Blueprint for Water
WATER PEOPLE NATURE
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Wildlife and Countryside LINK

National Infrastructure Assessment Call for Evidence

February 2017

Executive Summary

Blueprint for Water is a unique coalition of environmental, water efficiency, fisheries and angling organisations and a campaign of Wildlife and Countryside Link. Blueprint is calling for the Government and its agencies to set out the necessary steps to achieve "sustainable water" by 2021.

We welcome the opportunity to respond to the National Infrastructure Commission's (NIC) call for evidence on the National Infrastructure Assessment (NIA). We highlight the importance of building resilience into the system and ensuring that impacts on the environment are minimised. This requires careful consideration of the various options available and taking an ecosystems approach to decision making. We urge the NIC to integrate natural infrastructure, where possible, into the design of strategic infrastructure projects from the outset and promote opportunities for retrofitting natural infrastructure into existing assets. These are small but significant ways of bolstering our resilience to the challenges of climate change and population growth.

In addition to integrating natural infrastructure, there is a strong case for habitat creation and restoration to deliver our infrastructure needs. For example, managed realignment projects to protect against flooding; creation of farm ponds to reduce water demand from agriculture; and large scale urban green and blue space development, to reduce pressure on our sewerage systems. Such options also deliver other benefits including health and well-being, reduced urban heat island effect, improved water quality and enhanced biodiversity, which more traditional infrastructure lacks.

Please see our answers to specific questions below:

4. What is the maximum potential for demand management, recognising behavioural constraints and rebound effects?
Note: "demand management" includes smart pricing, energy efficiency, water efficiency and leakage reduction. "Rebound effects" refer to the tendency for demand to increase when measures aimed at reducing or spreading demand also lead to lower prices or reduced congestion, undoing at least some of any demand reduction. For example, if smart meters reduce the cost of electricity in off-peak periods, this could lead to greater energy consumption overall, where a large number of individuals or firms take advantage of these lower prices by increasing their total usage.

Demand management is currently underutilised within the water sector. Innovation in this area is low, and encouraging innovation could make great improvements.

Greater demand management could be driven through the development of a wide package of measures through the next Price Review (PR) process. This needs buy in from, and to be facilitated

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by, Government and Ofwat, to encourage such measures before resorting to large supply side preferences. Packages of measures should include a combination education measures for the general public to better understand issues around water scarcity, smart metering, as well as social and environmental tariffs. Initially, we would welcome a number of in depth pilots. These pilots need to be set up and monitored for a number of years, not only 6 months. This will help inform further Price Review processes and address issues such as uncertainty. Universal metering and, in particular a wider role out of smart meters, would assist water companies in better understanding the actual scale of leakage within assets. The sustainable economic level of leakage (SELL) is not helpful in driving leakage reduction, as water companies are able to do the minimum required, rather than drive distinction.

However, it is not just water companies who are responsible for reducing water demand. Industry and the general public need to better understand that water is a finite resource and needs to be managed sustainably. It is important for all stakeholders to take responsibility for demand reduction and there are efficiencies to be made within various industries and the retail sector. Regarding the former, there is currently little incentive for efficiency, as water is inexpensive and abstraction licenses allow, in most situations, the amount that companies need. Regarding the latter, there is concern that the new competition market may in fact reduce efficiency in this sector rather than drive it, as it is likely to drive prices even lower.

Irrigated agriculture is one of the biggest users of water globally. Management practices that increase efficiency in irrigation methods can greatly increase the availability of water for other human and environmental uses. Of all sectoral water demands, climate change will affect the irrigation sector most strongly[1]. It is areas in the UK with greatest risk of water scarcity, which have the greatest agricultural demand for water. To date, little has been done to incentivise demand change in agricultural water use, but there is potential for substantial savings to be made.

10. What changes could be made to the planning system and infrastructure governance arrangements to ensure infrastructure is delivered as efficiently as possible and on time?

It is important that in an effort to increase infrastructure (and housing) development and reduce the time taken for delivery, there should not be short cuts around quality or analysis of need and impact. Good quality infrastructure, where it is most needed and where it has been designed to minimise impact on the environment, will last longer and have greater use.

We urge caution that the checks and balances in place to ensure good quality are not weakened. It is vital that whilst ensuring efficient and prompt delivery of infrastructure, environmental safeguards remain.

[1] https://www.ipcc.ch/publications_and_data/ar4/wg2/en/ch3s3-5-1.html

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Delivering natural infrastructure

Current national and local policy does not provide clear governance arrangements around sustainable drainage systems (SuDS), whilst it promotes SuDS in large developments. Without clear direction and responsibility for delivering, adopting and maintaining SuDS leads to long discussions between developers and planning authorities around SuDS options.

In addition, Highways Authorities can have a contradictory approach to developers, and local authority proposed SuDS schemes, leading to further delay. Highways Authorities have no legal driver to adopt SuDS and have an automatic right for run-off to be released direct into water courses, regardless of quality. This conflicts with work being done to improve water quality under the Water Framework Directive by water companies, local authorities and others. If water run-off from highways was required to pass through SuDS in new development, it could help improve quality and reduce SuDS design issues and drainage in a new development. In turn, this would facilitate development and agreement over drainage systems,.

11. How should infrastructure most effectively contribute to protecting and enhancing the natural environment?

Those delivering infrastructure systems should include ecological expertise from the project outset, designing for multiple benefits, including maintenance planning. The Wildfowl & Wetlands Trust, in partnership with RSPB, have published guidance on designing SuDS for multiple benefits which can be useful for anyone working on this topic. It is not enough to assume biodiversity benefits from green infrastructure. To benefit wildlife and the environment, the type of the system, as well as how that system is designed and managed is paramount. For example, a simple sedum green roof offers less biodiversity benefit compared to those with more diverse vegetation.

The importance of protecting existing high value habitats and species should be considered for any project. Remnant natural habitat is usually more diverse than newly created habitat. There are two important factors to this: understanding where important areas for biodiversity are which shouldn't have infrastructure built on them, and retaining pre-development habitat within a development site, where possible.

Natural infrastructure should also be integrated into the design of more traditional infrastructure and retrofitted into maintenance and renovation projects. Additionally, it is important to consider whether a natural infrastructure approach could meet the objective, as opposed to hard infrastructure or using a combination of both.

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12. What improvements could be made to current cost-benefit analysis techniques that are credible, tractable and transparent?
Note: "credible" improvements are those that generate results that are in line with robust evaluation findings for comparable schemes. "Tractable" improvements are those that can generate usable quantitative outputs. "Transparent" improvements are those that do not rely on 'black box' modelling and assumptions.

The Natural Capital Committee, in their third report, recommended that the National Infrastructure Plan should incorporate natural capital into each of the main infrastructure sectors, following the mitigation hierarchy for managing impacts (avoid, minimise, restore, offset). An investment programme for natural capital should also explicitly feature in the National Infrastructure Plan. Within a natural capital approach, social and environmental costs and benefits, including non-financial, are accounted for within decision making.

Natural infrastructure can offer a great value-for-money approach, if accounted for properly. The discount rate applied to cost benefit analysis must be quite low - considerably closer to zero than the Treasury's Green Book value. A low discount rate does not simply highlight environmental impacts; it increases the relative importance of the future, compared to the present. Many large scale infrastructure projects are very long-lasting, with expected economic lifetimes spanning many decades, such as airports or nuclear power plants. It is vital that a precautionary approach is taken towards environmental harm and a low discount rate is applied to help prevent this future risk.

Reframing the question – for example, asking "What is the least-cost strategy for reducing congestion on a highway by a given amount?" rather than limiting the analysis to the status quo vs. one preferred alternative may yield a different solution[2]. In particular, natural infrastructure options should be considered as alternatives wherever possible.

20. What does the most effective zero carbon power sector look like in 2050? How would this be achieved?
Note: the "zero carbon power sector" includes the generation, transmission and distribution processes.

Evidence indicates that campaigns to tackle water demand could be used to reduce the daily peak demand patterns, which reduces the pressure on network pumping energy costs during peak use times. Additionally, water companies could use demand-side strategies to also achieve efficiencies in

[2] Ackerman, F. (2008) Critique of Cost-Benefit Analysis, and Alternative Approaches to Decision-Making, Friends of the Earth.

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the distribution of urban water (e.g. reduced energy for pumping in pressurised water system, pipe augmentation deferrals, peak energy demands)[3].

However, we also pose the question, if we are looking at zero carbon, why not water efficiency as well?

22. What are most effective interventions to ensure the difference between supply and demand for water is addressed, particularly in those parts of the country where the difference will become most acute?
Note: "demand" includes domestic, commercial, power generation and other major sources of demand.

Within the UK water is not valued appropriately. In both domestic and industry sectors water continues to be treated as a low-value and unlimited resource.

The Water UK *Water resources long-term planning framework* looked at the resilience of long term water supplies, concluding that significant effort and investment was needed to ensure droughts did not impact on consumers, businesses and the freshwater environment. One of the most effective tools they identified to boost resilience is rigorous demand management, through household metering.

Currently, only half of the households in the country pay for water based on the amount they use. The percentage of metered households needs to increase significantly if we are to empower consumers to control their own water bills, and incentivise water efficiency. Under current legislation, water meters cannot be introduced on a universal basis in large parts of the country, even when it is clear that these systems could go a long way to securing long term resilience of regional and national water supplies. **Water companies should be able to introduce universal metering** if, after consultation with customers through the existing Water Resources Management Plan and Business Plan processes, it is found to be the most affordable option for customers overall, as well as being the best option for water resources management and resilience. High users who would find increased bills difficult to pay could be supported using social tariffs.

The NIC is encouraged to refer to Waterwise's recent water efficiency strategy document for further ideas and case studies around demand management.

Regarding supply options, there are environmental risks to be considered on a case by case basis, which should be taken into account during decision making in order to minimise environmental risk and damage. Before large supply options are given approval, it should be clear how demand options

[3] Beala, C.D., Gurung, T.R., Stewart, R.A. (2016) Demand-side management for supply-side efficiency: Modeling tailored strategies for reducing peak residential water demand, *Sustainable Production and Consumption*, 6: 1-11

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and leakage reductions have been optimised and considered. One simple option would be to ensure all new houses are built to energy and water efficient standards.

To increase resilience, we should have a package of options, but we also need to ensure that cumulative supply options do not cause environmental degradation, as well as considering the merits and risks of each individual option.

There is currently no join up between water resources, waste water management and flood management. A joined up, holistic approach at a catchment scale is needed, as suggested in Q24. By slowing the flow throughout a catchment, the environment will have a greater resilience to drying out in times of low precipitation, which ultimately will slow down our lead in to drought scenarios.

23. What are the most effective interventions to ensure that drainage and sewerage capacity is sufficient to meet future demand?
Note: this can include, but is not necessarily limited to, governance frameworks across the country.

Long term waste water plans

Water companies are required to produced long term (at least 25 year) Water Resource Management Plans, to ensure that water supply systems are sufficient to meet future demand and resilient to climate change and other pressures. We believe that this process has delivered a step-change and fostered a forward looking, collaborative and innovative approach to ensure the needs of people and the environment are met in relation to water supplies. A similar process for wastewater is essential to address the outstanding and significant problem of sewage pollution in rivers and streams. The Government should require **water companies to produce, consult on and publish statutory long term wastewater management plans that secure the delivery of resilient wastewater services.**

Manage water more holistically

A more holistic approach between water supply, waste water and flood management is essential. The 2013 National Policy Statement for waste water states that demand management measures could achieve a reduction in sewer and treatment capacity required for England of greater than 1 billion litres per day[4].

Currently, developers have an automatic right to connect new development to the sewerage system, even if that system is at capacity. As a minimum, sewerage companies should be statutory consultees in designing new developments, and the automatic right to connect should be removed. This will allow sewerage companies to have better control over sewerage capacity. Additionally, as

[4] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69505/pb13709-waste-water-nps.pdf

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mentioned above, reducing water demand can help to alleviate pressure on the sewerage system. As such, new water efficient homes, commercial developments and infrastructure could help ensure our sewerage system is able to cope with an increasing population. Small changes to existing infrastructure and considering the role of natural infrastructure within new design can help address diffuse pollution problems, reducing pressures on the system.

A network of sustainable drainage systems

Reducing surface water run off could substantially reduce pressure on the sewerage system. SuDS should be designed into new developments from the outset. Together with a suitable retrofit programme, SuDS will provide a buffer to future challenges. SuDS need a strategic, rather than simply opportunistic, approach looking at where they could be best applied. Therefore, an opportunity mapping exercise should be undertaken in our major urban areas (at the very least). This can identify where SuDS would be best placed from a geological and surface water flood risk perspective, but also connecting them to current green space as well as joining up or creating stepping stones between habitats. How such a network of SuDS could work within a wider catchment approach, should also be investigated.

24. How can we most effectively manage our water supply, wastewater and flood risk management systems using a whole catchment approach?

We fully endorse this question and believe that a catchment approach to water management, integrating management of supply, waste water and flood risk, is hugely important. The question of how this could be managed is an important one.

Whilst it is widely recognised that the catchment is the ideal scale in which to undertake and integrate water management activities to achieve more for less (see Defra 2013 Catchment Based Approach or Dieter Helm, 2015, Water Catchments), it can be argued that, to date, we have failed to make it happen, and certainly to make it happen effectively. This failure has been recognised by the water sector, which has increasingly attempted to intervene on behalf of their customers, at a catchment scale, to address a range of issues such as pollution and flooding.

We recommend the following:

- **Better integration of both governance and planning around water management at a catchment scale**. Potentially through having fewer organisations responsible for water management and through less but better joined up plans at a catchment scale.
- **A stronger regulatory baseline** that is adequately enforced by regulators to tackle inappropriate and illegal activities within a catchment such as agricultural pollution.
- **Better targeting of funding so that it can, and does, deliver multiple benefits and addresses problems at source, rather than dealing with consequences**. For example, funding sources

and rules that preferentially promote solutions such as better land management; delivers flood attenuation water quality and biodiversity benefits at source, rather than separate funding streams that deal with consequences, including providing enhanced water treatment or ever higher flood walls.

- **Greater partnership working at a catchment scale.** Involving local communities and stakeholders in planning, decision making and delivery. Building on the existing catchment partnerships.

25. What level of flood resilience should the UK aim to achieve, balancing costs, development pressure and the long-term risks posed by climate change?

Many attendants at the recent NIC workshop on flood risk management suggested that the Government should aspire to deliver a set level of resilience to future flooding. In practice, this may be difficult to achieve without a significant shift away from current policy, which is to deliver the maximum flood benefit from a defined budget, to one where the level of resilience is defined and budget and policy are set to meet that standard. However, we welcome the shift from a sole focus on flood defence, to a broader view that recognises the importance of making communities, businesses and infrastructure more resilient to flooding.

Although it is widely recognised that universal flood defence is not attainable, there seems little recognition that not all floods are equally damaging. Indeed, many of our most important wildlife sites are associated with and thrive from regular, shallow winter floods and have been farmed for many generations. Failures to make adequate distinction between protecting homes and essential infrastructure, and investing in agricultural land drainage, can result in suboptimal decisions being made about where public investment in flood risk management should be directed. Communities are often not given the information necessary to make informed choices. There is value in understanding international projects on similar issues; such as the Netherlands 'Room for the River' programme, where farm buildings have been relocated to higher ground in recognition that fields will periodically flood. Allowing for such approaches and other natural flood management measures can help our communities buffer the effects of climate change.

We understand that river maintenance is needed in some circumstances to improve conveyance around critical pinch points, yet much discussion continues to react to a call for river maintenance. Instead there is a need for a wider debate about ensuring land use planning sufficiently manages water during and after extreme rainfall events. This principle is fundamental to the Room for the River programme in the Netherlands, as well as the Blue Green City principles in the UK. The Government will have to make difficult decisions around where to invest in defence, where to provide support in improving resilience, and where to remove or step back defences, however, natural flood management and habitat creation such as floodplain marshes and managed realignment can help increase resilience and longevity of defences.

26. What are the merits and limitations of natural flood management schemes and innovative technologies and practices in reducing flood risk?
Note: "innovative technologies and practices" can include, but is not necessarily limited to, property level resistance and resilience, temporary defences, advances in predictive asset maintenance and innovative construction materials.

The evidence for the effectiveness of natural flood management is growing and our ability to incorporate it into our approach to reduce flood risk will also increase (see https://www.gov.uk/government/publications/working-with-natural-processes-to-reduce-flood-risk-a-research-and-development-framework).

Reconnecting rivers with their floodplains, new washlands and coastal habitats, stepping back embankments and incorporating green and blue infrastructure in urban areas to take flood water are all forms of natural flood management. However, we know that these methods work and they will be critical in order to avoid the worst impacts of future floods.

There is a growing body of evidence that upstream measures can be very effective at preventing flooding. However this effect depends on a complex array of factors, including the size of the catchment, topography, geology, soil type and critically, the duration and magnitude of the rainfall event. Specific interventions, such as installing in-stream features to stretch the storm hydrograph and reduce its peak, must be carried out in the right place and in sufficient quantity, if they are to be effective. These schemes will prove invaluable in certain catchments, when sufficient thought can be put to design, location and maintenance. Inclusion of such measures in agri-environment schemes would need to be strategically targeted to be effective and would need to be designed to deliver biodiversity benefits to ensure flood management does not come at a cost to the environment.

Significant gains could be delivered by preventing damaging practice and recognising the role of land use change in slowing flows into streams and rivers. The creation of new native woodland and scrub, the restoration of blanket bogs and rivers and creating salt marsh and mudflats through managed realignment can contribute to flood management objectives alongside restoring biodiversity, sequestering carbon and improving water quality. As they deliver a wide range of benefits, there are many organisations and landowners interested in contributing towards building a shared evidence base, delivering projects and supporting ongoing costs.

Additionally, more could be accomplished by removing perverse incentives which result in increased flood risk through damaging land management. Measures to conserve our soils, such as prohibiting the growth of high risk crops such as maize on vulnerable slopes, maintaining broad hedgerows and buffer strips, could contribute to reducing flood risk, slowing the rate at which water flows off of hillsides and preventing the silting up of watercourses.

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We consider the best outcomes will arise from a catchment approach to considering flood risk and using a combined suite of measures. These should include but not restricted to: upstream measures (designed to 'slow the flow' of water), downstream measures, (designed to make 'room for the river' and increase capacity to store flood water), coastal measures such as managed realignment where appropriate, together with measures in the urban environment such as SuDS and other green and blue infrastructure, traditional hard defences where necessary and improved land management.

This response is supported by the following organisations:

- Amphibian and Reptile Conservation
- Angling Trust
- RSPB
- Salmon and Trout Conservation
- Wildfowl & Wetlands Trust
- Woodland Trust

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