



Sustainable Flood Management

Scottish Environment LINK is the forum for Scotland's voluntary environment organisations representing a broad spectrum of environmental interests with the common goal of contributing to a more environmentally sustainable society.

1. Introduction



Flooding is a natural phenomenon, but one that is also exacerbated by human mismanagement of the environment. One of the results is that more and more people, particularly the vulnerable, are living in fear of flooding. The problem of flooding has been made worse by the way we construct and defend ourselves against floods, and the way we manage catchments. Land use practices and development planning have a major impact on the way rainwater drains from our land and into rivers and streams. In the uplands, important peatland habitats, and natural forests, which help regulate water flows and maintain water quality, have been drained and damaged. Rivers throughout Scotland have been straightened and floodplains drained to allow for farming, urban development and transport. The result of these activities is that rivers flow faster and over smaller, more restricted areas than they would under natural conditions. Many settlements are located on low-lying floodplains alongside rivers and flat land on the coast. Currently around 160,000 Scottish homes and 13,000 businesses are

vulnerable to inland and coastal flooding. Estimates of annual average damage from flooding are around £20 million – this could rise by 115% by 2080¹. We are already seeing the impacts of changing climate on weather, and these impacts will get worse in future. It is predicted that Scotland will see even wetter, stormier weather in winter months. A more sustainable, catchment-based approach to flooding is therefore needed which allocates public funds towards better management of floodplains, and sympathetic management of land.

2. Current approach to flooding

Our current approach to dealing with flooding in Scotland is piecemeal and reactive. A primary responsibility for flooding lies with individual landowners. Local authorities identify flood risk in their areas and propose flood defence schemes where risk has been identified. Scottish ministers provide grants to local authorities for flood defence schemes under the Flood Prevention (Scotland) Act 1961, which have more than doubled over 2005-2008. Furthermore, the percentage grant aid has also increased from 50% to 80%, if certain 'criteria' in the design of flood defence schemes are met. However, the current approach to flooding does not serve the public well, and on most occasions increases the flood risk elsewhere. Issues, such as climate change will make the situation worse should help to drive a change that is needed to achieve a more sustainable approach to flooding.

¹ Climate Change: Flooding Occurrences Review, Scottish Executive Research, 2002

3. The new duty on sustainable flood management



The issue of flooding was a subject to much of debate during the passage of the Bill through Parliament. Careful consideration of this issue gave the impetus to change the way we manage flooding in a way that enhances the environment and at the same time protects people from the damage caused by floods. In Scotland, the link between flooding and the Water Framework Directive (WFD) was made clear during the transposition into Scots law. The Water Environment and Water Services (Scotland) Act 2003 (the 'WEWS Act') grasps this opportunity and introduces a new duty on

Scottish Ministers, SEPA and responsible authorities to promote sustainable flood management:

'The Scottish Ministers, SEPA and the responsible authorities must – so far as is consistent with the purposes of the relevant enactment or designated function in question –

(i) promote sustainable flood management

and,

c) so far as practicable, adopt an integrated approach by co-operating with each other with a view to co-ordinating the exercise of their respective functions. '

(Water Environment and Water Services Act section 2 (4) (b) (i))

In practice, this means that:

- Scottish Ministers will be required to promote sustainable flood management when considering grant applications for flood defence schemes, when planning and determining priorities for agriculture/forestry funding, and in other policy development;
- Local authorities will be required to promote and implement this sustainable flood management provision when exercising their function under the planning legislation;
- Ministers can stipulate that the River Basin Management Plan (RBMP) and sub-basin plans address flood management issues;
- The RBMP and associated sub-basin plans will provide a strategic forum within which flood prevention measures can be considered, bringing together all those with an interest in flood management at a strategic scale – including SEPA, local authorities and NGOs;
- Catchment based source-to-sea approach will be the basis of sustainable flood management.

However, to this date, no further changes have been made as a result of this new policy. The design of flood schemes is still dominated by the traditional approach and hard engineering. Land managers, farmers and local authorities alike do not understand what SFM means in practice and the Scottish Executive has been slow in adopting recommendations to take this issue forward.

4. What is sustainable flood management?

The term means different things to different people, but generally, it embodies a shift from our predominantly piecemeal and reactive approach to flood management towards a catchment-based approach, that takes account of long-term social and economic factors and uses natural processes and natural systems to slow down and store water. This natural component is best named Natural Flood Management and is achieved by adopting the following elements to manage the risk of flooding:

- a strategic, catchment based approach (the whole river basin, from source to the sea)
- protecting and using natural systems and habitats
- promoting soft engineering techniques'



Soft-engineered solutions are designed to hold water. Natural floodplains and coasts are allowed to flood and wetland habitats such as wet grassland, peatlands, bogs, fens and saltmarsh act like giant sponges to soak up excess water then release it slowly back into the river. They are cost-effective means of achieving many objectives, including our biodiversity obligations, the aims and objectives of the WFD, as well as improving recreational opportunities. Such approaches can deliver social, economic, and environmental benefits. It offers a long term, sustainable solution to flooding in the face of changing climate and

weather patterns. There will, of course, still be a place for hard defences – sometimes there may be no alternative, but hard defences should be built after the maximisation of soft engineering measures have been taken to lower flood risk.. Many cities and settlements in Scotland are located directly on floodplains alongside rivers and the coast, which makes them vulnerable to flooding. However, even in such situations, soft engineering can reduce the need for building ever-higher flood defences to protect these vulnerable communities.

5. Natural flood management in practice

5.1 Insh marshes RSPB reserve

The Insh Marshes floodplain in Strathspey extends from Kingussie downstream to the Spey/Feshie confluence near Kincaig Bridge. This RSPB reserve is the largest, and most naturally functioning, floodplain mire in Britain, extending to 8 km long and nearly 3 km wide in places. The River Spey meanders through the floodplain and is joined by the fast flowing and dynamic River Feshie. The floodplain regularly floods during winter and spring, holding water after heavy rainfall and from snow melt. It acts as a natural flood defence system with floodwater covering some 1000ha at a depth of 2m. This natural sponge prevents extensive flooding to properties and farmland downstream. Flood risk is reduced to settlements including parts of Aviemore, which is an important base for the local tourism economy. The equivalent engineered flood control measures would be very expensive and result in the loss



of important wildlife habitat. A rough examination of maps suggests that 7km of flood defence banks might be needed to defend Aviemore, representing a capital cost of several millions.

The floodplain has massive conservation value, with numerous internationally and nationally important designations, including Special Protection Area and National Nature Reserve. It is renowned for the number and variety of breeding waders, wildfowl, spotted crakes, populations of wintering whooper swans and hen harriers and a rich diversity of plants and invertebrates. As well as its value for flood defence and for wildlife, the Insh Marshes contributes significantly to the local economy. It attracts many visitors who contribute to tourism and supports visitor attractions such as the RSPB reserve and the Loch Insh



Watersports centre as well as recreational pursuits such as fishing, walking and cycling.

5.2 The WWF River Devon Natural Flood Management Demonstration Site

The River Devon Demonstration site, in Clackmannanshire, allows for the testing and monitoring of techniques for natural flood management such as the restoration of wetlands, the reconnection of flood plains to the river and the planting of riparian woodlands. Taking a catchment approach and linked to land use, we have developed methods which, when applied at many sites, will lower the flood risk to communities downstream for a fraction of the cost of taking a totally traditional hard engineering approach.



The River Devon exhibits most of the characteristics of rivers in Scotland. It rises in the Ochil Hills, passes through forests and reservoirs, meanders through farmland and skirts close to urban areas before flowing into the Forth estuary. Working on the principle of dealing with the causes of flooding by working with natural processes, WWF arranged for a flood process map to be produced for the River Devon catchment. This revealed key locations for work and, importantly, what technique would be most appropriate to

lower flood risk. By collecting and analysing the data produced, WWF has shown that natural flood management will make a significant contribution to lowering flood risk from rivers in any catchment. Natural flood management can take its place in a suite of methods to achieve sustainable flood management for communities in urban and rural settings around Scotland.

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