



Sustainable and Resilient Catchments



“Everywhere the availability of freshwater is becoming increasingly unpredictable and uncertain”

David Attenborough

Catchment Management

Stantec's approach

The aspirations of the Governments 25-Year Environment Plan mark a shift in how we manage both urban and rural landscapes, promoting a more holistic **“Catchment Based Approach”** working with natural processes and in partnership with the local community.

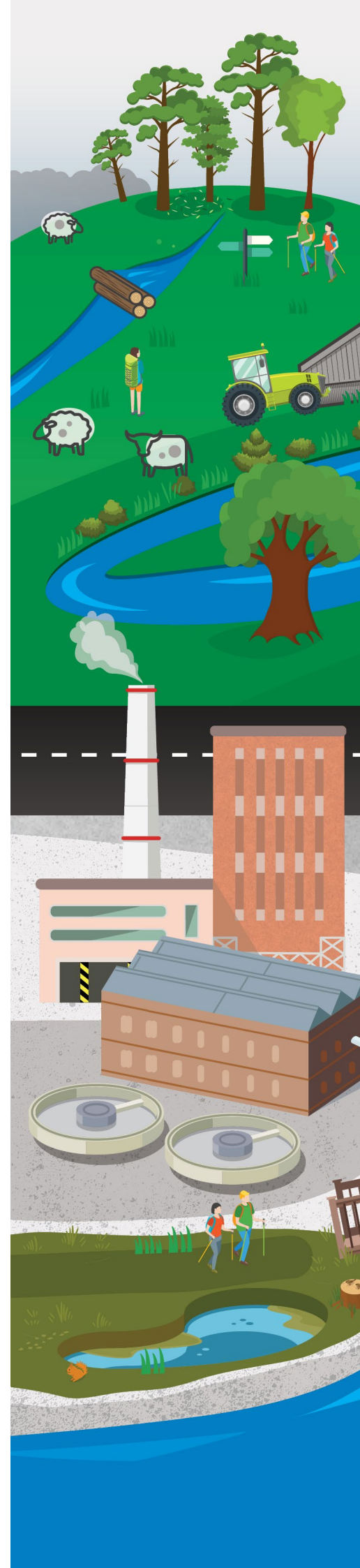
Catchments present the natural unit to identify synergies across different sector plans to align opportunities and realise wider environmental and the community benefits. Natural Capital accounting provides a useful basis to quantify the balance between more traditional engineered and catchment-based solutions for delivering a range of ecosystem services.

This brochure sets out our approach to catchment management along with some of the key services we offer.

Systems based thinking from source to sea

Stantec has the technical expertise to bring together the multiple disciplined teams necessary to adopt a truly integrated approach to catchment management, from source to sea. Our engineers, scientists and economists work alongside clients, across different sectors, and in partnership with local third sector and community groups to develop, deliver and evaluate catchment management solutions.

Stantec adopt an ecosystem services led approach, underpinned by Natural Capital accounting that recognises, and where possible monetises, the wider environmental and social benefits of working to enhance natural processes. This collaborative approach, equally applicable across urban and rural landscapes, is essential to develop sustainable solutions to mitigate the risks and pressures on the water environment.





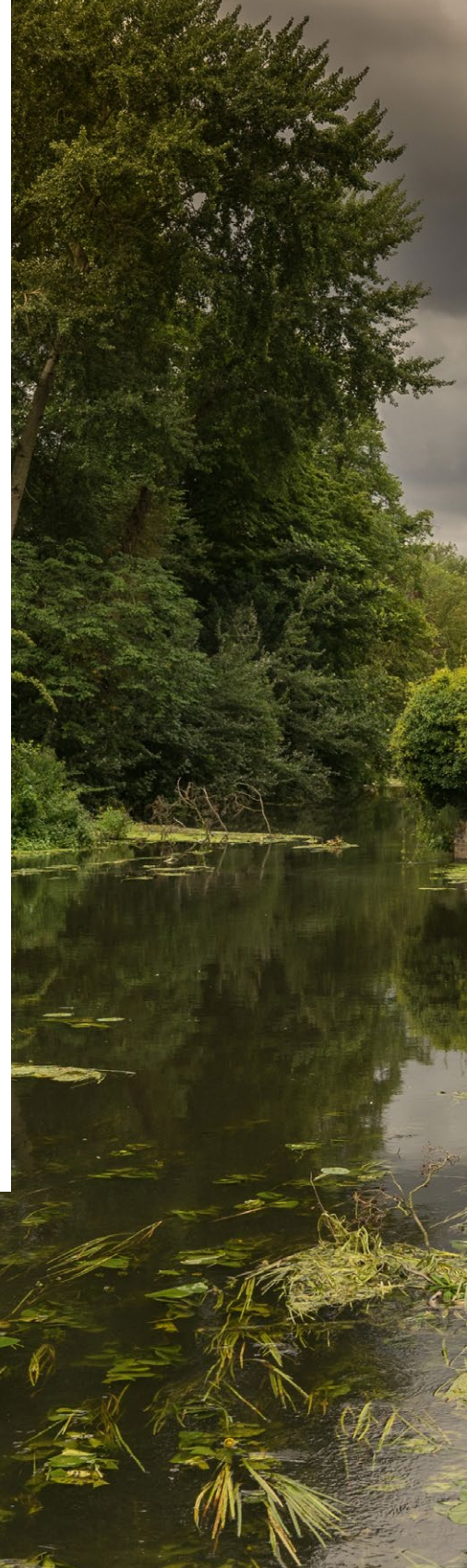
Managing upstream risks

Stantec has one of the most well-established water management teams in the UK, with experience working across all the water companies on all aspects of surface and ground water resources and water quality management.

This includes extensive experience in sustainable water resource investigations since AMP3 and the Restoring Sustainable Abstraction (RSA) programme. Our specialist team of water scientists has developed innovative and industry leading approaches to assessing groundwater and surface water abstraction effects on the aquatic environment, enabling water company activities to be contextualised within a hierarchy of environmental pressures that are preventing the achievement of good status under the Water Framework Directive (WFD).

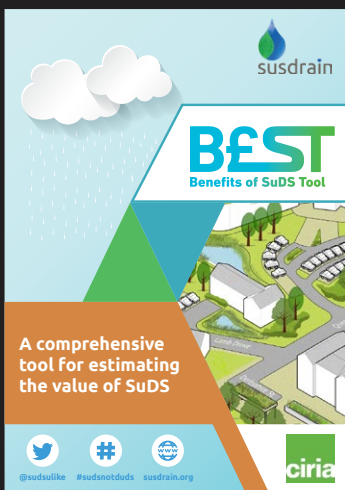
This approach recognises the need for cost-effective integrated solutions and allows the development of targeted interventions focussed on environmental outcomes. This holistic approach can lead to multiple benefits and significantly improve ecosystem functioning compared to abstraction reductions considered in isolation.

No Deterioration forms the principal driver for water resource investigation in AMP7 and is focussed around managing future risks. This requires identifying a chain of causation to manage these risks through prior planning and timely interventions. Stantec has an excellent appreciation of the task the sector faces and regulatory approved approaches to meet the challenge in a cost-effective manner and are already supporting a number of clients with early start WINEP investigations.



Stantec has supported the **Severn Trent Environmental Protection Scheme** during AMP6 to develop, review and evaluate the progress of their catchment management schemes focused on improving raw water quality across their surface water and groundwater supply catchments. This has included developing a system for managing the flow of information from data collection on the farm to modelling pollutant changes and monthly reporting dashboards to enable proactive programme management and reporting against appropriate targets.

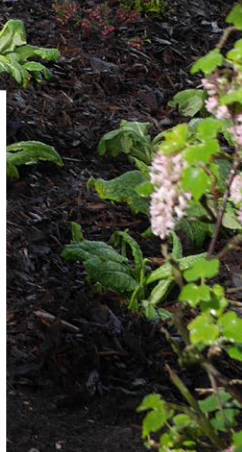




BEST

Stantec has worked with Ciria to develop **BEST** (Benefits ESTimation Tool), which provides a simple, structured approach to evaluate the wider benefits of blue-green infrastructure, including the “natural” upstream catchment.

BEST supports end-users in identifying, screening and monetising the potential benefits and provides a series of outputs aligned with ecosystem service categories to facilitate working with multiple stakeholders. Stantec have employed the BEST tool on collaborative multi-sector projects to evaluate the flow of benefits associated with different blue-green infrastructure solutions associated with both urban and greenfield developments.





Managing water for the benefit of urban communities

Our drainage systems in urban areas have a limited capacity to cope with rainfall, historical development and increase in hard surfaces. Further challenges in the future include population growth, urbanisation and climate change. Stantec adopt a systems-based approach to create resilient towns and cities by managing storm and waste waters combining soft and hard engineered solutions, all designed with community in mind.

Stantec has led the way through writing industry guidance with CIRIA (C713) to understand what, where and how to retrofit surface water management measures and control exceedance flows. We have also developed industry guidance to enable the benefits of these surface water management measures to be evaluated, with CIRIA's tool, BEST.

Stantec has developed simple and complex urban models across the UK and globally to understand where we need to manage flows. This has culminated in Stantec designing solutions at different scales to cope with different flows in very different urban contexts. For example, for Northumbrian Water we have designed solutions to manage flows to reduce flooding and reduce combined sewer overflow spills. Critically, these solutions are developed in partnership with numerous stakeholders. We have also designed on the micro scale, for example, working with Business in the Community, to demonstrate how sustainable drainage systems can be retrofitted to schools in Manchester.

Stantec recognises though, that at times, we first need to understand the 'art of the possible' especially across large spatial scales. We have developed routines with Yorkshire Water that handle big data sets to identify various surface water management opportunities at a catchment scale. These can quickly inform the types of techniques we could use, and the potential ease to retrofit.

Fundamentally we believe the importance of community involvement to manage surface water. We have supported engagement at a local level through our individual designs, or catchment scale, such as organising a charette with Yorkshire Water and its partners in Hull, to help determine collaborative ways to manage surface water in the long term. In the future, we believe that we will be working ever more closely with communities to tackle the challenges we face within our catchments.

Working with Natural Processes

Restoring the form and function of catchments to enhance ecosystem services and natural capital

River restoration encompasses a wide variety of ecological, morphological, hydrological and catchment management measures, that aim to restore the natural processes of the river system in supporting biodiversity, natural flood management, landscape enhancement and increased recreational value. Stantec delivers tailored solutions that are sympathetic and appropriate to the river's natural and cultural setting. Stantec have considerable expertise in river restoration including small scale habitat enhancement schemes, complex river restoration schemes and catchment scale restoration programs.

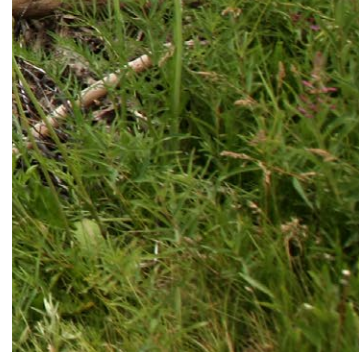
Our schemes deliver ecological and cultural improvements, providing multiple benefits that meet both the clients and regulators aspirations.

Stantec are providing strategic partnership support on a Southern Water river restoration scheme on the River Bewl, including a designated Site of Special Scientific Interest. The project was delivered working closely with local partners, including the Wild Trout Trust, to create and assess the effectiveness of enhancing natural processes through flow management, wetland features, gravel augmentation and woody debris. Partnership working with a broad range of stakeholders played a key role in the success of this project and helped to realise wider educational and engagement opportunities.

Examples of our work include:

- Inception and design of a new bypass channel to provide unobstructed fish passage past Oxford for the first time in centuries, bypassing three locks (Osney, Godstow and Kings).
- Naturalising a heavily modified watercourse, Hermitage Stream which runs through Dunsbury Park, that restored links between ancient riparian woodlands providing an effective wildlife corridor and enhancing ecological diversity.
- An award-winning program in the US to restore and maintain fish populations along 245 kilometres of the main stem of the San Joaquin River below Friant Dam.
- Natural Flood Risk Management and River Framework Directive Baseline assessment for the upper Allan Water.





Monitoring, Remote Sensing and Data Analytics



Unlocking the value of data to inform operational management

The exponential increase in sensor technology, data logging and management is generating vast amounts of spatial and temporal environmental data. Stantec has considerable expertise in advanced data analytics and modelling techniques to unlock this information to identify environmental risks and opportunities at the landscape scale, monitor change and predict likely future response, and thus achieve operational efficiencies through real time asset management.



Ops Genie

Ops Genie processes telemetry and open source information, validates the reliability of the data and applies data mining techniques to determine if the asset is in normal operating range. Built in Microsoft Azure, the results are displayed in a web-based application, with a simple system of visualization that draws attention to assets where there is likely to be a compliance failure.

Stantec has developed a **Riparian Health Assessment Tool** that uses satellite imagery to assess ecosystem health and target conservation / restoration activities at the catchment scale. Based on freely available Sentinel data this approach provides a rapid baseline assessment as well as the ability to monitor change through time.

Stantec Expertise

Paul Daily Water Group Director - Groundwater specialist

Paul is an experienced hydrogeologist and project director. He has applied his skills to a range of fields, including groundwater modelling, contaminant transport modelling, water resource assessment, low flow investigations, environmental impact assessment (for both infrastructure and extractive industries) and risk assessment.



Chris Mooij Strategic Technical Consultant for Water

Chris is responsible for building on Stantec's services and resources in the areas of asset and catchment solutions for the sector. Experienced at executive director level, Chris has worked with operators, regulators, non-government organisations and stakeholders for more than 25 years.



Chris Digman Technical Director, Urban Water Management

Professor Chris Digman is an expert and recognised technical leader in urban drainage. He specialises in wastewater and stormwater management, sustainable drainage (green stormwater infrastructure), flood risk management (from rainfall and blockages), pollution control and sewer solid movement. He has authored numerous industry technical guidance documents.



Rob Riddington Technical Specialist, River Restoration

Rob is a Chartered member of the ICE with over 20 years of experience in the flood risk and water management sector. He has specialist skills in flood management, river restoration, Water Framework Directive assessment, permitting and river engineering design. Rob has a reputation for developing practical solutions for Clients to meet their specific challenges.



Dr Russell Smith Technical Specialist, Catchment Science

Russell has over 20 years-experience in many aspects of catchment management from policy to delivery from a regulatory, consultancy, research and third sector perspective. His, specific technical expertise includes environmental system modelling, uncertainty analysis and water quality, in which he has published in peer review journals.



Bruce Horton Technical Specialist, Environmental Economics

Bruce Horton has over 15 years of experience in environmental and resource economics and policy. He has worked extensively for public and private sector organisations in the UK and internationally, predominantly in the water sector. He specialises in cost-benefit analysis (including valuation of non-market impacts) and natural capital accounting.



Kelvin Limbrick Project Technical Lead

Kelvin is a highly motivated and proactive Technical Lead for the Rivers and Catchments team, with over 15 years' experience within the consultancy industry. His core skills involve client care and management, technical management and the supervision and oversight of technical delivery within his team.





Design with
community in mind

Paul Daily

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