The Catchment Change Network Knowledge Exchange Project
Grant No. NE/G008787/1
Final Report

Summary

The Catchment Change Network had the aim of enabling the exchange of knowledge between the NERC research base and science user community to understand and manage uncertainty and risk related to water scarcity, flood risk and diffuse pollution management. It did this through an internet based network and web site, workshops and training events, and annual meetings for network members, including a final international meeting. The success of CCN has led to the continuation of the project as the Catchment Change Management Hub (ccmhub.net).

Successes

1. CCN developed a network of over 950 people interested in catchment change ranging from academics, the water industry, consultancies, Government, Environment Agency, Defra, Ofwat, Rivers Trusts and other NGOs, and interested members of the public.
2. The main CCN dissemination tool was the Web site catchmentchange.net, which provided information on events, links to other sites (including a Web ring with the Demonstration Test Catchments sites) and an interactive blog called Catchment Conversations. The CCN web site will be archived.
3. CCN organised some 9 meetings and training events, including three Annual Conferences. Joint workshops were held in collaboration with the Flood Risk Management Research Consortium, the Royal Town Planning Institute, the North West Brownfield Regeneration Forum, the England Catchment Sensitive Farming Delivery Initiative, the Water UK Management Group, and the NERC Water Security Knowledge Exchange Programme.
4. The last annual conference event, with the title on *Stakeholders, Next Generation Models and Risk in Managing Catchment Change*, was an international two-day event that brought together from all the areas represented by the CCN network but also extended to some interested members of the public and two artists.
5. Guideline documents were produced from each of the focus areas of water scarcity, flood risk and diffuse pollution. These ranged in nature from an academic paper in water scarcity (Hall et al., 2012) that is having influence on Environment Agency and Ofwat approaches; to a Framework for assessing uncertainty in fluvial flood risk mapping, to be published by CIRIA, and a range of guideline documents for different stakeholder groups in diffuse pollution, including a calendar produced for farmers complete with tips on how to minimise and mitigate diffuse pollution (this can be downloaded from http://ccmhub.net/2013-catchment-change-calendar/). One thousand hard copies were also produced and distributed in collaboration with the Eden Rivers Trust targeting farmers, academics and researchers.
6. As a result of discussions with the CCN Steering Group and others, the CCN has evolved into a Catchment Change Management Hub with the aim of providing a common resource for all information and tools for anyone interested in catchment change management from the public to policy makers. This has now gone live (see ccmhub.net) with initial funding from the Water Security KEP and BIS-ScienceWise. Important input to the CCM Hub project has been provided by Cascade Consulting; charged by Defra to review the experience of the Pilot Catchment Based Approach catchments and produce a Handbook for Catchment Change Management. This handbook will be incorporated into the CCM Hub site.

Outputs: Web site

Web site: http://www.catchmentchange.net/- includes reports of CCN workshops.

Outputs: Newsletters

A series of nine e-newsletters sent out to all contacts on the database.

Outputs: Publications

Beven, K J, Leedal, D T and Alcock, R, 2010, Uncertainty and good practice in hydrological prediction, Vatten, 66:159-163

Beven, KJ, Leedal, DT, Alcock, R, Hunter, N, Keef, C and Lamb, R, 2010, Guidelines for Good Practice in Flood Risk Mapping: The Catchment Change Network, Proceedings HydroPredict2010,

Beven, K. J. and Alcock, R., 2012, Modelling everything everywhere: a new approach to decision making for water management under uncertainty, Freshwater Biology, 56, doi:10.1111/j.1365-2427.2011.02592.x

Beven, K J, Leedal, D T, Hunter, N, Lamb, R, 2012, Communicating uncertainty in flood risk mapping, in Proceedings, FloodRisk2012

Beven, K J, 2013, Use of models in flood risk management, Chapter 2 in Beven, K J and Hall, JW (Eds.) Applied Uncertainty Analysis for Flood Risk Management, Imperial College Press / World Scientific: London, in press

Beven, K J, 2013, A framework for uncertainty analysis, in Beven, K J and Hall, JW (Eds.) Chapter 3 in Applied Uncertainty Analysis for Flood Risk Management, Imperial College Press / World Scientific: London, in press

Beven, K J, 2013, The GLUE methodology for model calibration with uncertainty, Chapter 6 in Beven, K J and Hall, JW (Eds.) Applied Uncertainty Analysis for Flood Risk Management, Imperial College Press / World Scientific: London, in press

Hall, J W, G. Watts, M. Keil, L. de Vial, R. Street, K. Conlan, P.E. O'Connell, K.J. Beven, C.G. Kilsby, 2012, Towards risk-based water resources planning in England and Wales under a changing climate, CIWEM Water and Environment J, 26: 118-129, doi:10.1111/j.1747-6593.2011.00271.x

Hall J. W., 2013, Decision making under uncertainty, Chapter 1 in Beven, K J and Hall, JW (Eds.) Applied Uncertainty Analysis for Flood Risk Management, Imperial College Press / World Scientific: London, in press

Hall, J. W., Harvey, H amd Tarrant, O., 2013, Uncertainty and Sensitivity Analysis of Current and Future Flood Risk in the Thames Estuary, Chapter 14 in Beven, K J and Hall, JW (Eds.) Applied Uncertainty Analysis for Flood Risk Management, Imperial College Press / World Scientific: London, in press

Haygarth, P. M., Page, T. J. C., Beven, K. J., Freer, J., Joynes, A., Butler, P., Wood, G.A., and Owens P. N., 2012, Scaling-up the phosphorus signal from soil hillslopes to headwater catchments, Freshwater Biology, 57, DOI: 10.1111/j.1365-2427.2012.02748.x

Laeger, S, Cross, R, Sene, K, Weerts, A, Beven, KJ, Leedal, DT, Moore, RJ, Vaughan, M, Harrison, T and Whitlow, C, 2010, Probabilistic flood forecasting in England and Wales - can it give us what we crave?, BHS International Hydrology Symposium 2010.

Leedal, D, Beven, K, Neal, J, Bates, P, Hunter, N, 2010, A case study of tools for manipulating and visualising large flood risk management data sources, BHS International Hydrology Symposium 2010, Newcastle University.

O'Connell E, Blenkinsop S, O'Donnell G, Hall J. (2010) Evaluating strategies for adaptation investment in a highly variable climate. *Paper presented at BHS Third International Symposium: Role of Hydrology in Managing Consequences of a Changing Global Environment*., Newcastle upon Tyne.

Page, T., A. L. Heathwaite, B. Moss, C. Reynolds, K. J. Beven, L. Pope and R. Willows, 2012, Managing the impacts of nutrient enrichment on river systems: dealing with complex uncertainties in risk analyses, Freshwater Biology, 57, DOI: 10.1111/j.1365-2427.2012.02756.x.

Sene, K, Weerts, A, Beven, K J, Moore, R, Whitlow, C, Laeger, S and Cross, R, 2013, Uncertainty estimation in fluvial flood forecasting applications, in Beven, K J and Hall, JW (Eds.) Applied Uncertainty Analysis for Flood Risk Management, Imperial College Press / World Scientific: London, in press

Outputs: Commentaries

Beven, K J, 2011, I believe in climate change but how precautionary do we need to be in planning for the future? Hydrological Processes, 25, 1517-1520, DOI: 10.1002/hyp.7939.

Beven, K J and Westerberg, I, 2011, On red herrings and real herrings: disinformation and information in hydrological inference, Hydrological Processes, 25, 1676-1680, DOI: 10.1002/hyp.7963.

Beven, K J, Buytaert, W and Smith, L. A., 2012, On virtual observatories and modelled realities (or why discharge must be treated as a virtual variable), Hydrological Processes, DOI: 10.1002/hyp.9261

Juston, J. M., A. Kauffeldt, B. Q. Montano, J. Seibert, K. J. Beven and I. K. Westerberg, 2012, Smiling in the rain: Seven reasons to be positive about uncertainty in hydrological modelling, Hydrological Processes, DOI: 10.1002/hyp.9625

Beven, K J, 2012, So how much of your error is epistemic? Lessons from Japan and Italy. Hydrological Processes, DOI: 10.1002/hyp.9648.

Outputs: Calendar

The Catchment Change Network Calendar 2013 Planting seeds to reduce water pollution from agriculture (available from CCN website and CCM Hub)

Walker, M., Mackay, E., Haygarth, P., 2012, Calendar rationale: spreading seeds to reduce water pollution from agriculture

Outputs: Guidance documents

Framework on reducing diffuse pollution from agriculture – perspectives from catchment managers

Framework on reducing diffuse pollution from agriculture – perspectives from policy makers

What part are the Demonstration Test Catchments playing in addressing water pollution? (In collaboration with the DTC project)

Beven, K. J., Leedal, D. T., McCarthy, S., 2013, Framework for assessing uncertainty in fluvial flood risk mapping, CIRIA, in press.

Hall, J W, G. Watts, M. Keil, L. de Vial, R. Street, K. Conlan, P.E. O'Connell, K.J. Beven, C.G. Kilsby, 2012, Towards risk-based water resources planning in England and Wales under a changing climate, CIWEM Water and Environment J, 26: 118-129, doi:10.1111/j.1747-6593.2011.00271.x