The River Cam Manifesto

This paper is a plea from *the Cam Valley Forum* addressed to everyone who lives in South Cambridgeshire, in Cambridge City or who knows or loves the River Cam.

We are asking everyone to wake up to the fact that all is not well with our river.

The Cam Valley Forum is a not-for-profit charitable association of local individuals, from diverse environmental and recreational groups that are concerned directly or indirectly with the River Cam and its tributary streams. CVF's mission is to actively defend the River Cam's health and wellbeing - for the sake of its wildlife and environment, for the sake of the many people that enjoy the river and who want to safeguard the River Cam's historic and cultural importance.

For these reasons we address here the various councils and the planning authorities, the Water Companies, the Environment Agency, the farmers and landowners and all business and housing developers. We are very aware that the new combined Cambridgeshire County Council and South Cambridgeshire District Council's next Local Plan is at a very formative stage of development.

The reality is that for too long we have not honoured our river sufficiently with protection or understood its real nature. The pressures of our current life style, which is resource dependent, lacks an appreciation of natural systems and carries the strong probability that future infrastructure development will continue on the same lines. This should make us all fear for the future. Many factors are key to the problem (we list ten in depth) and they need to be better understood by every informed citizen.

Summary

1. The River Cam does not have enough water flow to function properly. We have caused this to be the case. It is not just 'the weather'
2. Cambridgeshire is a naturally low rainfall area, but this is not the only reason for poor river flows. Our rainfall is very variable.
3. Over abstraction of water from the ground is the main reason. We pump too much water out of the chalk for our domestic supplies and, to a smaller extent, for agriculture. Water abstraction should not be viewed as a 'right' but only as a privilege.
4. The Chalk hills near Cambridge are where the water comes from. Chalk streams are very special (we have 85% of the worlds total) and we will lose them in England if we are not careful.
5. The Environment Agency already pumps extra water from the Chalk to support stream flows. This help is not enough and is only done because we have taken too much.
6. Most would agree that we should aim for sustainable development where we do not cause harm to our environment or compromise the needs of future generations.
7. Low river flows are added to by insufficiently treated water from sewage works. This is why the upper Cam is largely classed as of 'poor' water quality. Our wild plants and animals have an entitlement to the quality water our environment can provide.
8. A river, such as ours, can be better managed to be more resilient. This will help ease the problems of climate change, and both the occasional flooding and drought.
9. Saving water will help the river Cam. Here there is much we can all do.
10. Helping the river requires us to reassess our values. Our rivers could be cleaner healthier and something to be really proud of. We need to take action now.

Why is there this river problem and what can we do about it?

1. Our Water Cycle

This is where our thinking needs to begin. Everywhere on earth there is a water cycle. Rain and snowfall brings water down from the atmosphere. Water readily dries up, so evaporation from wet surfaces (or evapotranspiration of that water by plants) returns much of it back again up into the air. The atmosphere is always moist, even in the driest deserts, but useful rain is what we always need from it and which we must have to obtain fresh water.

Rain is commonly gathered up - as fresh flowing water - in its geographical catchment basin. That catchment brings together the water from springs, ditches, drains and tiny brooks into larger streams, lodes and rivers. For us, the tributaries of the Cam gather water south of Cambridge and flow north to the Wash and the sea.

Rainfall in Cambridgeshire is as low as anywhere else in Great Britain. It is commonly about 50-60 cm per annum and only a very small fraction of that rainfall ever reaches the sea. Although there is less rain here, what rain we get varies - annually, seasonally and episodically. We must therefore expect, at the extremes, both periodic droughts and, occasionally, massive downpours resulting in major floods.

Water that percolates into the ground provides over 90% of the needs of the water companies in this area; we have few reservoirs. Water comes to our homes, from these suppliers, through the water mains and taps, and then some of that goes off to the sewage treatment works. Once there it will evaporate further and be returned to a river. Water is a brilliant solvent so the river has innumerable chemicals and contaminants dissolved within its water. Our water is both a cleansing agent and a transport vehicle for washing everything away.

We have greatly modified our natural water cycle, by building dams, by irrigation, by pumping up deep stores of water, by pumping treated tap water along great networks of supply, or as waste water along underground sewers. There is much infrastructure. Our natural catchment boundaries do not necessarily follow the same lines as our political districts or our County boundaries. Thus pollutants flow into the Cam, coming from Essex, and some of 'our' Cambridgeshire groundwater may also be taken away, to the south of us by Hertfordshire and London. We must accept this 'shared catchment' and we must all work together across boundaries to improve our water cycle.

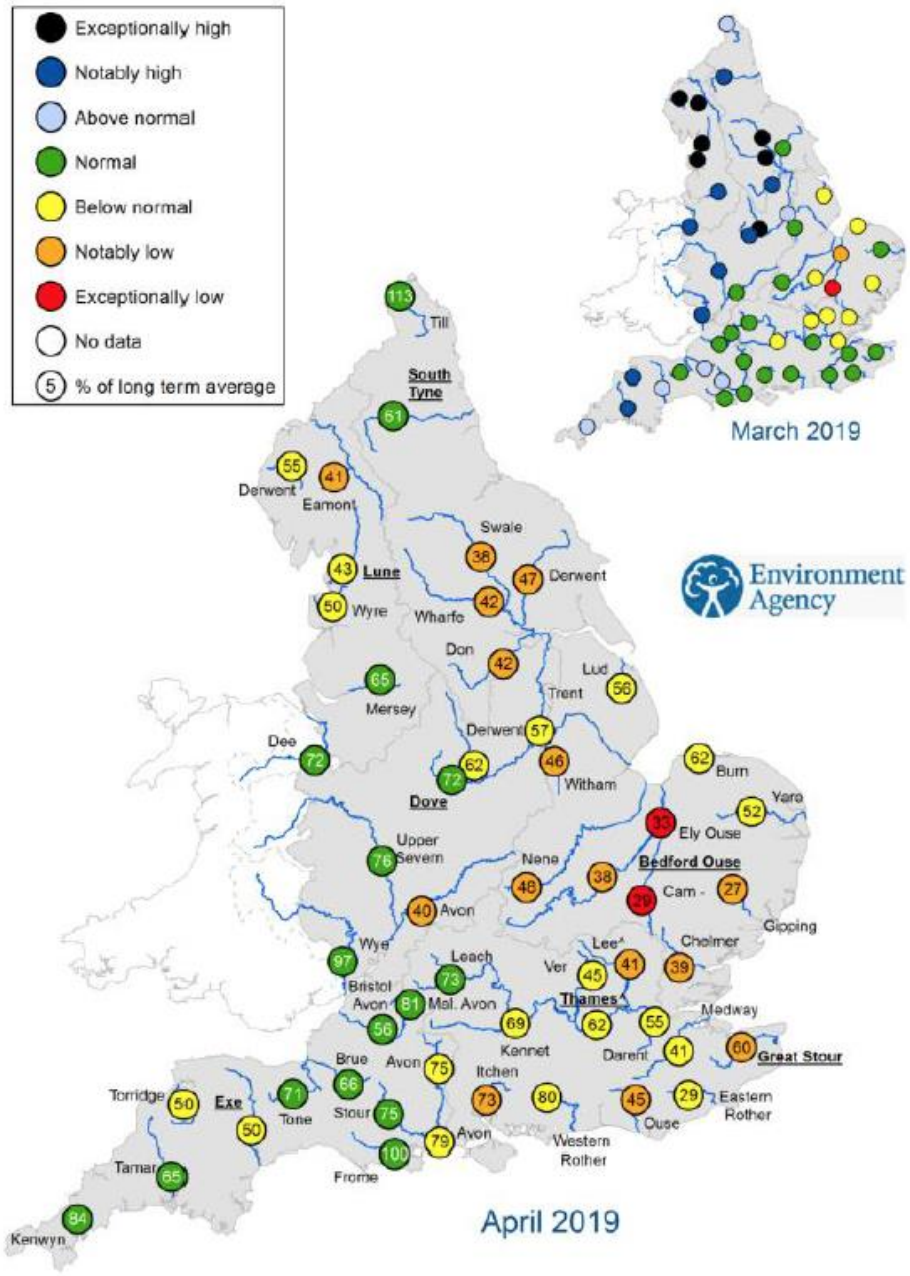
2. Rainfall, water table and climate change.

For decades Cambridge has had a mean annual rainfall of 56 cm (22 inches). The mean over 60 years is *substantially unaltered*. However, the annual rainfall commonly varies considerably, so it is not a steady constant, but owing to the fact that much of our catchment's geology is Cretaceous Chalk, much of the rain that we do get readily infiltrates to become groundwater. This fact *cushions the variability* and we are fortunate to have this resilient below-ground reservoir. It would seem sensible to maintain this **water quality and quantity at all costs**. Despite this the water table around Cambridge has fallen steadily over more than the past century and all the springs sourced from this Chalk aquifer and their downstream watercourses are now regularly depleted. This is not widely recognised, despite good historical and adequate recent evidence. The Environment Agency is arguably insufficiently empowered to control our water use. In their defence, the water companies are obliged to supply water to any customer that wants it. Thus the pressure for 'licensing' just goes on growing relentlessly.

Concerns about there being too little flow in our rivers is often voiced by numerous small river and stream-side communities in South and East Cambridgeshire, whose streams run dry, and this is not often headline news. But in the spring of 2019 (this year) the Wilbraham river was dry along some of its length and *The*

Times newspaper reported the Environment Agency's observation that in May **the River Cam was at its lowest level of flow since records began in 1949**.

The figure below comes from the Rivers Trust publication "Chalk Streams in Crisis" published in July 2019, showing Environment Agency River Flow data.

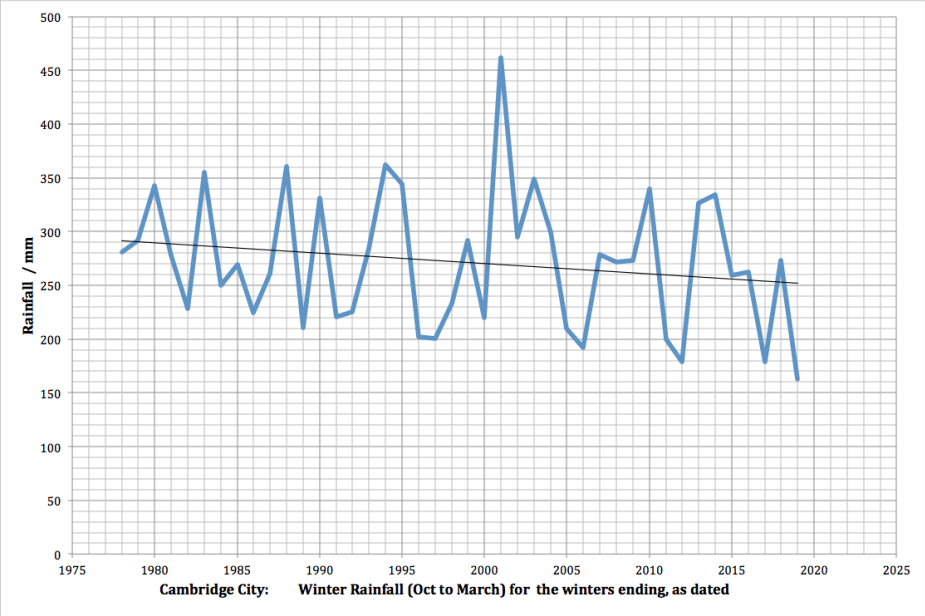


River flow rates, as a percentage of long term average

The river flow deficit we experienced cannot be attributed to changed annual rainfall totals alone nor even just to 'climate change'. The latter will most likely increase the variability of rainfall, year on year, so it may well have contributed to this drought, but the fact of that increasing variability demands a better managing of the environment for a resilience that it increasingly seems to lack.

It is most important, in Cambridgeshire, to understand that the summer rainfall (April to September) is largely taken up by plants and transpired back to the atmosphere. Winter rain (October to March) is, principally, what recharges the groundwater. The monthly and annual variation in rainfall is possibly greater now, but it is not really any great change in overall rainfall pattern that most threatens us. There may possibly be a small downward trend in winter rainfall over the past **40 years** (see below) and possibly now more summer drought and episodic higher rainfall periods but if there is a 'water shortage' changed winter rainfall is **not** the greatest cause.

Over the past **60 years** the winter mean is unchanged at 270mm. The mean average annual rainfall of 560 mm is also unchanged. **Depletion of our groundwater supplies is the real problem.**



Winter Rainfall

3. Over-abstraction: the nub of the matter.

The reason for lowered water tables is very simple - over abstraction of ground-water. When the ground water goes below a critical level the drop off in spring water is disproportionally great and flows can almost stop. There are too many of us now for an adequate supply. Both Anglian Water and the Cambridge Water Company as well as the Environment Agency (the monitor and regulator) know that we are in trouble with the long term sustainability of public water supplies; we are glad that this is now increasingly admitted in public. We are in a water stressed region.

What is not often realised is that this environmental change is far from recent. In 1885 the first Cambridge Pumping station was built at Fulbourn. By the turn of that century the Fulbourn village wetlands began to dry up. In 1912 to the east, by the Fleam Dyke, a new larger pump was built and this was in operation from 1921. This one station provided all the needed water for several decades. In 1954 this single station provided *two thirds* of the then county's water supply. Sixty five years later there are now boreholes at 26 sites across the Cambridge Water Company region and numerous transfer networks on a water grid working across several counties. In Cambridge, itself, we know that almost all (97%) of the supplied water comes from the boreholes in the Chalk and the ceiling of available water (deployable output) is dangerously low.

The Cambridge Water Management Plan (2019), draft summary says the following on page15: "We have already included some reductions in the volume of groundwater we use for our baseline supply forecast. We will make a further reduction in the volume of water we are entitled to take from the environment by

about 6.5Ml a day (6.5%) where necessary to manage the risk of causing deterioration to that environment". The problem of insufficiency is now more fully acknowledged. It needs acting on.

Water companies and the EA have long recognised the negative impacts of over-abstraction - but they have 'a duty to supply'. After the drought years in the 1970s and the perceived threat to wetlands a scheme was initiated to give groundwater reserves 'support' by pumping more water up to help conserve the life of these streams and wetlands in summer. This considerable augmentation by groundwater support was introduced in the late 1980s and developed over more than a decade. It is still not adequate today (see *5. Augmentation of water sources*. below). For these reasons, other abstraction licences, given to other water users, are now being removed. Does it matter if our streams dry up?

4. The unique value of our national Chalk streams

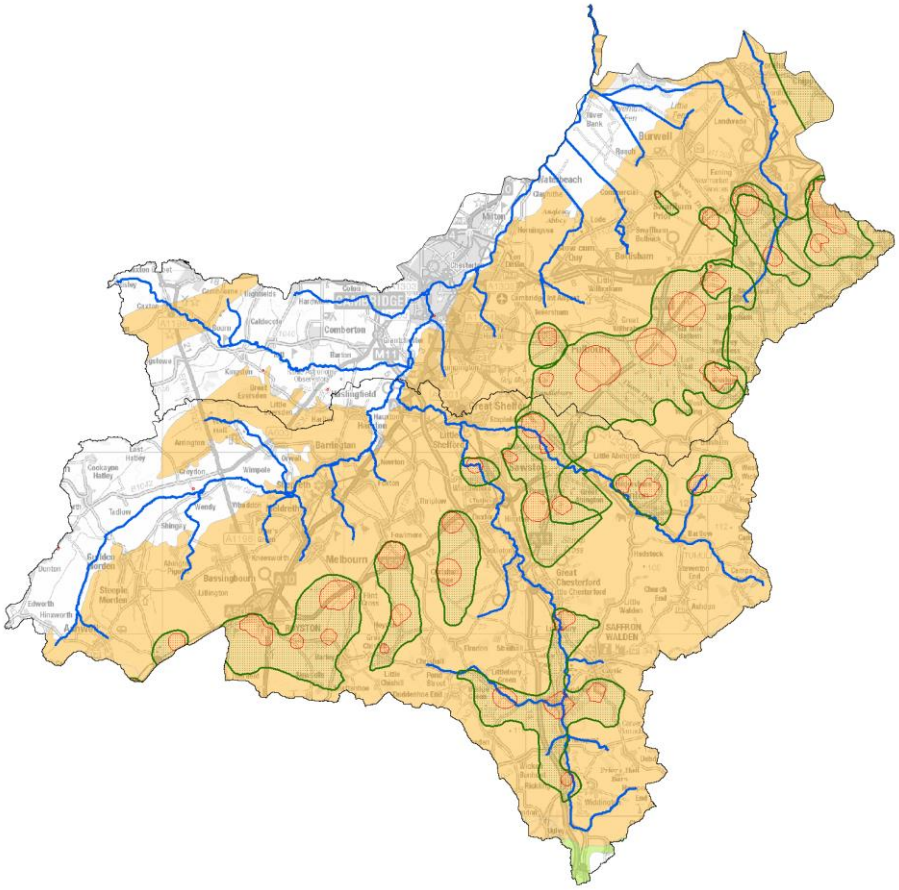
Chalk streams are a rare and threatened ecosystem. They have a very special fauna and flora. They are celebrated for their clear unpolluted water character, their beauty and their cultural and heritage associations - from world famous trout fisheries to the tales of '*Wind in the Willows*'. Northern Europe is the global stronghold of Chalk streams. Three quarters of the Chalk streams in Europe are in fact **in Southern England.** Of our two hundred national Chalk streams, just three - the **Rhee**, the southern **Cam** and the **Granta** contribute the greatest river flow uniting upstream of Cambridge, whilst the head waters of the lodes, coming from the Chalk east of Cambridge, flow into the lower Cam, north of the city; the River Cam then flows on into the Fens.

The Cam Valley and its tributary streams and rivers

Are **our** Chalk streams clean and pristine? Only a few small tributaries of the Rhee (such as the Shep) attain a 'good' status from the Environment Agency, most streams have a 'moderate' status and the most recent classification of the entire Upper Cam south of Stapleford is 'poor'! This is just shameful and inexcusable for such an iconic river.

The factors causing such failure are largely poor flow due to over abstraction (particularly for our public water supply) but also pollution from sewage works or septic tanks and to a small extent from agriculture, and to a further extent by physical modifications (e.g. for historic land drainage and industry). Only a few small streams have breeding brown trout populations, and local river groups are doing much more now to improve the nature of their local river flow. There are some significant small improvements on all our rivers but with growing pressure from climate change, population growth and new and expanding populations of invasive non-native species we will have to work hard to stop things from deteriorating further. Our calculation (from EA flow data) of the measured annual river flows in the catchment south of Cambridge, over 3 decades, is well below natural expectation for this area's rainfall. We feel that the mean figure (less than 10% of the catchment rainfall) is way too low, and it has been reducing demonstrably in particular in the Chalk-fed streams over this period. In drought years the flows on some small chalk streams such as that at Wilbraham, even at the end of winter, sometimes cease altogether.

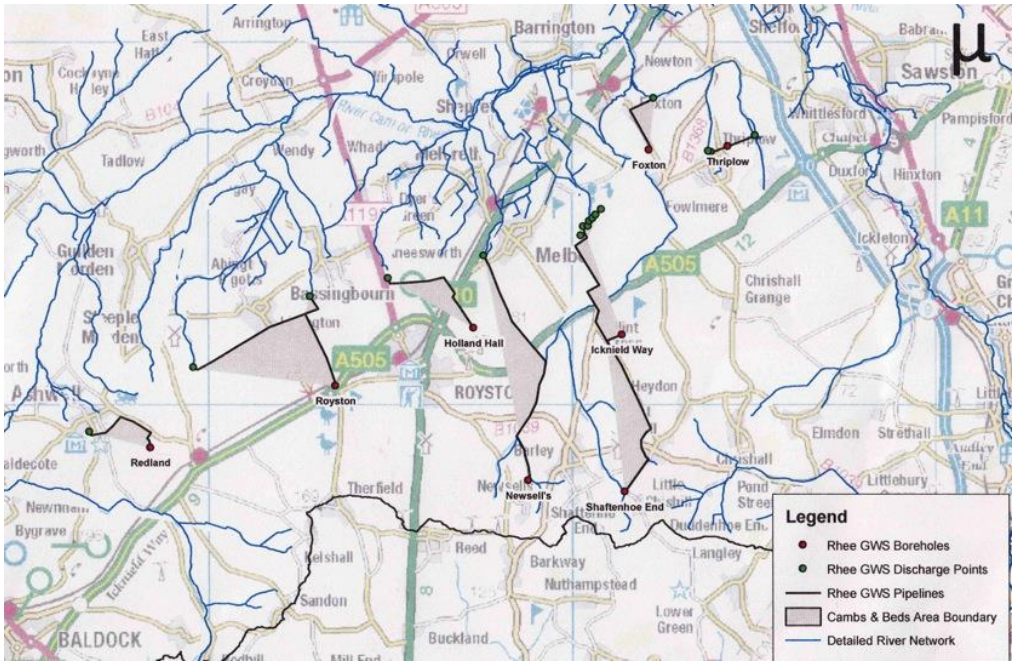
The present threat to our national Chalk streams has been raised not only by Wildlife Trusts and the World Wildlife Fund but also by prominent national figures, as diverse as Jeremy Paxman and Feargal Sharkey, and also by the Rivers Trust. On the 22nd of July this year the plight of our national Chalk Streams was debated in the House of Commons at an Adjournment debate.



The Cretaceous Chalk aquifer (buff) supplies our Chalk streams but it is also licenced by the EA for abstraction: the green and red areas are protected zones around borehole sites. These sources provide 97% of the Cambridge Water Company area drinking water.

5. The augmentation of water sources.

Millions of pounds have been spent locally by the Environment Agency, funded in part or whole through the licence fees (Environmental Improvement Unit Charge) to support threatened Chalk streams by pumping from supplementary boreholes to augment the depleted flows. Some 62% of the Cambridge Chalk groundwater that is pumped is taken for our water supplies; this is a continuous demand. But additionally, annually, 20%, of the Cambridge Chalk groundwater is also pumped from **the same sources** into Groundwater Support, mostly in the drier summer months. This huge volume comes in total from 14 borehole sources which is then piped to about twice that number of 'spring heads'. e.g. Fowlmere, Fulbourn, etc. The summer flows for such places as Wicken Fen's New River, the River Snail, the five Fen skirt Lodes, the Little Wilbraham River, the Hoffer brook, the River Shep, the River Mel, Bassingbourn's Wellhead Springs, Thriplow meadows, and the Mill River are all supported by this pumped augmentation. The Lodes/Granta Groundwater Support Scheme and the River Rhee Groundwater Support Scheme (see EA map below) are the two local exemplars. The Cam's streams in summer would be even drier without it but we question whether this is really sustainable in the long term.



River Rhee Groundwater Support Scheme: Boreholes (red) and 'spring heads' (green).

The new Nine Wells scheme, that will support Cambridge's Hobson's Brook, (due to start in 2020) is one more case in point. It is probably welcome to do this, yes, but it is surely a falsehood. As this pumped water represents an additional depletion to the aquifer elsewhere it cannot be sustained. It is a sleight of hand - a deceptive pretence - that all is fine and natural when it is not. The process creates a downward spiral effect on the aquifer, with no additional capacity to self-remedy. These 'additions' are cosmetic fixes that do not address the degree of real environmental imbalance.

The added water is often insufficient to restore a proper flow to a river, an example being the 'support' for the Little Wilbraham River, which is essential for Lode Mill which in recent years has had occasionally too little water to run. Augmentation certainly looks good at the 'spring head' but in dry weather water may just go back down into the stream's bed. Augmentation in summer months may also cease at times (as it did in 2015). The River Mel is another case in point. It is augmented with clear spring water, but it may ebb away and only be sustained by pulses of treated effluent emanating from the local Melbourn and Meldreth sewage treatment works. The present fixes are not solutions and, although expensive for the EA, are paid for, we must presume, by consumers in their water company bills.

6. The myth of water use sustainability.

Anglian Water and the Cambridge Water Company, understandably, want to paint a picture of its sustainable management whilst the Environment Agency (under Government pressure) is seemingly the 'yes man' to this over-abstraction.

As a community group, the Cam Valley Forum, with a stated duty to 'protect and enhance the environment of the river Cam and its tributaries', feel that the Government's Environment Agency has a ridiculous conflict of interest: it is charged with both monitoring the quality of the environment and also licensing environmental resource use - for the water companies have this 'duty to supply water'. The EA's first task is very well and honestly done, but the EA is between a rock and hard place on the second. The facts, *their facts*, are unfortunately there in evidence against what they (as the authority) still seem to sanction. To give the EA credit they do regularly warn the water companies about the risks and the penalties of over-abstraction and of under managing sewage treatment, but prosecutions have only followed when there have been very serious pollution incidents. In our view, if the Environment Agency's role is to protect the environment they really should say 'no' more emphatically and more often. **We are already well beyond the water resource limits for Cambridge - given the growth that is projected and now under way**. The water resources are not adequate for such consumption, let alone the additional population planned to be moving into the area in coming decades. The water companies, Anglian Water particularly, make major investments in reducing the impact of insufficiently treated sewage, but these 'poor' ratings by the Environment Agency in the upper Cam, on account of phosphate pollution, must be addressed now by the companies who manage the sewage treatment there. Blame here may be laid on Anglian Water. The Cambridge Water Company which operates supply only (under the name of 'South Staffordshire Water Company') usefully invests some of its profits in support of genuinely valued environmental benefits. Some of this money has been gratefully received by groups, like our Cam Valley Forum and the Friends of the Cherry Hinton Brook, for river improvement. They undoubtedly care but the company must also pay indirectly for river augmentation through its licence. The considerable cost of this is passed on to the public as a component of their water bills. Surely if 'sustainable development' had been achieved, would the river not now be in very good health without such measures being needed? There is a real disconnect in our environmental management.

The economic pressures for an unfettered water supply and the political pressures to go on allowing local water pumping are both too great. Current practice and the projected requirement from the aquifer is therefore, by any definition**, totally unsustainable.** The need to obtain water from further afield, or from more direct water-recycling through the waste water system, is ever greater.

Have we learned a lesson from our neighbours to the south? **It seems not**. Affinity Water serves 3.6 million people (rising to 4.5 million in twenty years time) in Hertfordshire. It takes groundwater from the aquifer to our south - some of which might have flowed north to our streams. Affinity Water has no reservoirs and North East Hertfordshire rivers are reputedly 'dying'. This is what brought the debate to the House of Commons in July. There is alarm. Here the local pumping from the Chalk, that had caused the River Mimram to dry up ceased in 2017. Despite this overdue conservation effort the normal spring flow to this river has not yet recovered fully. **Are Cambridge City and South Cambridgeshire planners oblivious of our own impending water crisis?**

7. Low flows and harmful water pollution mean biodiversity losses.

The Cam Valley Forum would like to see a greater and steady flow of pure water in our rivers. In Cambridgeshire's remaining wetlands (e.g. at Wicken) our fenland insects are still abundant but dramatic declines in the number of damselfly, dragonfly, stonefly, mayfly and caddisfly species have all occurred recently on other chalk streams in Southern England. Such losses are due to both failures of flow but also, significantly, to water pollution.

Water-crowfoot (left), a chalk stream plant, in which the Banded Demoiselle (right) breeds.

Is our river water clean enough? Here we need to recognise that innumerable soluble chemicals and particulates travel in a river. If they are at a level where they cause no measurable harm to the environment they are only 'contaminants' but if more concentrated they produce measurable harm and are classed as 'pollutants'. When the European Water Framework Directive came into our legislation, in the year 2000, it was stipulated that there should be an assessment of 'No Deterioration' in water flow and quality which would have to be met. Given that (by that date of 2000) there had already been too much groundwater removed, there was little room for the water companies to manoeuvre, but they were able then to bring more water in from more boreholes and from further afield to meet increasing demand. Creditable efforts have been made. What was perhaps not recognised sufficiently and planned for at that time was that, with an existing depleted stream flow, a greater and greater bulk of the water now going into our streams and rivers is in fact not 'stream water' at all but treated sewage effluent and leakage from septic tanks. This seemingly unavoidable effluent added to rivers is nowhere near the quality of clear Chalk spring water. Moreover, as populations grow a sewage work's capacity to release water with only minor contaminants, which are then innocuously diluted, becomes critical. Now, many of our rural sewage works are at or beyond capacity. If dilution of effluent from river flow is impossible 'contaminants' easily cross the line to becoming harmful 'pollutants'.

At the last survey (2016) the Granta and the Cam, upstream of Cambridge City were still classified (by the Environment Agency's own rating) as of 'poor' water quality and in need of remediation on up to 7 different counts. Yet this is after 15 years of EA oversight and monitoring under the beneficial aegis of the Water Framework Directive. It is not for want of their trying but this is surely now **deeply wrong**. Greater flows if they could be found would mean less harm - **but where is that needed groundwater to come from**?

Poor flows and river pollution both endanger wetland wildlife. Biodiversity loss has already been remarked upon at many sites, including Sites of Special Scientific Interest. Nine Wells Springs (adjacent to the Addenbrookes Biomedical Campus site) lost their SSSI status after a drought in 1976 that killed off two rare invertebrate species in the springs for which that site had been designated as of conservation value. This loss was entirely a catastrophic failure of flow.

The flora of the River Cam, and its wetlands around Cambridge, has lost 35% of the total wetland species recorded over three past centuries. Much of this loss is attributable to disturbance of river environments and to polluting nutrient enrichment. In our rivers such plants as the water crowfoots, starworts and pondweed species, rooted on the stream-bed, are sensitive to pollution and the different species are each useful indicators of water quality. Many animals (invertebrate and vertebrate species) are all dependent, through the food chain, on the health of these river plants. Without the right plants and the right insects, as food species, clean water fish species like brown trout will not thrive. Our rivers and their margins should be rich in a greater variety of water plants. Recently the non-native Floating Pennywort has dominated the Cam, thriving on the polluted nutrient rich waters, to the exclusion of almost all else! Our wetland habitats neighbouring the Cam are certainly in decline. The Cambridge Milk Parsley, a locally rare plant in Britain (that bears our city's name!) is now only holding on in two or three county conservation wetland sites. This is a shameful record as they are nationally rare.

To add insult to injury, in recent years, low flows and higher nitrate and phosphate pollution have caused great increases of the coarser vegetation growing in drier watercourses. As weed growth in watercourses is a threat to rapid flow, especially in a flood risk scenario, the Environment Agency has been directing staff on some Cam tributaries to clear this vegetation. Rather than use labour-intensive cutting they have apparently engaged contractors to use *glyphosate* herbicide along such watercourses. This not only kills marginal plants but kills water plants whose existence is already endangered by habitat loss and pollution. Is this because the EA 'fear flooding'? The Government has recently and repeatedly cut the Environment Agency's funding and staff. Our local Councils are also greatly under-resourced to support good ecological work.

8. Improving the catchment for flood and drought resilience.

We should expect a river to have *occasional* rule over its entire flood plain; floods are a natural, if inconvenient, event. This fact should be well recognised by planning authorities that stipulate where housing should be allowed to be developed. May we remind the Cambridgeshire planners that when we see aerial photographs of river flooding (in our national press) it is often the older buildings that are high and dry and the new developments that get inundated?

Cambridge City needs a Cam valley rainfall catchment area that will hold on to precipitated water for a longer time. Were this to be achieved, principally with winter rainfall stored in reservoirs, farmers would not have to depend on groundwater abstraction for irrigation in the summer. It is notable that a significant number of farmers have constructed their own reservoirs, at great expense and loss of farmland, to combat the perceived shortage of water for their irrigation activities. They ought to be better rewarded for saving this water.

Cambridge Riverside in flood

Where flood events do occur in the UK they are often the result of sustained unusually heavy rainfall events. Cambridge City has had such floods historically. Flooding events through rapid run off (which are always going to recur) will not so easily happen, if the river basin ecosystem is able to hold back more water up-stream, so as to then release it more slowly. Trees do retain more than 25% rain in their canopies and their roots slow down water release by hours, delaying immediate flood risks. This 'natural' approach would require a reversion to an earlier pattern of agricultural land-use management with wet meadows and less arable land in the flood plain itself. Some farmers are already making this positive change. South Cambridgeshire could develop a large wet woodland basin as a buffer against Cambridge City flood events. This would greatly impede a rapid flow, attenuate the flood, save water and ease soil erosion. **Such areas could provide needed recreation for people and would undoubtedly help to increase biodiversity**.

Drought years, in Cambridgeshire, are probably a greater threat than flooding. Presently many farmers are still licensed to abstract water. When will such over generous permissions be disallowed by the EA for the river's sake? The EA seemingly lacks the resources to revoke some licences and the powers to prevent an existing licence holder from selling their spare capacity. If such environmental controls are not more powerfully managed then we shall increasingly swing between summer or winter flood events and occasional summer droughts. The erratic and more extreme rainfall events, which are real and predictable elements of climate change, might be mitigated through such environmental action.

9. Saving water resources will help the river.

We give credit to the Water Companies for their efficiency savings and reduction of wasted water. That Cambridge Water have reduced per capita daily consumption, over 50 years, from 210 litres per head per day to less than 140 litres is good. But the population that needs this water has risen far faster than any success in reducing demand and wastage. This is the crisis. Licences are not withdrawn, we understand, when there is no proven wastage by the supplier. That is fair but where the 'need' for water is imposed on a region, for new population growth, the supplier must surely look elsewhere for a supply that will not cause a loss of environmental sustainability.

The health of the River Cam ecosystem should be of prime concern to planners and residents alike. One way in which this could be very sensibly addressed is by Water Companies reducing leakage in their distribution of mains water. For the Cambridge Water Company leakage stands at 14 Ml/day (million litres per day) across their supply region. Currently usage is estimated at 130 litres/head per day. That leakage equates to more than 100,000 customers' daily water usage. This is too high and equivalent to three buckets full *per household* per day

There is ample evidence that metering reduces our water consumption. This stands at 72% of local households. Laudably, all water companies do direct considerable effort to education and do provide commercial incentives to metering. We should all be encouraged to save water. Indeed this might be the most positive action that many of us can take. Relative to its worth water is perhaps under-priced to most consumers. Do we need a local discussion with Ofwat to establish better pricing for our environmental aims? In the interests of equity a 'progressive' pricing scheme, with cheaper water for low usage might be helpful.

Local authorities should adopt every opportunity to encourage the use of 'grey water' recycling for cleaning and flushing. The University of Cambridge's North West Cambridge (Eddington) water harvesting project employs a dual supply, between Cambridge Water (for mains) and Cambridge University (for grey water supply). **Could this pattern be emulated elsewhere**? At Eddington the target usage is now set at 80 litres/head per day for treated mains water. The supply of grey water makes up the difference in demand. **For such savings to be universal it would require huge infrastructural changes to all new housing development regulations.** At Northstowe, a new development north of Cambridge,

developers have claimed that they cannot make money if properties are fitted with water re-cycling and solar panels. These facilities, should surely be part of negotiations during the process of the selection of developers **before they receive planning permission to begin building**.

All of our local sewage treatment works recycle treated water only to the rivers. Full water recycling needs to be given a much greater priority. Should this be a requirement of any new sewage works in Cambridgeshire? Without such recycling, a major import of water to Cambridge from a more distant source (the Ouse or even the River Trent) will be required to sustain the supplies for the development that is now projected. The cost of importing water would again be substantial. We feel that this cost should be met to save the natural Chalk aquifer and Chalk streams and so sustain *our river*.

10. Environmental costs and reassessing our own values

There is presently something of a crisis in environmental economics. Businesses understandably focus on what is 'affordable' and 'provides good value for money'. Water is a classic example of a resource needed by people and hence it becomes 'marketable'. This has led us to see water only as a resource to bid for in our human enterprises. However, we are only one species in our ecosystem. **So to see our water resources only in this anthropocentric way has inevitably harmed the environment.**

People do need water, yes, but we also need a high quality environment, as a local resource, not least when packed together in a crowded urban centre and in need of green space and recreation. This is why there is now a greater need to adopt an 'ecosystem services' approach to our thinking - where the Natural Capital value of water is considered on the wider screen of its worth to aquatic ecosystems. The human benefits that accrue from having access to tranquil river environments that inspire wellbeing and contentment are not to be underestimated. Such things are indeed hard to price, and harder to integrate, into a more unified understanding where both environmental and human values are paramount for consideration.

Here we would like to **publically acknowledge** the good work being done for the River by our affiliated organisations: these include the Environment Agency, with whom we work, the Cam and Ely Ouse catchment partnership (CamEO), the hard pressed City and South Cambs Conservation Officers, many land owners, the Cam Conservators, the principal punting companies, the Cambridge Canoe club, the Wildlife Trust and, importantly, Cambridge Water Company and Anglian Water. We also express support for the many local river groups and community organisations - along the rivers and streams - with which we share a common purpose. Our river is central to so much. One County body *Natural Cambridgeshire*'s published vision '*Doubling Nature*' has 'in principle' been adopted by CCC and SCDC and our elected mayor. But that 'vision' cannot be realised fully if it ignores an understanding of our fresh waters.

The River Cam is highly valued and its 'life' must not be taken for granted. At its worst the Cam can be, and has been, like a canalised sewer - with a slow flow held back by weirs, sluices and lock gates. Surely we are prepared to pay for cleaner river water that flows? Might we pay for water that is clean enough to bathe in, as a chalk stream should be? Might we pay for river water that is not polluted with phosphates and nitrates - where mayflies and damselflies flourish amongst water plants unaffected by pollutants. Might we pay more to see trout swimming in crystal clear water through Cambridge city? Other urban rivers achieve this - surely we should too. Are we too busy lecturing other people around the world about 'saving rain forests' when our own river is not what it could be?

The River Cam, in this University City of world standing, should surely be an example to the world of achieving sustainable development. Should the Cambridge river not have a **higher conservation status** and earn **a more thorough protection** against the present onslaught of human development pressure?

We urge all who agree with these sentiments to be take action to achieve these aims.

CONCLUSIONS AND ACTION POINTS

What you can do politically

- Alert our Councillors and Members of Parliament to the fact that there is insufficient groundwater to service an adequate flow in our rivers and streams.
- Ask why it is that (as defined by Water Framework Directive) the upper Cam has a 'poor status', and in Cambridge has only a 'moderate status' when it all should be 'good status'.
- Campaign for stronger legal protection of our River Cam environment and a higher conservation status for our threatened chalk streams.
- Do not accept that it is natural for our headwater steams to run dry in the summer.
- Campaign for greater support for river monitoring by our weakened Environment Agency and in support of the many small voluntary river groups.
- Encourage our water companies to behave even more responsibly, investing more to conserve water quantity and quality.

What you can do physically

- Join one of the many local river groups and help to improve our river environment.
- Support the Cam Valley Forum.
- Go and visit the best streams we still have and see how wonderful they are.
- Try to use *less water* by more domestic water re-cycling, using roof catchment water on the garden and less mains water for toilets, car washing and hosepipe use. All this will help the rivers.

What Government (Local and National) needs to do

- Consider more fully how much the welfare of the River Cam is important for recreation, human well-being, water needs and food production.
- Consider whether the Cam needs additional legislative protection for its natural springs, chalk streams, wildlife and landscape features in rural and urban settings.
- Consider whether the Environment Agency can realistically be both the body that is *obliged* to licence water abstraction and *obliged* to protect the environment.
- Decide when augmentation is a 'losing battle' as *increasing* water supplies to people and *increasing* environmental care of rivers are in competition with each other. Groundwater is now a severely limited resource.
- Make reduction of leakage, regardless of cost, more of a water company obligation.
- Implement a compulsory building regulation requirement, *now,* for 'grey water' use in this water stressed area. Retro-fitting buildings for grey water use is more expensive.
- Plan for either creating more reservoirs (which has a cost in land area-reduction) or for the bringing in of **more water from outside the catchment** (which again has a great cost).
- Put more emphasis on natural flood protection by incentivising the re-creation of water meadows, wetlands, wet and dry woodland to provide a working and more cost-effective system of flood mitigation. This will increase biodiversity and opportunities for recreation.
- Recognise the reality of climate change **in all future planning and development**. The Environment Agency, for example, have built in an extra 20% variance into their flood models and, with climate change, summers are likely to bring more heat waves and perhaps more droughts.

The Cam Valley Forum *is a not-for-profit charitable association of local individuals, from diverse environmental and recreational groups that are concerned directly or indirectly with the River Cam and its tributary streams. CVF's mission is to actively defend the River Cam's health and wellbeing - for the sake of its wildlife and environment, for the sake of the many people that enjoy the river and who want to safeguard the River Cam's historical and cultural importance.*

For more information or to contact us, see our website https://camvalleyforum.uk/

We also recommend the Rivers Trust publication "Chalk Streams in Crisis"
https://www.theriverstrust.org/media/2019/06/Chalk-streams-dossier_June-2019_FINAL_FINAL-1.pdf

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