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Friends of Bradford's Becks

Cleaning up the Beck for a better Bradford

A proposal for investment in AMP7 to support a collaborative, catchment-based approach to water quality and regeneration for the Bradford Beck

Barney Lerner for the Friends of Bradford's Becks, 24th July 2017

Summary

The Friends of Bradford's Becks (FoBB) have been working since 2013 to implement an agreed catchment plan and improve the Beck and its tributaries for the benefit of the city and the water environment. We have been successful in raising awareness of the becks but we are unable to address some of the fundamental problems on our own, including[1]:

- *Poor ecological quality*
- *Significant sewage pollution which does not seem to show in official data*
- *Aesthetically poor condition of the Beck inhibiting urban regeneration*
- *Incomplete knowledge of the drainage system preventing pollution tracing*
- *Culverted watercourses under old industrial areas that are hard to inspect*
- *Misuse of toilets for waste disposal*

A collaborative, multi-agency approach could address these issues to the benefit of the chemical and ecological quality of the water bodies and the attractiveness and regeneration of the city. These issues cannot be resolved without some serious technical projects in support, funded through AMP7 investment by Yorkshire Water. With technical projects driving water quality improvements, the collaboration would be able to undertake softer activities to engage the community in developing a water-wise city and begin to re-naturalise the river.

We request that a plan for investment in a detailed investigation of the causes and the subsequent elimination of urban pollution in Bradford Beck catchment is included by Yorkshire Water in their PR19 submission. *FoBB would be pleased to work with and Yorkshire Water others to develop the detailed investigation and subsequent remediation plan.*

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[1] Surface water and sewer flooding risks are not discussed here

Background

The Bradford Beck catchment of 58 km^2 underlies the heart of Bradford and is home to about 200,000 people. As shown in Figure 1, all of the becks within the urban area have been culverted or canalised, from the confluence of Middle Brook and Chellow Dene to the River Aire at Shipley. These small rivers have 51 CSOs (combined sewer overflows) on them, as well as unknown numbers of surface water drains (there is no unified map of the drainage system). Some of the watercourses have been 'lost' as they have been culverted over the years; some smaller ones have become part of the sewerage system.

Problems with water quality in the Beck have been ongoing since the early 19th century. In 2002-4, Yorkshire Water made major Urban Pollution Management investments, installing storm tanks, reducing the number of CSOs (to 51), and installing screens (Caudwell, 2004). As industry moved away and treatment improved, quality also got better. Under the old GQA (General Quality Assessment), the Beck finally reached Grade A in 2009.

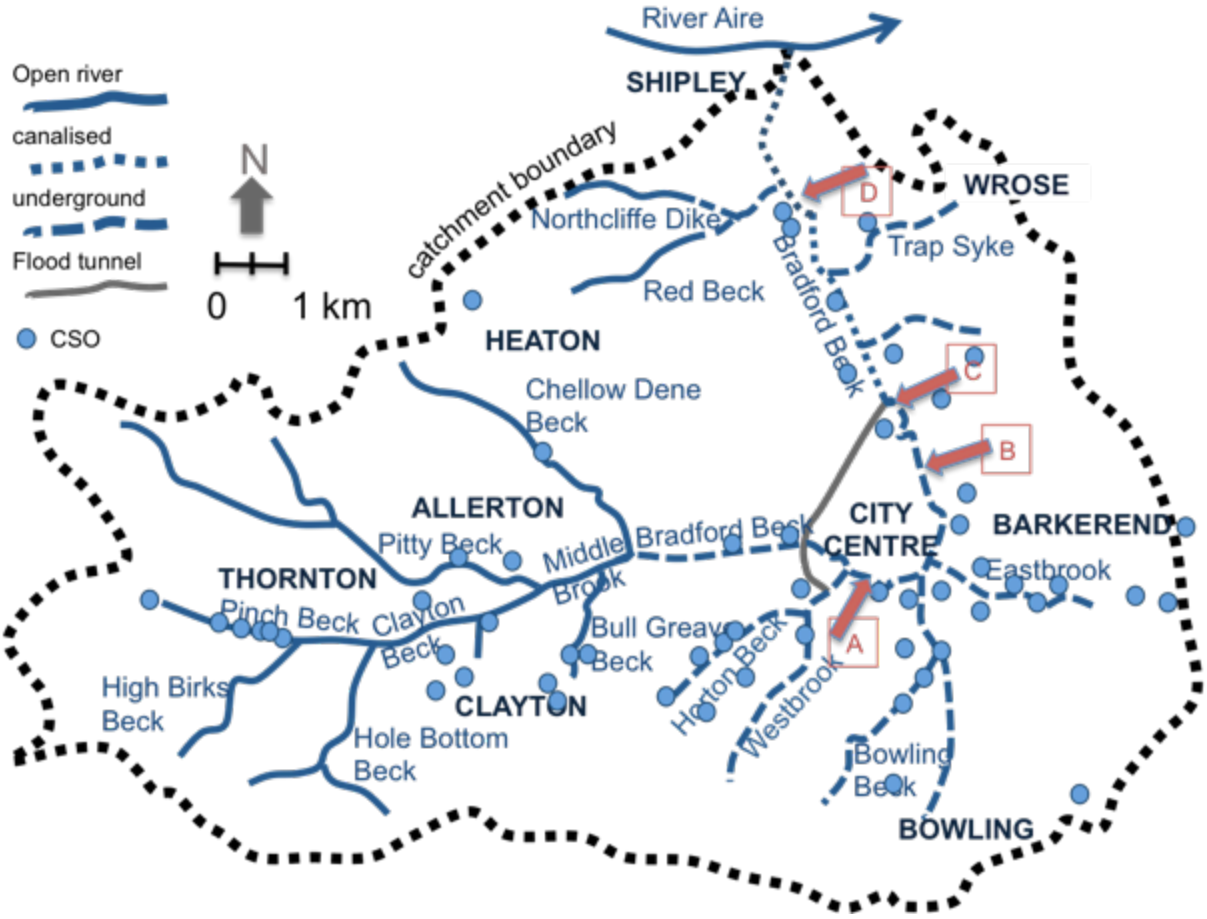

Figure 1. The Bradford Beck catchment, showing the character of the Beck and its tributaries, the approximate locations of CSOs, and the visual observation points A-D referred to in the text.

The WFD (Water Framework Directive) assessment of the single, heavily modified, water body in 2009 was *poor potential* for ecological quality and *good* for chemical quality. The 2016 assessment is summarised in Table 1 (now two water bodies). Our data, discussed below, suggests that the terms *moderate* for ecology and *good* for chemical quality do not reflect the actual position.

Table 1. Summary of 2016 WFD assessment of Bradford Beck's water bodies.

Clayton Beck (upstream)	
Not designated artificial or heavily modified	
Ecological quality	Moderate
Chemical quality	Good
Bradford Beck (downstream)	
Heavily modified	
Ecological quality	Moderate
Chemical quality	Good

The history of Bradford's relationship with the Beck reflects the changing nature of the city and its industry (Lerner, 2017). Initially a source of water and power, it became an open sewer in the early 19th century and was mostly culverted by the beginning of the 20th century. In more recent times, clean, visible rivers have been seen as an asset to cities, helping to drive regeneration and improve communities. The Allsop master plan for Bradford in 2004 featured wetlands, daylighting of becks, and a city centre lake as core elements in a blue-green corridor from Thornton Rd to Canal Rd. (although only the city centre lake has happened so far and that is not actually connected to the Beck). The draft Area Action Plans for Shipley-Canal Rd and the City Centre proposed daylighting in association with redevelopments in the Canal Rd area. The first housing development is now underway alongside the Beck at Shipley. All of these river-based regeneration ideas will be harmed by poor chemical and aesthetic condition of the Beck.

In 2012, ART (Aire Rivers Trust) prepared a catchment plan for Bradford's Becks through community consultation, supported by funding from the Environment Agency (ART, 2013). The plan received support from the Environment Agency, Yorkshire and Bradford Council (Environment Scrutiny Committee). FOBB (Friends of Bradford's Becks) was formed to take the six visions forward (Figure 2), setting out to raise awareness of the becks and work towards their improvement. The group has:

- Put in at least 2,500 hours of voluntary effort, much of it committed to improving the physical appearance of the beck.
- Raised over £20,000 in donations.
- Organised multiple events including a city centre celebration on World Rivers Day (Sept 2016) which was attended by several thousand people.
- Created a plaque trail marking the route of the culverted Bradford Beck under the city centre, entirely funded by donations.
- Launched a guide to walks around the catchment which includes a guide to preventing and reporting pollution (funded by CaBA, the Catchment Based Approach).
- Monitored the Beck for pollution.

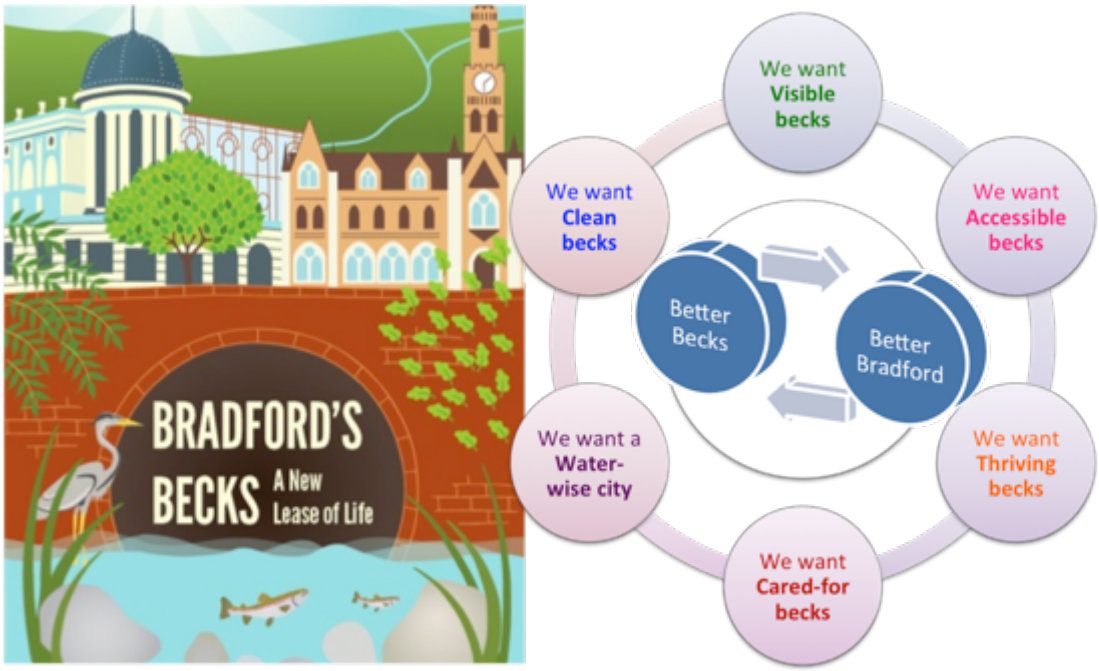

Figure 2. The cover of the Catchment Management Plan for Bradford's Becks, and the six visions at the heart of the plan (ART, 2013).

Recent observations

Over the period November 2016 to May 2017, with funding and support from the EA, the FOBB made over 600 individual observations of the visual and olfactory state of Bradford Beck and tributaries. We were looking at the general state of the water for pollution, and inspecting a number of surface water outfalls (SSOs) and combined sewer outfalls (CSOs) where we suspected pollution was occurring. Only 18 sites could be easily inspected because so much of the becks are culverted or otherwise inaccessible. This includes the majority of the CSOs, which discharge into culverted reaches.

Incidents

33 separate incidents of pollution were discovered and recorded at 14 separate sites along the Bradford Beck system and reported to the appropriate authorities. A summary of the incidents is given in Table 2.

Table 2. Summary of pollution incidents on Bradford Beck and tributaries, Nov 2016 – May 2017

Type of Incident	Number
Sewage	12
Construction	7
Abuse of drains	5
Fly tipping	3
Industrial	2
Misconnection	2
Agricultural	1
Surface run off	1

Notable incidents include:

- the SSO at Boggart Woods (Pitty Beck) which has been flowing sewage almost continuously. YW did some works to correct a misconnected sewer, but problems continue.
- Farmers Boy factory where we have caught short-lived industrial discharges from an SSO on 2 occasions, and seen evidence on the outfall apron to suggest that other incidents have occurred when we weren't watching.

Other misconnections

We have sufficient observations to compare the colour and smell of the Beck at four sites from just upstream of the city centre to near Shipley. The sites are shown on Figure 1 and are as follows:

- A – Westholme St, upstream of city centre
- B – Amber Mill, at the end of the main culvert (Forster Square retail park)
- C – Valley Mills, just before the end of the flood alleviation tunnel
- D – Poplar Rd, Shipley.

At the upstream end, site A, discolouration of the Beck was obvious on 4 of 25 dry days. At the downstream end, site D, 32 of 34 dry days had discolouration and/or smells; in other words the Beck is visually polluted at Poplar Rd on almost every dry day. The upper right photograph in Figure 3 shows the discoloration which is typical here. Skipton Properties, the developer of the housing site at Crag Rd, Shipley, has complained vigorously of the obviously polluted nature at the Beck alongside his site.

The large increase in polluted days between up- and down-stream is clear evidence of multiple, hidden discharges in the city. Some locational information on these hidden discharges can be gleaned by comparing our observations on the same days for the various sites. Table 3 summarises this analysis and shows that there are sewage discharges on dry days in all urban reaches of the river.

Table 3. Summary of the comparison between visual observation points A-D.

Reach of Bradford Beck	A to B	B to C	C to D
Number of observations on the same days	43	37	36
Number of additional visually polluted days at downstream location	5	9	14
Number of additional smelly days at downstream location	9	17	1

Sanitary litter

From the public's perspective, one of the worst detractions from the quality of the Beck is the large amount of plastic and sanitary litter caught up in the vegetation along its banks. Some examples are shown in Figure 3; the litter can be several metres above the normal water line. FOBB has painstakingly removed such material from several reaches during litterpicks, only to find that it is back again the following year.

The Bradford Beck is a small river with an average flow of only 0.6 m^3/s. It is also very flashy due to the steepness of the catchment and the high degree of urbanisation. The

maximum recorded daily flow is 13.8 m^3/s, 200 times greater than the average; the absolute peak within a day will be much higher.

We do not know how often the CSOs discharge into the Bradford Beck, nor how often the screens are bypassed by high flow rates. However, the typical CSO consent is for 3-5 discharges per year; presumably the expected frequency of bypass of a screen is less than once per year. So why do we see so much sanitary litter? With, say, a bypass return period of 5 years, we might expect 10 incidents per year (20% of 51 CSOs, assuming independence). With an electro-mechanical failure rate of screens of just 10% per year, we would expect a further 3-4 incidents per year (10% of 35 screens, assuming independence). With 51 mostly invisible CSOs discharging through 35 hidden screens, it is perhaps not surprising that sanitary litter is a common occurrence. We suggest that a review of CSO consenting on Bradford Beck, and other small catchments, should consider the CSOs as a group, not individually.

Figure 3. Examples of sanitary litter in vegetation along the Bradford Beck (lower picture from Wading to Shipley).

There is an associated national (and worldwide) problem of the use of toilets to dispose of sanitary wastes. This is exacerbated by the current problem about non-degradable wipes which consumers believe are "flushable". Is Bradford typical in this regard or do we have a worse problem? National action is needed on labelling, and a local educational campaign, drawing on previous research, would help to raise awareness of

good behaviour. Whilst we recognise that YWS is taking action to educate customers about 'non-flushables', we believe that there is more to do in this regard.

A way forward

To summarise the issues:

- Poor ecological quality
- Significant evidence of sewage pollution, even if it doesn't show in the official data
- Aesthetically poor condition of the Beck inhibiting urban regeneration
- Incomplete knowledge of the drainage system
- Culverted watercourses that are hard to inspect and which run under old industrial areas.

It is evident that much, if not most, of the pollution seen in the becks is sewage-related and hence we believe that Yorkshire Water have a duty to investigate and deal with the problems. In their Blueprint for Yorkshire, Yorkshire Water has identified seven outcomes for the company and customers, of which three are directly relevant here, namely:

- We protect and improve the water environment.
- We understand our impact on the wider environment and act responsibly.
- We take care of your waste water and protect you and the environment from sewer flooding.

The issues of water and ecological quality of the becks and the aesthetics and regeneration of Bradford are complex and intertwined. There are multiple stakeholders (EA, YW, Bradford Council, FOBB and other community groups, hundreds of businesses, developers and 200,000 people). The regulatory framework is complex, particularly around misconnections. There is an educational need around flushable wastes and misconnections, both domestic and industrial. Surely this is a classic situation for a collaborative catchment-based approach? Instead of approaching it as a regulatory problem with potentially adversarial relationships, the organisations should collaborate towards common objectives, looking for the best solution. Having grown out of the 2012 catchment plan, the Friends of Bradford's Becks would be delighted to join such an initiative!

However, resolution of these issues cannot be accomplished without significant resources and some serious technical projects in support. These might include:

- Creating a complete map of the drainage system by (a) including Bradford Council's records of surface water drainage into the YW's GIS, (b) physically mapping all outfalls and checking where they come from, (c) sharing this information with all groups.
- Reviewing the performance of the entire sewage and storm drainage system, checking for capacity problems and misconnections.
- Monitoring and analysing the behaviour of all CSOs and screens to understand discharge and bypass frequencies, and considering adjustments to maintenance regimes.

- Setting up continuous monitors in multiple locations and identifying sampling locations throughout the hard-to-access network so that short-lived illegitimate discharges can be detected and traced back to source.

Such a programme of technical work requires investment by Yorkshire Water, and we encourage its inclusion in PR19 in order that funds become available in AMP7.

With such good technical support in the background, the collaboration could also undertake such actions as:

- Educational projects on flushables, fats and oils and misconnections.
- Raising awareness in the general population of the Beck as an asset.
- Planning guidance and Council action to encourage use of SuDS on new builds, renovations, highways and the public realm.
- Renaturalisation of some reaches, improving visibility and accessibility.
- River Stewardship, with third sector organisations supporting riparian owners to maintain the banks and bed, clear litter, manage vegetation, and act as flood and pollution wardens.
- Support for businesses to check (and correct) their drains for misconnections.

This paper is intended to stimulate a commitment to a detailed investigation of the causes of, and the subsequent elimination, urban pollution in Bradford Beck catchment. FoBB would be pleased to work with all relevant agencies to develop the investigation and remediation plan, and to support future collaboration on the wider aspects of improving the becks and Bradford. We request that Yorkshire Water includes such a plan for investment in their PR19 submission.

References

ART (Aire Rivers Trust), 2013. Bradford's Becks: a new lease of life. A plan for the 21st century. Main report and appendices (https://bradford-beck.org/six-visions/)

Caudwell, M., 2004. Bradford UPM – Modelling the Change. Paper presented to the WaPUG Spring Meeting, 23rd April. 5 pages.

Lerner, D., 2017. The Bradford Beck. *The Bradford Antiquary*, Sept 2017 issue, pages 88-99.