WEAVER VALLEY

"Finding Space for Water"
-Floodplain Restoration
In the Weaver Valley

Summary Report
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"Finding Space for Water"-Floodplain Restoration in the Weaver Valley

The Government and the Environment Agency recognise that our river systems have become so heavily modified that they are no longer capable of performing natural flood management functions. The new policy set is clear; there is an evident need to work "with" rather than "against" nature; including the need to reconnect rivers to their natural floodplains restoring their natural hydrological functions. By reducing the environmental impact of structural defences and engineering schemes the new approach has importance in contributing to other policy areas including the Water Framework Directive, a strong adaptation delivery response to the climate change agenda and delivery of environmental, social and economic benefits consistent with the Government`s sustainable development principles.

"The Weaver Valley could be a great flagship nationally for this sort of large-scale approach, would be a good attractor of funds for implementation, great for public relations for visitors and residents, demonstrate responsible governance from the political angle and be a good draw from the tourist perspective as the potential for landscape improvement would be excellent"

(Chris Mahon, Director of Conservation, Cheshire Wildlife Trust and Chair of the Natural Environment Task Group, WVRP)

Setting the Context-the Loss of Natural Floodplains and Wetlands

The development of floodplains for agriculture, settlements and industry, ensued by the need to engineer flood defences to protect this economic investment now lying vulnerable on floodplains, has led to the loss of approximately 98% of natural rivers and their associated floodplains in Europe (Blackwell and Maltby, 2005). Not withstanding the loss of valuable riparian and floodplain habitat; land drainage, urbanisation, river regulation (e.g. channel straightening and shortening, construction of embankments and general reduction of the floodplain area) reduces the natural water storage capacity of catchments and increases discharge peaks of rivers, particularly in their lower reaches (Blackwell and Maltby, 2005). Inevitably, this has led to a substantial rise in flood hazard and vulnerability to flooding events over recent decades. The Water Framework Directive (EU, 2000), has raised concerns over the current flood control paradigm across Europe and questioned the centuries old system of structural defence (Werritty, 2006). Structural defences will continue to be essential to protect development in selected areas (Blackwell and Maltby, 2005), however river impoundment in addition to being prohibitively costly also often exacerbates the flood risk problem and absolute protection is not actually possible (Menzel and Kundzewich, 2003). With the prospect of increasing flood risk associated with climate change it is now widely considered time for a different approach in tackling flood risk (Ostaficzuk and Ostrowski, 2003).

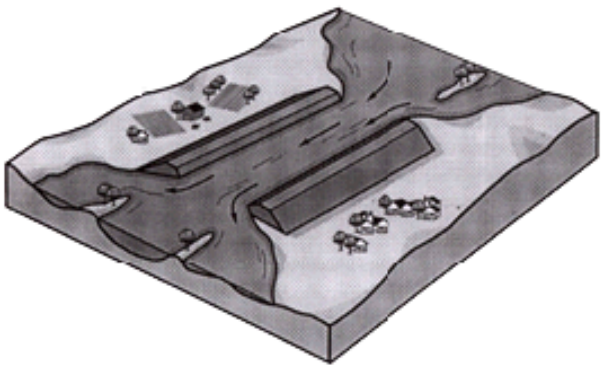

Figure 1:

In many cases river impoundment can exacerbate the flood risk problem. Constricting a river and increasing flow velocities potentially transfers flood risk upstream and downstream of the structural defences. This `flood defence paradigm` has continued for decades (Werritty, 2006).

Source: www.friendsoftheriver.org

Natural Flood Defence

An international network of ideas and body of international research and practice has begun to influence flood defence thinking in the UK: “natural flood defence”, and in particular “floodplain restoration”, being a pre-eminent emerging solution to the increase in flood risk and costs.

“The long-term solution to flood devastation is to restore our floodplains and wetlands. These habitats provide vital functions in rain retention, water storage and flood alleviation as well as supporting a wealth of wildlife. It is essential that we work with nature and not against it. The use of hard engineering for flood protection is not the only solution, and in some cases can make things worse.”

The Wildlife Trusts Water Policy Manager, Allison Crofts (2000)

The Wildlife Trusts recognise within their recent report “A Living Landscape” that the natural systems on which our health, resources and wellbeing demand are in urgent need of repair. The Trusts recommend we accelerate our efforts to think “bigger and longer term”, including at the whole river catchment scale, to transform our landscape within a generation: “living landscapes that support, inspire and renew. Through them we can halt biodiversity loss, create truly sustainable communities, reconstruct a resilient countryside able to adapt to climate change, and enjoy business that grows as a result of, rather than at the expense of, a healthy environment” (Wildlife Trusts, 2006). This approach includes the recommendation to incorporate natural processes into policies to ensure long-term cost effectiveness and sustainability such as moving away from hard flood defences to more natural solutions (Wildlife Trusts, 2006).

“Excess water entering a naturally functioning floodplain, either from over river bank flow or from adjacent hill slopes as runoff, is temporarily stored, then is slowly redistributed during periods of low flow, overall serving to delay and reduce river peak discharge. Reducing peak discharge decreases the probability of the occurrence of floods downstream” (Blackwell and Maltby, 2005).

Figure 2: The Halkaer Wetland Re-Creation Project, North Jutland, Denmark

Source: K Potter

Despite supportive government policy, floodplain restoration projects for flood alleviation in this country are reported to be few and of a small scale due to the conservative approach of key stakeholders, poor funding and low stakeholder awareness and support. There are opportunities available for re-wetting through the agri-environment schemes. However, farmers and landowners are often understandably reluctant to enter into wetland habitat creation projects within agri-

environment schemes due to current payments being too low to provide financial incentive and attract wide spread uptake, a lack of uncertainty over future incomes and the fear of the difficulty of reversing capital works in the future (OnTrent, 2005). The 'Making Space for Water' document recognises that the expense of flood alleviation schemes could out weigh the whole agri environment structure', from a funding source that is already being squeezed.

An effective multi-agency partnership, achievement of multiple objectives (biodiversity, landscape and social benefits) and strong stakeholder engagement facilitate floodplain restoration projects (Potter, 2006).

A Project in the Weaver Valley Regional Park-Achieving Multi-Objectives through Floodplain Restoration?

The Weaver Valley believes it can act as a "catalyst for projects" (WVRP, 2006, p5). Due to the wide ranging partnership, including regional and local planning authorities and key organisations, many with involvement in implementing the NWDA`s Climate Change Action Plan and an inherent interest, responsibility and/or expertise in tackling flood risk, the WVRP has strong potential to influence policy making and facilitate an exemplar, demonstration project or catchment based approach to floodplain restoration. In doing so, overcoming the current often fragmented approach to planning and consequent lack of strategic direction to flood risk management found nationally (Potter, 2006). The WVRP project has recently been successful in a bid application for resources to deliver a mitigation and adaptation climate change strategy, of which floodplain restoration could feature as a main component. In addition to addressing flood risk and the climate change agenda, a floodplain restoration project could help deliver the key social, economic and environmental benefits the Weaver Valley Project aims to achieve.

Flooding in the WVRP

The WVRP falls within the Weaver/Gowy catchment (see figure 3). Fluvial flooding is the major cause of flood risk in the WVRP, with most of the flood risk problem areas located on and around the main rivers. "Inadequate floodplain capacity" affects the vast majority of properties at risk of flooding in the catchment due to insufficient channel capacity and the affected properties being located on low lying land in the rivers' natural floodplains. Flooding from blockage, inadequate capacity or failure of culverts is another major flood issue. The overall flood risk to the catchment is believed to be low, as much of the catchment is rural in character and there is a low estimated return period of flood problems.

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Figure 3: The Weaver Valley Regional Park Boundary, set within the Wider Weaver Catchment (in blue)

It might be questioned why a floodplain restoration project is not being targeted at a higher risk area? However, "low flood risk" means flood defence works in the catchment can often be of a lower priority for the Environment Agency in terms of capital spend, hence alternative funding solutions achieving multiple objectives could prove attractive to alleviate flooding to those properties that remain at risk in the WVRP. It is also an "overall" assessment of the catchment; specific areas suffer a higher risk, in particular Northwich.

Locations at Risk of Flooding within the WVRP

Figure 4: EA Floodplain Map of Northwich Town Centre

(Extracts and details on flood risk issues related to the Weaver Valley have been sourced from the EA`s Weaver Gowy Catchment Flood Management Plan (CFMP) Inception Report (2006a), the Local EA Plan (LEAP) Action Plan (1998) and Consultation Report (1997) for the Weaver/Dane and the Agency`s Floodplain maps (*http://maps.environment-agency.gov.uk/wiyby/wiy by Controller),* unless otherwise referenced.)

Northwich suffers the main urban flood risk in the WVRP. The River Weaver floods properties south of Northwich (see figure 4) before converging with the River Dane in the town centre; this is the main flood risk location. A significant flood event occurred in 1946 flooding 326 properties. Flooding from the Weaver and Dane also occurred in 2000 and 2001. Northwich is considered a medium flood risk location but the EA believe this may "underestimate future risk" (EA, 2006a). Potential areas for regeneration lie on the floodplain. The Environment Agency is currently investigating potential flood risk management options for the town.

As the Weaver flows north it converges with Witton Brook bringing flood risk to Winnington, an industrial area of Northwich, site of the proposed "Winnington Urban Village". There is a fluvial and tidal threat to at Frodsham from the Weaver Navigation and surrounding tributaries. The southern industrialised part of Runcorn is a potential flood problem area with Rocksavage Power Station, an industrial estate and the Chemical Works at risk in this low lying floodplain, however, the Weaver sluices are available to control flow levels to a degree (EA, 2006a). The Weaver Navigation flows through Winsford putting more than residential properties at risk.

Middlewich constitutes a principle flood problem area. It is thought culvert problems may be the flooding mechanism as the River Croco and the River Wheelock meander through the town (EA, 2006f). The Wheelock causes flood risk problems in Sandbach, associated with properties being too close to the floodplain. In Wheelock, near Sandbach, culvert problems are thought to contribute to the cause of flooding coupled with the confluence of 4 tributaries in a residential area (EA, 2006f). Flood Risk in Crewe & Nantwich District Crewe and Nantwich are the two urban areas that stand out from their rural environment (EA, 2006a). Crewe in the Upper Weaver sub-catchment has several major watercourses flowing through the town, before they converge with the River Weaver. Development has occurred all along each watercourse and therefore inadequate floodplain capacity is the main mechanism for flooding. Crewe is thought to be a low/medium flood risk location, including Wells Green, within the WVRP (EA, 2006a). A smaller number of properties are believed to be at flood risk from the Weaver in Nantwich with flooding occurring in 1971, 1999 and 2000. These locations are thought to have a low probability of flooding (EA, 2006a).

National and Regional Policy Drivers for Floodplain Restoration

The serious flooding incidents across Europe and the Foresight "Future Flooding" report have led to Defra`s new "comprehensive, integrated and forward-thinking strategy" for managing both future flood and coastal erosion risks in England: "Making Space for Water". The strategic document was developed in the context of climate change adaptation. It looks to adopt a whole catchment approach, involving all stakeholders in achieving a better balance between the economic, social and environmental "three pillars of sustainable development" (DEFRA, 2005A, p8). As the document's title indicates, "more space for water" will be made, through for example, promoting the greater use of rural land use solutions, such as the creation of wetlands and washlands and the appropriate use of realignment to widen river corridors achieving multi-functional benefits where possible.

The Environment Agency, responsible for managing flood risk from main rivers and a general supervisory duty over all matters relating to flood defence are undergoing a strategic switch in policy approach from "flood defence" to "flood risk management":

*"We are increasingly trying to use more natural methods of dealing with floodwater. Called "soft defence", they include wetlands and salt marshes in places that provide space for floodwater and prevent flooding from occurring elsewhere. At the same time, this method can benefit wildlife by providing greater habitat. Soft defences are becoming more common as climate change drives the need for flood defence measures. While they generally occupy a larger area of land than a hard defence, they require less investment and maintenance" (*Environment Agency, 2006b).

The recently published Stern Report on the Economics of climate change underlines how the cost of not facing up to the threat of climate change is considerably greater than the costs of preventing it. The Government published PPS1 on sustainable development in 2005 looking to embed action on climate change into the planning system; directing regional and local planners to consider climate change in their plans and development decisions. The commitment to providing support for local government in the drive to combat climate change has recently been restated; the Local Government White Paper (2006) identifies climate change as a key priority for local government with a new performance framework to enable local authorities to place this issue much higher up its agenda (Defra, 2006). In addition the Consultation on Planning Policy Statement: Planning and Climate Change (Supplement to Planning Policy Statement 1) has just opened. The new PPS aims to build on existing policies to focus, reinforce and clarify the role of the spatial planning system in combating climate change (Defra, 2006).

"Make no mistake, climate change is a 'make or break' issue for this region and no region is better equipped than ours to tackle the environmental challenge of the age" (NWRA, 2006)

At a regional level, the Northwest Regional Development Agency's Action Plan "Rising to the Challenge-A Climate Change Action Plan for England`s Northwest 2007-09" sets out a Vision for the region, focusing on the twin objectives of reducing regional greenhouse gas emissions and adapting to those effects of climate change which are now unavoidable. A Northwest Climate Change Partnership (NWCCP) is being developed to realise the delivery of the Action Plan. The following actions lend support to a floodplain restoration project or strategy for flood risk management:

- Undertake scoping studies to assess future regional risks, opportunities and priorities for the potential climate change impacts on the region's landscape, sensitive habitats & species and the contribution of natural systems to carbon sequestration and reduced flood risk (Action 4. Lead organisation-Natural England)

- Undertake scoping studies to assess future regional risks, opportunities and priorities for the potential for green infrastructure, including regional parks, to adapt and mitigate for climate change impacts and commence implementation of findings (Action 4. Lead organisation-Community Forests Northwest (CFNW))

- Identify, support and promote demonstration projects on energy efficiency and demand reduction, climate change adaptation measures, low carbon buildings and transport to exemplify best practice (Action 22. Lead organisation-NWDA)

Natural floodplain woodland comprises "broadleaved woodland in close proximity to the intricate hydraulic system characteristic of river floodplains that are subject to a regular or natural flooding regime resulting in water flowing through multiple channels and a transition from open water, through marsh and vernal ponds, to areas with drier soils subject to infrequent flooding" (Kerr and Nisbett, 1996). The increase in hydraulic roughness and diverse network of backwaters and ponds characterised in NFPW increases water storage capacity, retains more water on the floodplain and hence, when strategically positioned, has significant potential in flood risk mitigation. In addition, the increased planting of trees, and hence CO2 sequestration, in itself mitigates climate change. Additional benefits include an enhanced landscape and recreational opportunities, improved fisheries, enhancement of low flows and timber production (Kerr and Nisbett, 1996). The natural floodplain woodlands (NFPWs) of Europe have been subjected to wide scale destruction, the majority making way to agriculture and urban development. Only a few miniature fragments remain in Britain, mainly in the New Forest and on the Lower Spey. Where they survive, NFPWs have been compared to a tropical high forest, they are "tall, majestic woodlands" comprising of oak, ash, black poplar, willow, suckering elms, alder, birch and lime (Kerr and Nisbett, 1996). Initiatives to restore NFPW bring back what is essentially a lost ecosystem and can help towards targets set in the UK Habitat Action Plan for the restoration and new planting of wet woodland. (Although natural climactic vegetation cover is NFPW, the location of project areas obviously requires sensitivity to

Harnessing the Benefits of the Natural Landscape in the Weaver Valley. . . .

The UK has obligations under the EU Habitats directive to take appropriate steps to avoid deterioration of our most important wetlands (RSPB, 2004). As the RSPB point out, as many existing sites are being lost through sea level rise, so "no net loss" can only be achieved by creating new sites. A floodplain restoration project could restore or recreate now rare and valuable habitats. In addition to restoring and recreating a rare habitat, by achieving further multiple benefits a floodplain restoration project would hit more objectives for the WVRP and wider policy drivers than for nature conservation per se; and hence potentially attract greater funding opportunities.

Large-scale pilot programmes are recommended by the Stern report to generate valuable experience. Due to the wide ranging partnership, including regional and local planning authorities and key organisations, many with involvement in implementing the NWDA's Climate Change Action Plan and an inherent interest, responsibility and/or expertise in tackling flood risk, the WVRP and Natural Environment Task Group specifically, could offer strong potential in facilitating a catchment based approach to floodplain restoration and flood risk management. A floodplain restoration project should aim to surmount current obstacles, capitilise on the established WVRP partnership of key players to exemplify best practice and deliver multi objective solutions to flood risk alleviation

through overlapping agendas, pooling funding opportunities, influencing policy and taking collective responsibility for flood risk issues, meeting the challenge of climate change.

A Scoping Study is required to identify potential sites to restore fluvial floodplains, with the primary objective of attenuate flood pulses in urban areas at risk downstream within the Weaver Valley Regional Park (WVRP). The study would be an essential precursor to establish the feasibility and scope of the main project; factoring flood risk management into the landscape and greenspace network of the Weaver/Gowy catchment area to deliver a more sustainable approach to climate change adaptation.

"One cannot fail to be aware of the rapid growth (at last) of climate change on a number of agendas in recent weeks. With the publication of the Stern Report, a significant thrust to climate change awareness and action towards adaptation should be on the cards. It would be remiss of us to ignore this impetus in the context of Weaver Valley and the opportunities it presents."

(Chris Mahon, Director of Conservation, Cheshire Wildlife Trust and Chair of the Natural Environment Task Group, WVRP)

Figure 5: Sutcliffe Park, Greenwich UK-a flood alleviation scheme delivering multiple objectives for the community and the environment- Sutcliffe Park has been highlighted as the blueprint for the Thames Gateway "green grid" for open space. "In adapting to climate change, we could actually improve the environment". As for the Thames; "it's one of the region's greatest assets and the last thing you should be thinking about is raising the river walls" (Wheeler, 2005). Source: K Potter.

References:

Blackwell, M.S.A. and Maltby, E. (Eds.) (2005) Ecoflood Guidelines: How to use floodplains for flood risk reduction, The Ecoflood Project.

Communities and Local Government (2005) “Planning Policy Statement 1: Delivering Sustainable Development”. TSO, Norwich, February 2005: http://www.communities.gov.uk/index.asp?id=1143805.

Communities and Local Government (2006a) “Strong and Prosperous Communities-The Local Government White Paper”. TSO, Norwich, October 2006: http://www.communities.gov.uk/index.asp?id=1503999

Crofts, A (2000) Wildlife Trusts News Archive: http://www.wildlifetrusts.or g/index.php?section=news:archive&id=161).

Department for Environment, Food and Rural Affairs (2005a) “Making Space for Water: Taking Forward a New Government Strategy for Flood and Coastal Erosion Risk Management in England”. Defra, London, March 2005.

Environment Agency (2006a) Weaver Gowy Catchment Flood Management Plan Inception Report for Consultation, January 2006.

Environment Agency (2006b) “Creating a Better Place”, publicity leaflet.

European Union (2000) “Water Framework Directive”. 2000/60/EC.

HM Government (2006) “The Stern Review Final Report, 2006”: http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm

Menzel, L. and Kundzewicz (2003) “Non-Structural Flood Protection-A Challenge”, International Conference Paper “Towards natural flood reduction strategies”, Warsaw, 6-13 September 2003.

Mahon, C (2007) Excerpts from Personal Communication to the Weaver Valley Regional Park Team and the Author.

Northwest Regional Assembly (2006) “Rising to the Challenge-A Climate Change Action Plan for England`s Northwest November 2006”: http://www.nwda.co.uk/publications.aspx?publications=&area=78&subarea=81&publicationview=1&item=200611091906274525

Ostaficzuk, S. and Ostrowski, M. (2003) “The Faulty Solutions of Anti-Flood Measures”, International Conference Paper “Towards natural flood reduction strategies”, Warsaw, 6-13 September 2003.

Potter, K.M. (2006) “Where’s the Space for Water?- How Floodplain Restoration Projects Succeed.” Masters Dissertation for the Department of Civic Design, Liverpool University, September 2006.

RSPB (2004) “Freshwater Wetlands, the Need for More in Eastern England”, The RSPB, Norwich.

Werritty, A. (2006) “Sustainable flood management: oxymoron or new paradigm?”, Area, 38.1, 16-23.

Pictures, Front Cover-Environment Agency Flood Defence Engineer and Kingston University Geomorphologist at the “Anti-Flood Park”, Sutcliffe Park, Greenwich, a floodplain restoration/flood alleviation scheme for the River Quaggy. Source: K Potter.