

Response to the National Infrastructure Commission environment and climate change discussion paper

July 2017

Wildlife and Countryside Link (Link) brings together 46 environment and animal protection organisations to advocate for the conservation and protection of wildlife, countryside and the marine environment. Taken together we have the support of over eight million people in the UK and manage over 750,000 hectares of land.

Summary

We welcome the opportunity to respond to the National Infrastructure Commission's (NIC) discussion paper on "the impact of the environment and climate change on future infrastructure supply and demand". We are pleased to see the environment included as a driver of change and that the paper acknowledges the important role that the environment has to play in our future infrastructure needs and solutions. However, overall there needs to be a greater emphasis placed on the environment as an asset, rather than as a challenge.

Although not an explicit objective of the NIC, our response highlights the importance of recognising the UK's international environmental commitments. For example the Convention on Biodiversity and our national Biodiversity 2020 strategy, which aims to "*halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people.*" We also highlight the UK's domestic implementation of the Sustainable Development Goals. In particular number nine – to build resilient infrastructure, promote sustainable industrialization and foster innovation – but also with respect to number 15 – to halt and reverse land degradation, halt biodiversity loss. Sustainable development cannot be achieved without a much greater strategic emphasis to not only protect, but also enhance, the environment.

Incorporating the environment in decision making

- We are supportive of the concluding remarks in the discussion paper, such as section 7.2: The environment can reduce the demand for infrastructure. However, we feel that this should be more strongly emphasised throughout the paper.
- Although briefly covered in the conclusion, we would support much greater emphasis on the opportunities for maximising the wider societal benefits that could be delivered through infrastructure projects. The NIC will be unable to demonstrate it has contributed to improving quality of life without considering how such wider benefits can be maximised. A healthy natural environment helps improve people's quality of life¹²³.

¹ IEEP, FOE (accessed 25/07/2017) Nature for Health and Equity http://www.foeeurope.org/sites/default/files/biodiversity/2017/briefing_nature_health_equity_march2017.pdf

² Pearson, D. & Craig T. (2014) The great outdoors? Exploring the mental health benefits of natural environments, *Frontiers in Psychology*, 5: 1178 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4204431/>

³ Bowler, D.E. *et al.* (2010) A systematic review of evidence for the added benefits to health of exposure to natural environments, *BMC Public Health*, 10:456 <https://bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-10-456>

- The discussion paper does, to some extent, acknowledge the potential for nature to deliver and protect infrastructure. However, we believe the National Infrastructure Assessment (NIA) should look to fully integrate the environment, green infrastructure and multiple benefits across infrastructure sectors. The environment needs to be considered at every stage, from strategic direction and cost benefit analysis, to location, design and delivery, if the NIA is to maximise the potential for infrastructure in the UK.
- Evidence suggests that sustainable urban systems can only be achieved through combining grey and green infrastructure. The design and management of urban areas greatly influences the conservation of urban biodiversity and the functionality of green infrastructure. Cities are complex ecosystems, driven by both socioeconomic activities and natural processes, and therefore need more integrated, effective, comprehensive, and multi-functional infrastructure⁴. This is a vital area for the NIC to build upon.
- Sustainable natural approaches are more flexible than hard infrastructure ones, and have greater distribution of costs. For example, providing a smart water meter and the offer of a water efficiency retrofit of taps, toilets and showers to every household customer of a water company spreads risk and cost. While a new reservoir puts many more eggs in one basket, and might end by the time it's been built, being in the wrong place for the demand it expected (as with Kielder reservoir in the North West, which anticipated significant industrial demand, but is now to a large extent a recreational facility). The same applies to community Sustainable Drainage Systems (SuDS) projects vs large new wastewater treatment plant. Big new infrastructure can also attract significant legal bills which distributed, softer infrastructure does not.
- To achieve the greatest benefits, opportunities need to be considered from the outset of infrastructure development. For example, biodiversity benefits from sustainable drainage and green infrastructure are not guaranteed unless designed into the development – from the design right through to the long-term management. SuDS, for example, can be effectively designed for multiple benefits⁵. It is not enough to assume biodiversity benefits from green infrastructure. If multiple benefits aren't considered, the developer may choose to put in tanks and concrete rills. Such schemes provide far less biodiversity opportunities compared with more vegetated options such as grassy swales, ponds and rain gardens. It is not only the type of system used, but also how that system is designed, for example, designing shallow instead of deep-water habitats. A simple sedum green roof offers far less biodiversity benefit compared to those with more diverse vegetation. Green roofs can be designed and developed to incorporate microhabitats customized for particular species and/or, more closely mimic natural habitats⁶.
- The discussion paper does not fully explore the opportunities that using natural processes can bring to reducing the capital and operational cost of infrastructure. For

⁴ Li, F. *et al.* (2016) [Urban ecological infrastructure: an integrated network for ecosystem services and sustainable urban systems](#), Journal of Cleaner Production

⁵ Graham, A. *et al.* (2014) Sustainable Drainage Systems: Maximising the potential for people and wildlife, a guide for local authorities and developers, RSPB & WWT <http://www.wwt.org.uk/conservation/saving-wetlands-and-wildlife/influencing-action/guidance/sustainable-drainage-systems-suds/>

⁶ Urban Habitats (accessed 25/07/2017) Green Roofs and Facades: A Habitat Template Approach http://www.urbanhabitats.org/v04n01/habitat_full.html

example, managed realignment reduces the costs of sea wall maintenance. In addition, there is no mention in the report of the need to protect current natural infrastructure. For example, remaining salt marshes can buffer the coast against storm surges and protect communities and defences. Approximately 100ha of saltmarsh continues to be lost each year in the UK. Investments in habitats such as saltmarsh offer value for money once wider benefits are assessed⁷.

- We encourage the NIC to work closely with the Climate Change Committee and the Natural Capital Committee. There is highly relevant cross over between organisations. For example, the 2017 Climate Change Committee Adaptation report highlights the three biggest risks for the next three years as flooding, overheating in cities and drought. There is a significant role in which infrastructure, and in particular natural infrastructure, can play in mitigating these risks.
- The Natural Capital Committee's third report concludes, "*a comparison of natural capital investment against other capital investment shows that returns on the former are competitive with the latter. This suggests that inadequate money is being allocated to improving our natural capital infrastructure, and also that societal wellbeing as a whole could be improved if resources were reallocated towards investing in natural capital.*³"
- We would like to have seen more recognition in the discussion paper around the importance of protected areas, not solely those under European designation, and the need to ensure their protection. For example, international sites such as RAMSAR, domestic statutory sites (SSSIs) at a national level, and locally important wildlife sites, as well as biodiversity outside protected areas, including irreplaceable habitats such as ancient woodland. The scale and approach required to safeguard nature is set out in the Government commissioned Lawton Review '[Making Space for Nature](#)'. This report is extremely relevant in considering the role of nature in both infrastructure and resilience.
- We urge the NIC to take this opportunity to promote biodiversity and habitat restoration and creation, both in rural and urban areas, as part of the process towards delivering a sustainable infrastructure network.
- The "big win" for infrastructure design will be the ability to avoid environmental harm, restore modified habitats and deliver habitat that is additional – not just compensatory – as well as being of sufficient quality and rich in biodiversity, so that it warrants protection in due course.

We recommend the following:

- A national, strategic approach offered by the NIC to promote the proactive design and delivery of multiple benefits. The NIC considers the opportunities for the environment to provide infrastructure and resilience, and the value of natural infrastructure for all infrastructure sectors.

⁷ Natural Capital Committee (2015) The State of Natural Capital: Protecting and Improving Natural Capital for Prosperity and Wellbeing
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/516725/ncc-state-natural-capital-third-report.pdf

- The NIA to strategically consider the catchment scale and identify where the issues and opportunities are in a catchment. For example, what interventions are needed where – what is the best package of measures (economically, socially and environmentally) to deliver resilient infrastructure. Third sector organisations should be identified where they can provide advice and experience in planning and delivering catchment scale initiatives.

Water management

- We welcome your consideration of water resources as national infrastructure. We would like to highlight that, as a national resource, it makes sense for water meters to be rolled out across the nation – not just in water scarce areas. We suggest that a smart meter for every home, linked with an offer of a retrofit of taps, toilets and showers, can make a significant contribution to closing the supply-demand gap anticipated by the reports cited (as well as reducing water and energy bills). For example, 4% of dual-flush toilets, which have been installed in millions of new homes to meet water efficiency standards, are leaking far more than they save - on average 215 litres a day. Government standards to prevent installation of these leaky loos, and programmes to repair those that are already installed (as many water companies already include in their retrofit packages), would help reduce the supply-demand gap. Homes built since 2000 are almost twice as likely to have lavatories that leak as older homes are⁸.
- Demand management is an important tool in water resources and we support more innovation by water companies in this area. Companies should be actively engaging with all their customers on water efficiency, including smart meters and free retrofits. We support the acknowledgment that it is not just the residential sector where demand savings could be made. Around 1/3rd of water abstracted is used for water companies to produce drinking water⁹, highlighting that domestic water consumption is only part of the picture and that potential savings could be made in other areas. Large demand savings could be made through better management of water in the agricultural and industrial sectors. For example, fiscal incentives for water storage and flexibility in licensing to refill in times of high river flows. We would like to see more ambition across all new water retailers on demand management as some are currently aiming far higher than others. We do not believe that the current strategic approach to abstraction licensing delivers long-term sustainability, or a fair approach to water supply. We recommend that this is considered within the NIA.
- We would like to see better alignment between water supply and flood management, whether this is through water storage or natural flood management (NFM). Evidence indicates that rainfall collected from roofs within a two kilometre square city centre area could result in an approximate reduction in run-off of 23% and provide non-potable

⁸ Waterwise (2017) Water efficiency strategy for the UK

<http://www.waterwise.org.uk/data/resources/67/Waterwise-UK-Water-Efficiency-Strategy-full-report.pdf>

⁹ Discover Water (accessed 25/07/2017) Where water comes from (date from 2014)

<http://discoverwater.co.uk/where-water-comes-from>

water needs in the area¹⁰. There is growing evidence that the same features that slow the flow and reduce flood risk also help enhance base flows during water scarce periods. For example, peatland restoration, can help store rainwater in upland areas and help recharge aquifers¹¹. Current cost benefit within water companies' results in investment schemes such as rainwater harvesting being removed as a viable option because of cost. This is because the social and flood risk benefits, as well as increased resilience of such schemes, are not properly accounted for. We would like to see funding frameworks support more NFM and multiple benefit funding, which opens opportunities for supporting more diverse and innovative projects to deliver natural infrastructure. For example in Cape Town, South Africa, new ways of providing water resources are being developed, such as designing pavements in such a way that they collect rainwater runoff as a resource. This is not driven as a flood management measure, but because there is a water crisis and residents are limited to 87 litres per day (just over half average UK daily consumption). The stormwater potential for resource in Cape Town is significant; three times the total demand falls on the city each year. [See Benjamin Biggs presentation at the International Water Association water efficiency conference in July 2017 under Presentations/Resources, recycling and quality]

- We are disappointed that Table 4 shows no relationship between 'water quantity and quality' and 'flood risk'. There are numerous reasons to indicate that such a relationship exists. For example, trade-off proposals to hold winter levels in reservoirs lower to enable them to capture storm flows; the impact floods have on the location, effectiveness and cost of water treatment; through to the potential for catchment measures to benefit water quality, as well as reduce flood risk. It is also important that the environmental parameters in the table include biodiversity (sites and species). The potential for agricultural reform to provide payments for public goods could be used to reduce flood risk, improve water quality and support water saving measures, but should also benefit biodiversity. Any future farm subsidy scheme should be subject to an Environmental Impact Assessment (EIA), including its impact on national infrastructure, water resources, quality and flood management. We recommend the NIC considers the role of land management in the delivery of infrastructure services.
- There was no mention that infrastructure itself can reduce conveyance at critical points, such as bridges creating pinch points. It is important not to increase conveyance in rural areas where we should look to slow and store water, and fail to address real conveyance issues downstream. In the recent Cumbria floods, much of the worst damage was caused at pinch-points associated with constrained water courses within built up areas (e.g. the embanked dog leg on the Greta at Keswick). The discussion paper also fails to highlight the importance of conveyance achieved through re-connecting rivers with their floodplains. The role of green infrastructure in improving conveyance should have greater emphasis, for example expanding the role of both rural and urban SuDS, and the need to plan for water management at a larger scale.

¹⁰ Doncaster, S., Blanksby, J. & Shepherd, W. (2012) Rainwater harvesting: An investigation into the potential for rainwater harvesting in Bradford. Research Report. SKINT (North Sea Skills Integration and New Technologies).

¹¹ Committee on Climate Change (accessed 25/07/2017)

<https://www.theccc.org.uk/2015/10/29/preparing-for-uk-water-extremes-flooding-and-drought/>

- We are pleased to see the role of SuDS highlighted within the paper and we highlight the role that they can play in a rural as well as urban environment. We also welcome the acknowledgement of the impact of pollution from wastewater as an important factor impacting water quality alongside urban and rural sources. However, there is little attention given to the capacity and resilience of our drainage infrastructure to cope with climate change. In 2015/16, 37,434 areas were externally flooded by sewage, and 4,344 properties were internally flooded by sewage¹². We acknowledge the huge investment already made in upgrading sewage systems around major conurbations. However, there are numerous recent examples of smaller rural sewerage treatment works being less well maintained and over-run in storm water events, with the consequent damage from overflows to river systems. There is currently no strategic analysis by water companies as to their long-term sewer and treatment needs. We support current work looking at how to deliver long-term wastewater plans and urge the NIC to consider such plans within the NIA. In addition, we highlight that private sewerage systems such as septic tanks and small sewage treatment works are understood to provide as much as 10% of diffuse rural pollution affecting water bodies in some areas. Yet, little work is being done to reduce pollution from these sources. As there is no registration, there is no record of where septic tanks exist, or of their maintenance or performance.
- There is a clear role for the Government to play in driving ambitious water efficiency. Recent comments and speeches from Defra have referred only to abstraction licensing reform as the Government's contribution to reducing the gap between supply and demand. But there are other tools within the Government's control, including standards and regulations. For example, much water is wasted, even in new products in new homes. We have no mandatory water efficiency label for products (unlike with energy), and new toilets that leak millions of litres of water every day are still being installed. [Waterwise's Water Efficiency Strategy for the UK](#) (2017), sets out a blueprint for innovative and ambitious water efficiency across the UK, with a role for all players, including government and industry. One planning tool, which could be used at a local level, is water neutrality. This is where new development is only permitted subject to retrofitting measures in homes, schools, hospitals, businesses etc. in the surrounding area, to ensure no increase in demand.

Green infrastructure

- We support the discussion paper's position that green infrastructure can contribute to the provision of infrastructure services, as well as provide valuable multiple benefits. However, there was little mention of the role green infrastructure can play in protecting hard infrastructure itself, such as rail depots and roads, and in increasing infrastructure resilience.
- SuDS are an important green infrastructure option, which, when designed and delivered appropriately, can provide substantial social and environmental benefits.

¹² Discover Water (accessed 13th July 2017) <http://www.discoverwater.co.uk/sewer-flooding>

There is growing evidence that retrofitting SuDS is cost effective¹³¹⁴. These systems are also extremely valuable in improving quality of life, enhancing people's sense of space and community, and reducing the risk of flooding, which can have significant mental health implications¹⁵. SuDS themselves have additional benefits associated with improving mental health. Assessments indicate that if SuDS were retrofitted into all schools in Manchester, they could have mental health benefits through increased access to green space, which is equivalent to around £120 million over a ten year period¹⁶.

- Sea level rise is only briefly mentioned within the discussion paper, but is an important aspect of climate change and impacts on communities and infrastructure. The environment can play an important role in buffering communities and hard infrastructure. For example, managed realignment can create saltmarsh habitats that dissipate wave energy, providing a first line of defence against tides and waves, particularly during storms. Hence, they can reduce the capital and maintenance costs of fixed flood defences, whilst also acting as sinks for pollutants and carbon, and providing valuable recreational opportunities. Evidence suggests that such schemes are cost beneficial¹⁷¹⁸¹⁹. For example, the 400 hectare Alkborough Flats managed realignment scheme on the Humber estuary cost around £10 million to build and provided around £12 million of storm protection benefits to land and property. It also created new intertidal habitat, and delivered other ecosystem services benefits valued at about £1 million per annum²⁰. Maintaining flood defences at Abbots Hall was estimated to have a benefit to cost ratio of 1.3 compared with 2.81 for managed realignment. At Horsey Island the benefit to cost ratio of maintaining defences was 0.78 compared with 1.64 for managed realignment²¹.
- Managed realignment can often be the most economic flood defence option, even without taking habitat values into account. The full potential of managed realignment is only apparent if appraisals take into account the social opportunity cost of land lost, the social benefits of habitat and recreational opportunities, and wider benefits of carbon storage, pollution control, fisheries and flood risk. In particular, efficiencies would be better realised if appraisals of Flood and Coastal Erosion Risk Management (FCERM) options considered wider, whole-estuary scales. Managed realignment and related

¹³ Wolf, D.F., Duffy, A.M. & Heal, K.V. Whole Life Costs and Benefits of Sustainable Urban Drainage Systems in Dunfermline, Scotland

http://www.saltiresociety.org.uk/Downloads/International_Travel_Bursary/civil/rad45EF6.pdf

¹⁴ BeST Case Study: Reducing Combined Sewer Overflow Spills in Roundhay (accessed 20/07/2017)

http://www.susdrain.org/files/resources/BeST/best_case_study_roundhay_v2.pdf

¹⁵ Kaźmierczak, A & Cavan, G. (2011) Surface water flooding risk to urban communities: Analysis of vulnerability, hazard and exposure, *Landscape and Urban Planning*, 103(2): 185-197

¹⁶ BITC, WWT (2017) Water Resilient Cities: The multiple benefits of a strategic retrofit of SuDS in schools across Greater Manchester <http://environment.bitc.org.uk/environment-knowledge-hub/multiple-benefits-report-2>

¹⁷ Tinch, R., and L. Ledoux. 2006. [Economics of Managed Realignment in the UK](#). Environmental Futures Limited.

¹⁸ Turner, R. K., D. Burgess, D. Hadley, E. Coombes, and N. Jackson. 2007. A cost-benefit appraisal of coastal managed realignment policy. *Global Environmental Change* 17: 3-4: 397-407.

¹⁹ Shepard, C.C., Crain, C.M. & Beck M.W. (2011) [The Protective Role of Coastal Marshes: A Systematic Review and Meta-analysis](#), *PLoS One*, 6(11): e27374. Published online 2011 Nov 23.

²⁰ Everard, M. (2009) Ecosystems Services Case Studies. Environment Agency Science Report.

http://catalog.ipbes.net/system/assessment/194/references/files/569/original/Using_science_to_create_a_better_place_-_ecosystem_services_case_studies_2009.pdf?1364317641

²¹ Hardiman, N & Cathcart, R (2013) The Synergies Project Final Report: Identifying opportunities for the integrated delivery of outcomes across the Biodiversity 2020, Water Framework Directive and Flood and Coastal Risk Management Programmes, Defra

options may offer substantial benefits in terms of achieving sustainable estuarine or coastal forms, and by making maintenance of existing defences elsewhere viable²².

We recommend the following:

- For the NIA to understand how planning policy to build at any cost may influence the resilience infrastructure and communities to climate change, and in particular to restrict the delivery of green infrastructure.
- For the NIA to consider green infrastructure as an integral part of its infrastructure network and its role in delivering resilient infrastructure. In order to achieve this, a green infrastructure strategy could be valuable, including a local mapping exercise to better understand the green infrastructure network. Layers such as flood risk and opportunities for further green infrastructure could help identify where green infrastructure may be most cost-beneficial.

Strategic approach

- We are concerned at the statement that “as the UK leaves the European Union there may be an opportunity to revisit some of these standards to ensure that they are well designed, unintended outcomes are avoided, and overall benefits secured.” There is substantial evidence that supports the EU’s environmental records, in particular the Birds and Habitats Directives²³. It is the UK’s transposition and delivery of the Directives – not the legislation itself – which could be improved to ensure that unintended outcomes are avoided and benefits secured. All environmental legislation should be converted from EU to domestic law, with any ‘non-technical’²⁴ changes made only by primary legislation. This will allow Westminster Parliament and the devolved legislatures to take a full and proper role in scrutiny. Such an approach would help ensure that future infrastructure is truly sustainable and contributes to quality of life.
- We strongly support retention of the ‘one out, all out’ classification under the Water Framework Directive, as a failure in any one metric is almost always symptomatic of an environmental stressor. We also believe that the benefits to communities from environmental protection and restoration are not taken into sufficient consideration within local planning. As a result, this can lead all too often to an argument of disproportionate cost, or overriding public interest, being used as an excuse to overlook environmental damage.
- Any reduction in legislative standards could not only lead to the declining health of water bodies, but also a roll back in investment in research, development and innovation, such as in phosphate stripping technology. Such an outcome would surely work against the objectives of the NIC. The Science and Technology Committee review on water quality and priority substances recommends water companies look to

²² Tinch, R. & Ledoux, L (2006) Economics of Managed Realignment in the UK

²³ <https://www.wcl.org.uk/habitats-and-birds.asp>

²⁴ ‘Non-technical changes’ are changes other than those necessary in order for the legislation to continue to operate, following the removal of EU institutions.

natural processes for innovative approaches – there is much more in this field which could be developed²⁵.

- We welcome an evidence-based assessment, however, where data gaps exist it is important that action is still undertaken and adapted as evidence becomes available. There is a risk that the assessment focusses too much on the need for data – when is there enough data? – and not enough on the need for action. In some situations, it is necessary to consider whether there is evidence to oppose an approach. For example, we agree that to date most of the evidence around successful catchment management approaches is at relatively small scales. However, there is little evidence on how these effects scale up, rather than evidence indicating that scaling up catchment management approaches do not work. The recent NERC supported call for evidence may begin to address some of these gaps. Additionally, modelling is being undertaken on the effects of NFM in Cumbria, which we believe will suggest that an effect is possible at larger scales. This is critical, as many small and isolated communities will not benefit from grant in aid for engineered schemes; a small reduction in peak could make a significant difference in whether a community floods or not.

We recommend the following:

- The NIA considers where more evidence is needed and how best to fill those evidence gaps, for example through the delivery of pilot projects.
- Long-term, regular environmental monitoring continues post-Brexit to adequately collect data on the impacts of infrastructure on the environment and vice versa. This should include hydrological and ecological responses to changes in water quantity and quality. For example, from sedimentation and excessive nutrient input and for chemicals of concern and emerging chemicals of concern. Without this monitoring, we risk not understanding the whole picture, such as the impacts of multiple pressures and cumulative effects.

We fully support the final paragraphs of the discussion paper and reiterate that the environment as a driver should not be automatically considered in opposition to the delivery of the other drivers, instead to assist the delivery of them. Often environmental damage can be avoided or mitigated if considered properly from the outset.

The following organisations support this response:

- Angling Trust
- CPRE
- Friends of the Earth England
- Institute of Fisheries Management
- Marine Conservation Society
- Rewilding Britain
- RSPB
- Salmon & Trout Conservation
- The National Trust
- The Wildlife Trusts
- The Woodland Trust
- The Rivers Trust
- Waterwise
- Wildfowl & Wetlands Trust
- WWF

²⁵ Science and Technology Committee (2013) First Report, Water quality: priority substances, House of Commons <https://www.publications.parliament.uk/pa/cm201314/cmselect/cmsctech/272/27202.htm>