

## iCASP Response to Westminster Sustainable Business Forum Water and Housing Inquiry

November 2017

### iCASP

1. Yorkshire Integrated Catchment Solutions Programme (iCASP) is a five-year (2017-2022) Natural Environment Research Council-funded partnership established to support the UK Industrial Strategy. iCASP aims to generate £50 million+ of benefits to Yorkshire's economy by influencing investments, informing policies and strategies, identifying cost savings, and creating new products and jobs. It will do this through projects that support the use of environmental science in catchment management. As well as regional impact, iCASP is aspiring for national and international influence through sharing the experience of regional projects at the national level, and by exporting catchment management expertise and products internationally.
2. iCASP partners are: University of Leeds, University of Sheffield, University of York, National Centre for Atmospheric Science, Arup, Bradford Metropolitan Borough Council, City of York Council, Dales to Vales River Network-Yorkshire Dales Rivers Trust, Environment Agency, IUCN UK Peatland Programme, JBA Trust, Leeds City Council, Linking Environment and Farming, Met Office, Natural England, National Farmers' Union, Pennine Prospects, Yorkshire Water, Yorkshire West Local Nature Partnership, and Yorkshire Wildlife Trust. iCASP is also looking to work with additional organisations through its projects.
3. iCASP is based out of water@leeds at the University of Leeds, one of the largest interdisciplinary centres for water research in any university in the world.
4. Further information about iCASP can be found at <https://icasp.org.uk/>
5. This response is from the iCASP Programme Office based at the University of Leeds, rather than on behalf of the iCASP partners. It addresses two of the key themes outlined in the Call for Evidence:
  - i. What are the practical solutions that can both improve water efficiency and mitigate flood risk? What are the new innovative solutions in the sector, and what micro-trials can be successfully operated at scale? What are the 'game changers' that will have a significant impact? What transferable practical lessons can we learn from international as well as national experience?
  - ii. How do we build more water-efficient homes and communities (garden towns, housing estates) that will be resilient to climate change? What do you know has worked and failed previously? What has prevented the building of water-efficient flood-resilient homes in the past?

Practical and innovative solutions, upscaling, and what has prevented the building of water-efficient, flood-resilient homes

6. An increasing body of research on integrated catchment management solutions has coincided with flood managers looking to take a twin-track approach involving both hard, engineered solutions in flood zones and solutions that seek to mitigate flood risk using targeted interventions throughout the catchment. However, the evidence base to quantify the flood benefits of various strategies that could be incorporated into the latter, is only just beginning to develop<sup>1</sup>. In addition, water companies are increasingly adopting catchment solutions to manage their land holdings to improve water quality before it reaches treatment works, for example the Sustainable Catchment Management Programme (SCaMP)<sup>2</sup> and Upstream Thinking<sup>3</sup>.
7. An ambitious strategic plan for delivering water-efficient and flood risk resilient homes at volume needs to adopt the principle of working at river catchment scale, linking to catchment management plans, Local Plans and Spatial Development Strategies (the latter as proposed in the Housing White Paper *Fixing our broken housing market*), and other plans, policies and strategies, in order to better align water (including flood) and housing infrastructure (a need recognised in the Industrial Strategy Green Paper *Building our Industrial Strategy*).
8. iCASP was established because of the consensus from its partners of the need to work at catchment scale.
9. It is our view that without such an approach, upstream factors contributing to housing flood risk and poor water quality may not be mitigated, and the downstream impacts, including on flood risk, water quality and ecology, and other topics addressed by National Planning Policy Framework (and associated planning practice guidance), will not be recognised adequately and addressed in housing design/planning.
10. Planning at such a scale also enables the consideration of cumulative impacts (the importance of which is reflected in the Housing White Paper) which could result from the combined effect of a number of new housing developments. Notably this combined effect is not merely the sum of effects from a set of new housing developments. Rather the effects interact because at a catchment scale the altered timing of flows from different parts of the catchment interact with the timing of the flows in the main channel creating non-linear responses<sup>4</sup>. Furthermore, some parts of the catchment will be more sensitive

<sup>1</sup> Dadson SJ et al. 2017 A restatement of the natural science evidence concerning catchment-based 'natural' flood management in the UK. *Proc. R. Soc. A* 473: 20160706.

<http://dx.doi.org/10.1098/rspa.2016.0706>; Burgess-Gamble, L., Ngai, R., Wilkinson, M., Nisbet, T., Pontee, N., Harvey, R., Kipling, K., Addy, S., Rose, S., Maslen, S., Jay, H., Nicholson, A., Page, T., Jonczyk, J., Quinn, P. (2017) *Working with Natural Processes - Evidence Directory*, Environment Agency - October 2017, Project Number SC150005.

<https://www.gov.uk/government/publications/working-with-natural-processes-to-reduce-flood-risk>; Rogger MG et al. (2017) Land-use change impacts on floods at the catchment scale – Challenges and opportunities for future research. *Water Resources Research*, doi: 10.1002/2017WR020723.

<sup>2</sup> SCaMP <https://www.catchmentbasedapproach.org/deliver/scamp>

<sup>3</sup> Upstream Thinking <http://www.upstreamthinking.org/index.cfm?articleid=8692>

<sup>4</sup> Acreman, M. and Holden, J. (2013) How wetlands affect floods. *Wetlands* 33, 773-786.

to development than others, particularly in terms of the resultant outcome on downstream flood risk<sup>5</sup>.

11. Working across traditional planning boundaries in a way that recognises the interconnectivity of ecosystems and their management is also a more suitable operational scale for Working With Natural Processes (the increasing body of research associated with such approaches has been synthesised by the Environment Agency<sup>6</sup>) and for working with all relevant stakeholders. Currently there is a lack of a joined-up approach between different organisations with overlapping remits to deal with water-efficiency and flooding.
12. iCASP should be seen as a resource in the development of a strategic plan for delivering water-efficient and flood risk resilient homes. iCASP can help to ensure that world-leading research from the iCASP university partners on upland management for reducing flood risk and improving water quality, valuing green infrastructure for cost-benefit analysis, flood forecasting and risk reduction, climate change adaptation, and sustainable drainage systems is accessible, to develop innovative solutions to address complex catchment management challenges. Bringing together researchers from different disciplines with developers, water companies, planners, and risk management authorities is a key part of this process.
13. Already the iCASP is contributing to the delivery of the Leeds City Region Strategic Economic Plan 2016-2036 (and its aspirations to build 10,000-13,000 homes per year)<sup>7</sup> by supporting the development of the Leeds City Region Green and Blue Infrastructure Strategy (in preparation) which is prioritising building green infrastructure into housing developments.
14. iCASP is also working to protect housing and water infrastructure by providing evidence for flood alleviation schemes in Leeds, Sheffield and York.

### Conclusions

- An ambitious strategic plan for delivering water-efficient and flood risk resilient homes at volume needs to adopt the principle of working at catchment scale. This means thinking about: i) the upstream solutions to flood risk for housing; ii) the on-site measures that reduce downstream flood risk and water quality problems and water-use efficiency, and iii) how housing features and impacts combine and interact with the flows of water across catchments.
- The Yorkshire Integrated Catchment Solutions Programme (iCASP) is a resource for accessing evidence on integrated catchment solutions.

<sup>5</sup> O'Donnell, G., Ewen, J. and O'Connell, P.E. (2011) Sensitivity maps for impacts of land management on an extreme flood in the Hodder catchment, UK, *Physics and Chemistry of the Earth* 36, 630-637.

<sup>6</sup> Burgess-Gamble, L., et al. (2017) *Working with Natural Processes - Evidence Directory*, Environment Agency - October 2017, Project Number SC150005.

<https://www.gov.uk/government/publications/working-with-natural-processes-to-reduce-flood-risk>

<sup>7</sup> Leeds City Region Enterprise Partnership and West Yorkshire Combined Authority (2016) *Leeds City Region Strategic Economic Plan 2016-2036*, May 2016, [www.the-lep.com](http://www.the-lep.com)

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- Programmes like iCASP could be scaled-up to provide a national service or replicated in multiple regions to enable efficient access to evidence to support the implementation of policies related to catchment management such as those on water and housing.