

SECTION 1: INTRODUCTION

1.1: The need for a Catchment Plan for the River Wandle

“We’re glad to see lots of people and organisations already looking after the River Wandle, and we want even more joined up planning and projects to improve the river”

- from Ketso community and stakeholder workshops

Chalk streams like the River Wandle are a rare and precious part of our cultural and ecological heritage.

The image of a pristine chalk stream or river, with constant flows of clean, clear water, and iconic native species like trout and mayflies, is recognised all over the world. Around 85% of the world’s chalk streams and rivers are located in southern and eastern England, and they still have the potential to provide a pristine environment for wildlife, as well as many benefits for people who live near them. Yet these globally-rare habitats face intense and mounting pressures, which have already forced many into a seriously degraded state.

The Wandle represents a microcosm of these pressures – from over-abstraction to pollution, urbanisation and invasion by non-native species. But these challenges also offer unique opportunities to restore and even recreate significant areas of habitat which have been described as England’s equivalent of the Arctic ice-caps or the Brazilian rainforest.

Since the 1960s, when the Wandle was fishless and effectively functioning as south London’s open sewer, the river’s environmental status has already seen astonishing improvements – to the extent that it was singled out as one of the six British rivers with the highest rate of improvement in 1972 (Shew, 2012) and once again hailed by the Environment Agency as one of the UK’s most improved rivers in 2011.

In 2007, after one of the most serious pollution incidents in the Wandle’s history, local communities and the statutory authorities agreed that sustainable recovery needed to be based on robust scientific evidence, strong partnerships around the river, and a long-term Catchment Plan. This would also contribute to meeting the objectives of the European Water Framework Directive (WFD), which requires the river to reach Good Ecological Potential by 2015 (with alternative target dates of 2021 and 2027 under certain circumstances).

Since the need for a Wandle Catchment Plan was agreed by local stakeholders in the Wandle catchment, the Catchment Based Approach to river management and restoration has been formally adopted by government as the best framework for delivering river improvements nationwide. As a result, the Wandle Catchment Plan now forms part of a UK-wide suite of strategy documents, each tailored to the individual requirements of their river catchments.

The Wandle Catchment Plan consists of two parts – the Vision (published in 2012) and this more technical document.

It is designed to be a ‘living’ document, to be updated in light of new and ongoing work and research. It is also designed to be aspirational: using robust science to identify what is strategically necessary to restore the river, and make it resilient to future pressures, rather than responding to political pressures which may be subject to change over time (thus bringing different delivery priorities and tactical opportunities to the fore).

And it represents the outstanding commitment of local communities and the statutory authorities to restore the Wandle “to be a naturally functioning and self-sustaining chalk stream, rich in biodiversity and a haven for Londoners”.

1.2: A shared Vision and Action Plan

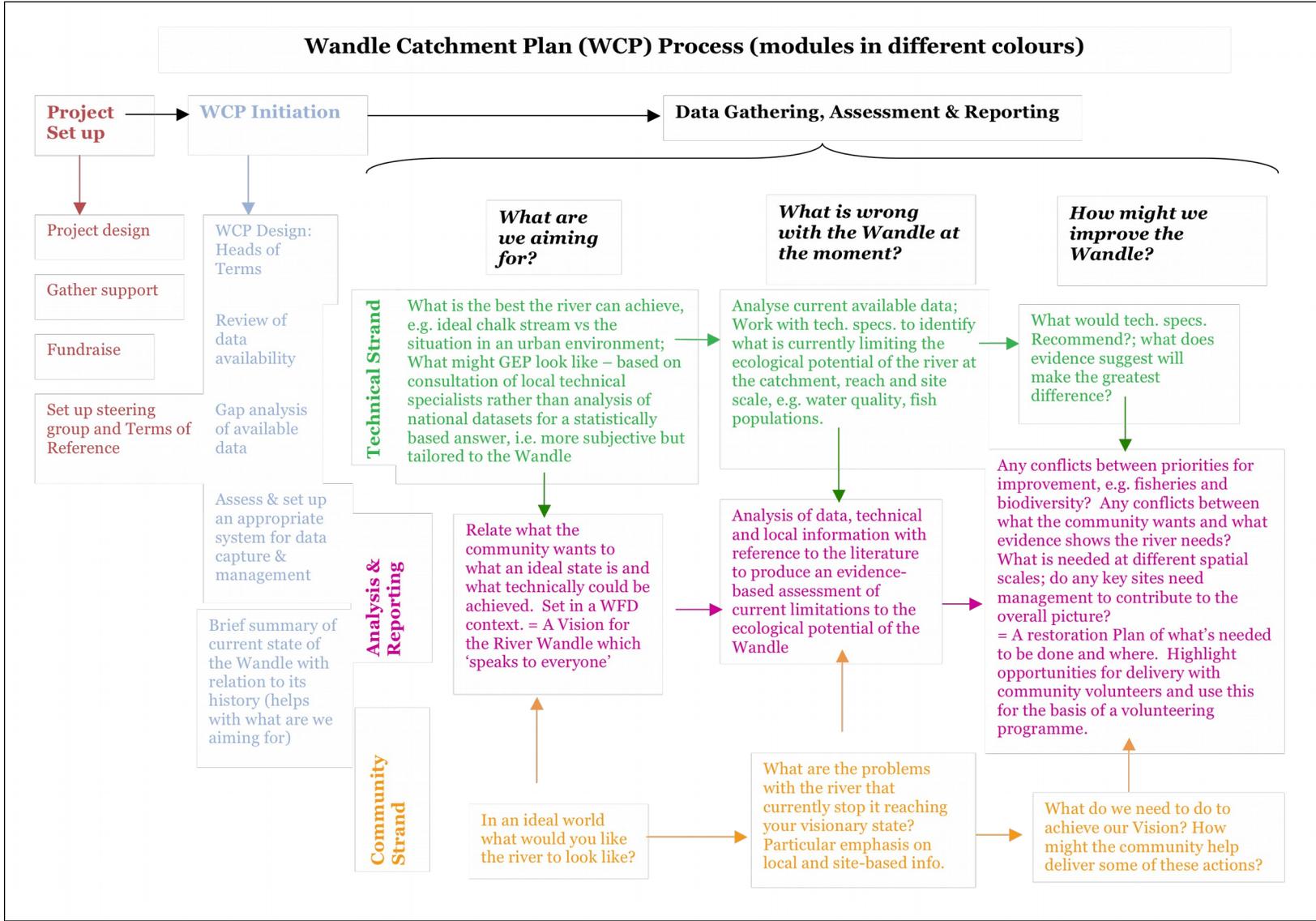
The Wandle Catchment Plan has been developed by means of a rigorous partnership process of investigation, using a double-stranded approach of community consultation underpinned by expert scientific guidance, as depicted in the flow chart below.

The creation and implementation of the Wandle Catchment Plan is a partnership project facilitated by the Wandle Trust, an environmental charity dedicated to restoring and maintaining the health of the River Wandle and its catchment. The Wandle Trust works closely with policy makers, land managers and statutory bodies in addition to engaging with the local community in outreach and education activities. This has made the charity a natural choice to lead the consultation on local people's Vision and Action Plan for their river, and develop and maintain the Wandle Catchment Plan in the future.

Strategic guidance has been provided by a Steering Group formed of representatives from local, regional and national organisations: the London Boroughs of Croydon, Sutton, Merton and Wandsworth, Environment Agency (EA), Natural England (NE), the National Trust (Morden Hall Park), Beddington Farmlands, Thames Water (TW), Sutton & East Surrey Water (S&ESW), Wandle Valley Regional Park Trust, WWF-UK, the Angling Trust, the Rivers Trust and London Wildlife Trust.

The Wandle Catchment Plan is composed of two parts:

- A shared Vision for the River Wandle outlining what the community (anyone with an interest in the Wandle) wants the river to look like in the future: this was published in October 2012
- An Action Plan of evidence-based Objectives, Targets, Actions and Projects to restore the river, maintain and enhance the ecosystem services it provides for people, and help it to achieve Good Ecological Potential under the European Water Framework Directive (WFD)



1.2.1: Community consultation

From the very first stages of creating the Wandle Catchment Plan, engagement with local stakeholders has been a key priority. The views of residents and other stakeholders have been at the heart of creating the shared Vision, and have guided the definition of Good Ecological Potential for this Action Plan.

By involving local communities in developing the first strand of the Catchment Plan, plans for future actions and projects have been designed to reflect their values and interests. As a result, it's hoped that these projects will be sustainably enhanced with long-term support from local people.

Four questions were posed during the consultation process, at group workshops and via a questionnaire (both in hard copy and electronically via the Wandle Trust website):

- What would they like the River Wandle to look like, in an ideal world? (vision)
- What is currently good about the River Wandle? (assets)
- What is currently bad about the River Wandle? (challenges and barriers)
- What could be done to help improve the River Wandle, and how could they be involved? (solutions)

Fifty-six different organisations and interest groups participated, involving approximately 500 people including councillors, residents' associations, local schools and angling clubs. Twenty-seven workshops took place across the London Boroughs of Croydon, Sutton, Merton and Wandsworth, and were run during the daytime, evenings and weekends to enable as many people as possible the opportunity to participate at a venue and time local and convenient to them. Questionnaires were handed out at local events (for instance, Morden May Fayre and Wandle Trust community river cleanups).

To enable everyone to have a say in a creative, hands-on format, a Ketso kit (www.ketso.com) was used as a consultative tool. This innovative tool is designed to encourage participation whilst preventing any one individual from dominating a workshop. Additionally, workshops were tailored to the groups' needs, for example creating a more discursive situation with people on hand to transcribe ideas if participants were less comfortable with writing. All participants were asked for feedback on the method used and content of the workshop and the results were overwhelmingly positive.

Participants were asked to provide contact details and their interest in volunteering to enhance the River Wandle. Options included desk-based and non-manual volunteering as well as physical activities such as planting native species, litter cleanups and surveying. This information has already increased the volunteer database within the catchment and fed into funding applications that encourage volunteer involvement.

1.2.2: A shared Vision

Participants' answers to the first question above ("What would you like the River Wandle to look like, in an ideal world?") were organised into themes. Several themes emerged as being important to local people, with four standing out in particular. All the comments made about these four themes were then examined again in full to create the wording of the shared Vision's final aims:

- Habitat and wildlife: the river supports a mosaic of habitats with high biodiversity
- Water: plentiful and clean, and varied in its flow speeds, widths and depths
- Good access: sympathetically managed pathways along the whole river

- Engagement: everyone in the catchment aware of the river and knowing how their actions can affect it. Councils, businesses, government agencies and the public working together for the river

Together, the participants' responses were used to create a shared Vision of:

“A naturally functioning and self-sustaining chalk river rich in biodiversity and a haven for Londoners”

The outputs from the workshops were then submitted for a second round of community consultation via the Wandle Trust website. In addition to ensuring transparency and checking for accuracy of interpretation, this was designed to demonstrate that the consultation responses were being used and kept the community informed and engaged with progress of the Catchment Plan.

The Vision is written in plain English for wide distribution throughout the catchment. It has been designed as an attractive, pocket-sized booklet, which is available both as a hard copy and to download in electronic (pdf) format. The Vision outlines the four aims that the local community identified as mattering most to them, and includes an illustrative map of the river, showing the main tributaries and associated stillwater bodies to set the river in the context of its wider landscape. It also describes the Wandle Catchment Plan mission to help the river attain Good Ecological Potential, and is a valuable promotional tool for the Wandle Catchment Plan.

1.2.3: Scientific guidance

In addition to strong local engagement, the robustness of the Wandle Catchment Plan rests on foundations of strong science. To this end, expert scientific evidence has been provided by Technical Advisory Groups (TAGs), with guidance based on scientific data analysis relating to the Wandle specifically, and drawing upon best practice experience of comparable scenarios elsewhere.

Academic researchers, practitioners and regulators discussed several topics: fish and fisheries, ground water and abstraction, the multi-stranded topic of surface water including flow, quality, ecotoxicology, flood risk management and storage, and how to define and measure Good Ecological Potential for the Wandle. Individuals with strong local knowledge and historic understanding of particular sites have also provided valuable input.

As the Wandle Catchment Plan is reviewed for the progress being made towards achieving GEP in the months and years to come, the TAGs will continue to play a vital role in expanding our knowledge and understanding, and ensuring that best practice principles and adaptive management techniques are adopted.

1.2.4: The Action Plan: its Objectives, Targets, Actions and Projects

A key outcome of the Wandle Catchment Plan is to detail clear means of delivering seven key Objectives which have been identified as central to achieving the Vision.

Two of the four Aims described in the Vision – Habitat and Wildlife, and Water – are clearly linked to WFD objectives (see Section 2).

Consequently, they form the focus of this initial stage of the Action Plan. The Action Plan Objectives describe the Targets and Actions that will help to restore the river, starting with those specifically aimed at achieving Good Ecological Potential, before moving onto wider ecological issues of importance. In this way it is hoped that the purpose of the Catchment Plan is clear: that

of fulfilling WFD requirements whilst also addressing the wider issues that matter regarding the health of the river and the enjoyment people can gain from it. These Objectives are detailed in Objectives tables at the end of the relevant sections of this Catchment Plan, and are supplemented by Projects tables in Appendix E.

Aim 1 (Water): Water is plentiful and clean, and varied in its flow speeds, widths and depths	
Objective 1: water quantity	Water supply in all sections of the river is sufficient to sustain a healthy population of native flora and fauna and is resilient to risk of drought or flood from extreme weather events or management for human use
Objective 2: water quality	Quality of water flowing in the River Wandle meets the standards required for Good Ecological Potential and is stable with no risk of deterioration
Objective 3: dynamics of flow	The river has a re-naturalised varied profile that creates a diversity of flow speeds and water quantity to provide all the key habitat types required by the native flora and fauna associated with lowland chalk streams
Aim 2 (Habitat and Wildlife): The river supports a mosaic of habitats with high biodiversity	
Objective 4: fish and fisheries	Thriving populations of native fish associated with chalk rivers are present and able to move freely
Objective 5: macrophytes, trees and the wider river habitat	Communities associated with chalk rivers are abundant along the river, providing good habitat variety for wildlife and for people
Objective 6: invertebrates	The diverse communities associated with chalk rivers are abundant along the river, playing important roles in ecosystem function and complexity, such as providing a food source for other wildlife
Objective 7: phytobenthos	Good populations associated with chalk rivers are present along the river
Aim 3 (Good Access): Local people can access sympathetically managed pathways along the whole river	
Aim 4 (Engagement): Everyone in the catchment is aware of the river, and knows how their actions can affect it. Councils, businesses, government agencies and the public work together to improve the river	

The Vision's Aims relating to Access and Engagement demonstrate local people's enthusiasm for being able to see or get to the river, and interact with it for a wide range of recreational, educational and cultural purposes.

These Ecosystem Services provided for people by the river are extremely important, since they reveal how the restoration of ecological processes has far wider benefits for society. As a result, the values placed by local people on the Ecosystem Service benefits derived from the river and its associated landscape are integral to the definition of Good Ecological Potential for the Wandle, and will help to shape the way future project work is carried out.

The relationship between the Catchment Plan's Aims, Objectives, Targets, Actions and Projects are depicted below:

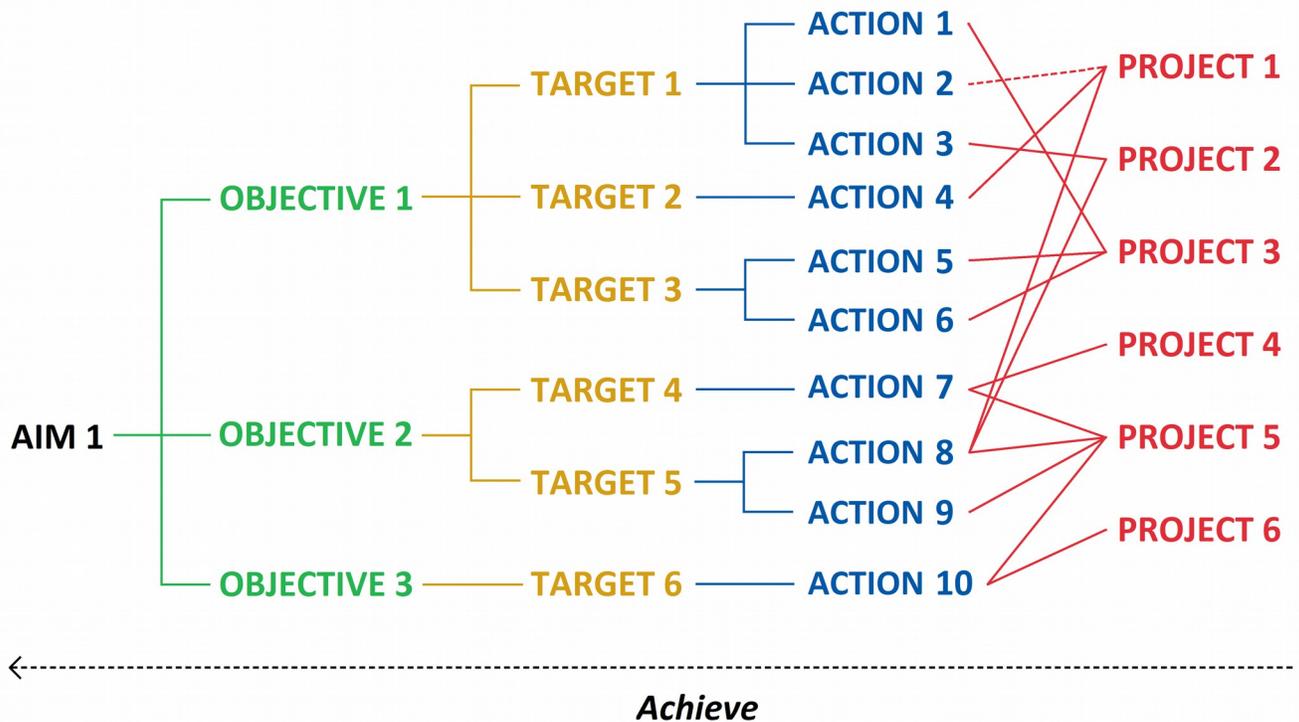


Fig 1a: The relationship between the Wandle Catchment Plan's Aims, Objectives, Targets, Actions and Projects. Each Project achieves multiple Actions.

It is important to note that the Wandle Catchment Plan is intended to focus on scientific issues directly relating to the river and its ecosystem, rather than wider socio-economic themes of access and engagement, which fall outside the direct scope of this Plan. It is anticipated that issues of access and engagement will be addressed by a separate process, for instance through the Wandle Forum's Access and Recreation Working Group, and the Wandle Valley Regional Park.

1.2.5: Existing and future projects

The final component of developing the Action Plan has been working with partners to identify projects that are already contributing to improving the ecological health of the river and its associated landscape now.

This information is presented in the Projects tables in Appendix E and demonstrates the significant levels of funding that are already being invested into improving the river. It also reveals the wide variety of projects being undertaken, and the effectiveness of partnership working on the Wandle, with many organisations already involved and benefiting from volunteer contributions along the full length of the river.

By drawing this information together and updating it regularly, existing partnerships can be strengthened, resources can be shared, and gap analysis can reveal priority areas for action where different groups could collaborate to achieve even greater success.

1.3: The Ecosystem Approach

The overall objective of the Wandle Catchment Plan is to present a holistic strategy for the river – not only to guide implementation of WFD requirements, but also to exceed these objectives with sound science and create a healthy river for people and wildlife. These societal values will play a direct role in how the Wandle is managed for future generations, and the Catchment Plan embraces this philosophy via the Ecosystem Approach.

The Ecosystem Approach, as adopted by the Convention on Biological Diversity in 2000, seeks to develop a strategy for integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Perhaps most significantly, it also recognises the importance of human choice in the management of natural resources.

In the Wandle catchment, the importance of community engagement has long been recognised as vital to the success of ecological enhancement works. Involving local stakeholders engenders deeper understanding of the natural environment and a sense of ownership, and from this understanding emerges a valuable interest in protecting it from destruction and degradation. Considerable community consultation, to identify societal values concerning the river, has been a feature of the Wandle Catchment Plan from the outset.

The Ecosystem Approach works holistically to maintain natural processes and look at likely outcomes of actions in the long-term and as a bigger picture, rather than focusing on the immediate and local scale. The Wandle Catchment Plan has looked at the many pressures and threats to the River Wandle, now and those that are likely in the future, and has identified the fundamental natural processes that should be prioritised for restoration if the river is to improve and attain Good Ecological Potential.

The Ecosystem Approach also helps to assess the best management approaches for the delivery of ecosystem services, which are further discussed in Section 9.

1.4: The Catchment Based Approach

The Catchment Based Approach (CaBA) to river management and restoration is an intuitive and scalable solution to the challenge of large-scale River Basin Management Planning which has arisen as a result of WFD.

Part of this approach includes WFD's requirement (under Article 14) to engage stakeholders through a more local focus, in order to develop a sense of common ownership of river catchment problems and solutions. Historic water and land management policies have tended to separate issues: CaBA considers water and land management holistically through the lens of ecosystem services (see Section 9) in order to achieve multiple environmental and social benefits (Catchment Change Network, 2014).

Between May 2011 and December 2012, a series of 25 Catchment Pilots were developed nationally to test this new approach. The Wandle was selected as one of an additional 38 catchments where seed funding was granted and lessons were learned, although full evaluation did not take place.

CaBA was launched in 2013, informed by lessons learned from the full range of catchments involved. This Catchment Plan is related to that process.

Further reading:

The Catchment Change Network's website: <http://www.catchmentchange.net/pilot-catchments/>

1.5: Cost Benefit Analysis

In early 2014 the EA undertook an extensive Cost Benefit Analysis (CBA) of all possible projects related to delivery of WFD on the Wandle, and the effect of these projects on ecosystem services provided by the river.

This analysis is designed to facilitate prioritisation of projects for completion before 2021, and it will also be incorporated into the next Thames River Basin Management Plan (RBMP). As such, the CBA will be available as part of the RBMP consultation process.

Further reading:

Environment Agency (2014) *Thames River Basin Management Plan (draft for consultation September 2014 – March 2015)*

1.6: Reference conditions, enhancement and restoration

Chalk streams and rivers present particular difficulties when it comes to deciding reference conditions for river restoration. As highly anthropogenically-modified systems, almost all chalk streams have been shaped by extensive re-engineering for water meadows, milling and other socio-economic functions, with abstraction and intensive urbanisation appearing as more recent factors.

Chalk stream headwaters are usually located some way down their topographic catchment, where the spring line breaks out of the aquifer. It is likely that the upper reaches of a natural chalk stream would be extensively braided in shifting channels through wet woodland, with heavy shading, and substantial inputs of woody debris creating constant diversions to flow (English Nature / Environment Agency, 2004)

Very few such reference conditions currently exist, except on the Bere Stream tributary of the Piddle, and a small stretch of the Wylde. Part of the upper Nar also supports similar habitat, with more formalised channel morphology due to relatively high hydraulic energy: this may be cognate to the steepness of the upper Wandle. No British examples of unmodified larger chalk rivers now survive (English Nature / Environment Agency, 2004).

As a result of massive urbanisation throughout its lower catchment, returning any part of the Wandle to such a primordial state is likely to be difficult. However, the task may be facilitated by concentrating on reactivating natural fluvial functions and processes rather than restoring actual physical structures.

In 2010 the EA's Rivers and Streams Habitat Action Plan Steering Group published the following definitions, drawing a clear distinction between 'enhancement' and 'restoration':

- **Enhancement** is defined as instream habitat enhancement, channel-narrowing, removal of weirs or barriers, establishment of buffer zones through riparian fencing or tree planting, and wetland creation within 10 metres of the channel. Also appropriate agreement and implementation of ongoing planned management activity. Enhancement projects include restoration work.

- **Restoration** is defined as measures that result in a significant increase in diversity of hydromorphological features and / or improved floodplain connectivity and the restoration of river function through essential physical or biological processes, including flooding, sediment transport and the facilitation of species movement.

Perhaps ironically, restoring the Wandle's natural ecological processes is likely to be more realistic in its modern post-industrial urban setting than attempting to revert the river to a Mesolithic-era wildwood reference condition.

Restoring natural processes will make the river more resilient to pressures such as pollution, invasive non-native species and severe weather events caused by climate change. It will also help the Wandle to support a wide range of flora and fauna, and improve provision of the many ecosystem service benefits which are important to local people, including access, recreational activities, aesthetic appeal and cultural heritage.

It should be noted that prior written consent from the EA is required for any works in, under, over or within 8 metres of the top of the bank, or within 16 metres of the landward toe of a tidal defence, under the terms of the Water Resources Act 1991 and Thames Region Land Drainage Byelaws 1981. Any proposed works must demonstrate no increase in flood risk to third party property or land.

1.7: Monitoring

Monitoring long-term changes, whether as a result of deliberate enhancement activities or any other influences, is a critically important part of the process of environmental management. Despite the potential for significant learnings, however, the importance of scientific monitoring is not widely recognised by funders, and sufficiently long-term funding of this nature is almost always difficult to obtain.

It is the view of all partners involved in this Catchment Plan that well-designed, long-term monitoring should be viewed as an essential component of any project undertaken to restore or enhance the River Wandle.

1.8: The focus of the Wandle Catchment Plan

“From local volunteers to councils and businesses, we want everyone to co-operate and make sustainable long-term commitments to improving the river”

- from Ketso community and stakeholder workshops

The Wandle Catchment Plan is designed to be an aspirational, 'living' document underpinned by scientific evidence, best practice and the values of the community.

Regular reviews and updates will enable it to remain relevant and useful to stakeholders, and to feed highly relevant and actionable information into the Thames River Basin Management Plan. It will also facilitate changes in approach whenever necessary: for example when new research identifies ways to address challenges that could not be tackled previously, or when new funding streams become available.

The overarching aims of the Catchment Plan are:

- To draw together data and knowledge on the Wandle catchment and evaluate it in light of current and future pressures to identify optimum solutions for improving the river
- To present a Vision for the River Wandle that has strong stakeholder (including community) buy-in
- To investigate and define Good Ecological Potential (GEP) for the River Wandle
- To investigate the Ecosystem Services offered by the River Wandle, and identify added benefits of attaining GEP
- To identify a suite of Objectives, Targets, Actions required to realise GEP
- To identify projects and measures required to realise GEP and, where possible, their associated costs

For the purposes of this Catchment Plan, the River Wandle system has been divided into eight reaches based on the local distinctiveness of their physico-chemical and morphological surface water character and fish populations. These divisions were agreed in discussion with the Fish and Surface Water TAGs. Distinguishing these reaches will enable rehabilitation measures to be targeted more effectively and will facilitate monitoring of progress towards attaining GEP. They are (see also Fig 1b):

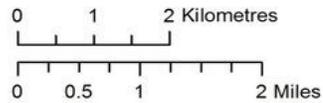
1. Carshalton water body (Carshalton Ponds source to confluence with Croydon branch at Wilderness Island)
2. Beddington reach (Croydon source to confluence with Carshalton branch at Wilderness Island)
3. Confluence to Beddington Sewage Treatment Works effluent carrier outflow at Mill Green
4. Effluent carrier (the outflow from Beddington STW at Mill Green)
5. Effluent carrier to confluence with River Graveney
6. River Graveney (including the Norbury Brook)
7. Confluence with River Graveney to tidal creek (EDF weir)
8. Tidal creek to mouth of the River Thames

In future, additional ephemeral reaches may be added: for instance, the Grotto arm of the river through Carshalton.

The River Graveney joins the Wandle at two points: by Connolly's Mill below Wandle Park in Merton, and adjacent to Waterside Way industrial estate via a culvert siphon under Tooting High Street. The main flow emerges from this latter, downstream point and is the most meaningful dividing point between functioning reaches on the Wandle.

Some experts in the Fish and Surface Water TAGs have noted that they are unable to identify distinct differences in the characteristics between some of these reaches: for example, with regard to water quality, because it is not currently possible to assess water quality separately for each of these proposed reaches, due to a lack of sufficient EA monitoring sites or other data. However, expert opinion within the TAGs suggests that there are likely to be different characteristics between these reaches, and that monitoring is likely to confirm this.

It is therefore strongly recommended that additional monitoring be adopted as soon as possible to fill gaps in current knowledge, and it has been agreed that river restoration efforts should initially be focused on reaches 1, 2, 3, 5 and 7 where the greatest opportunities for improvement may be found.



Legend

-  EDF weir to mouth of Thames
-  R. Graveney confluence (near Haydons Rd rail station) to tidal creek boundary (EDF weir)
-  R. Graveney / Norbury Brook
-  Effluent carrier outflow (joining main Wandle at Mill Green) to confluence with R. Graveney
-  Effluent carrier (from Beddington Park to Mill Green)
-  Confluence (at W.I.) to effluent carrier outflow (joining main Wandle at Mill Green)
-  Beddington branch (to confluence at Wilderness Island)
-  Carshalton branch (to confluence at Wilderness Island)

Fig 1b: The eight functioning reaches of the River Wandle identified for the purposes of the Wandle Catchment Plan.

1.9: Next steps: a living document

The Wandle Catchment Plan is not the first strategic document to address the health of the river and its surrounding landscapes.

Many strategies and local plans already address various site- or issue-specific challenges related to the ecological health of the river and the benefits it provides for local people. Examples include those written by local councils, the National Rivers Authority (NRA) and its successor the EA, and the water companies Thames Water and Sutton & East Surrey Water. Some of these plans pre-date the Water Framework Directive or do not address it directly. Many are difficult to access because they were published in non-digital formats, or were written primarily for internal use.

This first iteration of this aspirational Catchment Plan will facilitate a gap analysis for the River Wandle and its catchment – not only pertaining to Actions that currently have no projects to deliver them, or those that are being delivered incompletely and require further support - but also to identify where further research and liaison with partners are needed before projects can go ahead.

Once this has been achieved, priorities for action can be highlighted based on criteria including contribution to delivering GEP, timescales and status within the sequence of activities required, ecosystem service benefits, and social and political interest amongst others. It should also be possible to identify aspirational projects to work towards GEP and wider ecosystem benefits. This will enable partners to pool resources, develop joint strategies and make funding applications to carry out such projects.

The Wandle Catchment Plan aims to identify knowledge gaps, draw existing plans together and build on the wealth of experience they represent, in order to understand the whole catchment more fully.

Everyone involved hopes that it will encourage new research where gaps in our knowledge need to be filled, as well as many future projects where partnership working will produce better results and multiple benefits for the river and its communities. The Wandle Catchment Plan will also seek to establish regular monitoring of all WFD elements, using standard methods, to ensure there are no data gaps and that a robust baseline exists for measurement of future changes. To this end, and to facilitate targeting resources for restoring the river, a pilot Urban River Survey project is proposed to assess the characteristics of river reaches and facilitate the targeting of resources in rehabilitating the river.

Ongoing liaison with the Steering Group and TAGs will continue, in addition to knowledge exchanges with other chalk river and urban catchments undergoing restoration. This will make it easier to share information and build relations with further teams and individuals, such as the water companies' water resource teams and the EA's flood risk management staff, to achieve greater integrated working and success.