swans – and are associated with attractive landscaping and overall environmental improvement (Apostolaki and Jefferies, 2005).

With respect to retention ponds, a UK study suggested that the presence of a well-established pond was perceived as improving property saleability and value by around 10%. Evaluating environmental goods in terms of monetary value has always been seen as a difficult task (Ebert, 2008). However, two main techniques have emerged which allow their assessment: the hedonic valuation and the contingent valuation methods. Hedonic pricing relates to the observation of house price variations due to different factors. The use of this method to value a detention basin associated with multipurpose green space found that the device had a positive impact on property values, while a detention basin without any green features was shown to have no discernible impact (Lee and Li, 2009).

Another study (Bastien et al., 2011) found that people living adjacent to a pond gained widely varying benefits from it (a place to walk the dog; amenity; biodiversity; enhancing property prices; drainage; and education) and that the extent of these benefits was related to the amounts of litter around the pond. The research also highlighted that ponds with the most visible safety features (double fencing, prickly bushes and life belts) were perceived as being the least safe. However, the risks involved were perceived as being lower than urban risks such as road traffic.

¹A swale is a linear depression (ditch, with or without embankments) which may link to other SUDS devices such as ponds and detention basins

²A detention basin is an engineered depression or hollow designed to collect and store surface runoff at times of high rainfall. These basins are usually dry between rain fall events, unlike SUDS ponds which are permanently wet.

There is relatively little evidence about the amenity benefits afforded by SUDS. Those studies that have been carried out have tended to focus on hedonic and contingent valuation in order to explore residents' views of SUDS.

From consultation with stakeholders, there was a confirmed need for primary research investigating health and well-being and learning outcomes in children with SUDS in school playgrounds; identification of the risks/barriers to accessing water and how best to manage this in children/young people, followed by a valuation study to explore people's views towards SUDS.

Research Undertaken

The main approach of the research was a literature review using systematic review principles (e.g. clear search terms, inclusion and exclusion criteria). Because of the paucity of literature about the amenity value of SUDS, efforts were made to track grey literature. No formal evaluations or reports of particular types of SUDS have been uncovered, although discussions with a number of practitioners have provided anecdotal evidence about SUDS and their benefits, including the potential health and well-being effects of SUDS in schools.

This summary is one of a set of four derived from the BlueHealth project. All summaries and the project report are available at www.crew.ac.uk/publications.

Policy Implications



Evidence from the greenspace literature makes plausible the theory that water in the environment offers benefits for human health. However, it is not yet clear whether the effects of green and blue space on health and well-being can be separated from each other.

Literature on greenspace and health and well-being appears to show that people derive greater benefit, and value more highly, environments which have greater biodiversity. Water plays a significant role in relation to biodiversity, and ponds are known to provide rich habitats for a range of insects, plants, animals and birds. Based on the work undertaken in relation to "green health" one can argue that SUDS ponds have the potential to support mental health and well-being, although there is no empirical evidence of this link.

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