

Weaver Gowy Catchment Flood Management Plan

Summary Report December 2009



managing
flood risk

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Introduction



I am pleased to introduce our summary of the Weaver Gowy Catchment Flood Management Plan (CFMP). This CFMP gives an overview of the flood risk in the Weaver Gowy catchment and sets out our preferred plan for sustainable flood risk management over the next 50 to 100 years.

The Weaver Gowy CFMP is one of 77 CFMPs for England and Wales. Through the CFMPs, we have assessed inland flood risk across all of England and Wales for the first time. The CFMP considers all types of inland flooding, from rivers, groundwater, surface water and tidal flooding, but not flooding directly from the sea (coastal flooding), which is covered by Shoreline Management Plans (SMPs). Our coverage of surface and groundwater is however limited due to a lack of available information.

The role of CFMPs is to establish flood risk management policies which will deliver sustainable flood risk management for the long term. This is essential if we are to make the right investment decisions for the future and to help prepare ourselves effectively for the impact of climate change. We will use CFMPs to help us target our limited resources where the risks are greatest.

This CFMP identifies flood risk management policies to assist all key decision makers in the catchment. It was produced through a wide consultation and appraisal process, however it is only the first step towards an integrated approach to Flood Risk Management. As we all work together to achieve our objectives, we must monitor and listen to each others progress, discuss what has been achieved and consider where we may need to review parts of the CFMP.

In the Weaver Gowy catchment the main sources of flood risk are fluvial flooding from the rivers, surface water and sewer flooding from the drainage system. Approximately 1,130 properties in the catchment have

a 1% chance of flooding in any one year from rivers. In the north of the catchment, at Stanlow oil refinery and parts of Runcorn and Frodsham, there is a risk of tidal flooding. We estimate that by 2100 approximately 1,400 properties will be at risk of fluvial flooding. This is a 24% increase compared to the current number of properties at fluvial flood risk across the catchment.

We cannot reduce flood risk on our own, we will therefore work closely with all our partners to improve the co-ordination of flood risk activities and agree the most effective way to management flood risk in the future. To develop this plan and ensure social, economic and environmental issues were taken into account we worked with, and consulted many organisations. These include Defra, United Utilities, local authorities, National Farmers Union, Country Land and Business Association, Natural England and British Waterways.

This is a summary of the main CFMP document, if you need to see the full document an electronic version can be obtained by emailing enquiries@environment-agency.gov.uk or alternatively paper copies can be viewed at any of our offices in North West Region.

A handwritten signature in black ink, appearing to read 'Tony Dean'.

Tony Dean
Regional Director

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The purpose of a CFMP in managing flood risk

CFMPs help us to understand the scale and extent of flooding now and in the future, and set policies for managing flood risk within the catchment. CFMPs should be used to inform planning and decision making by key stakeholders such as:

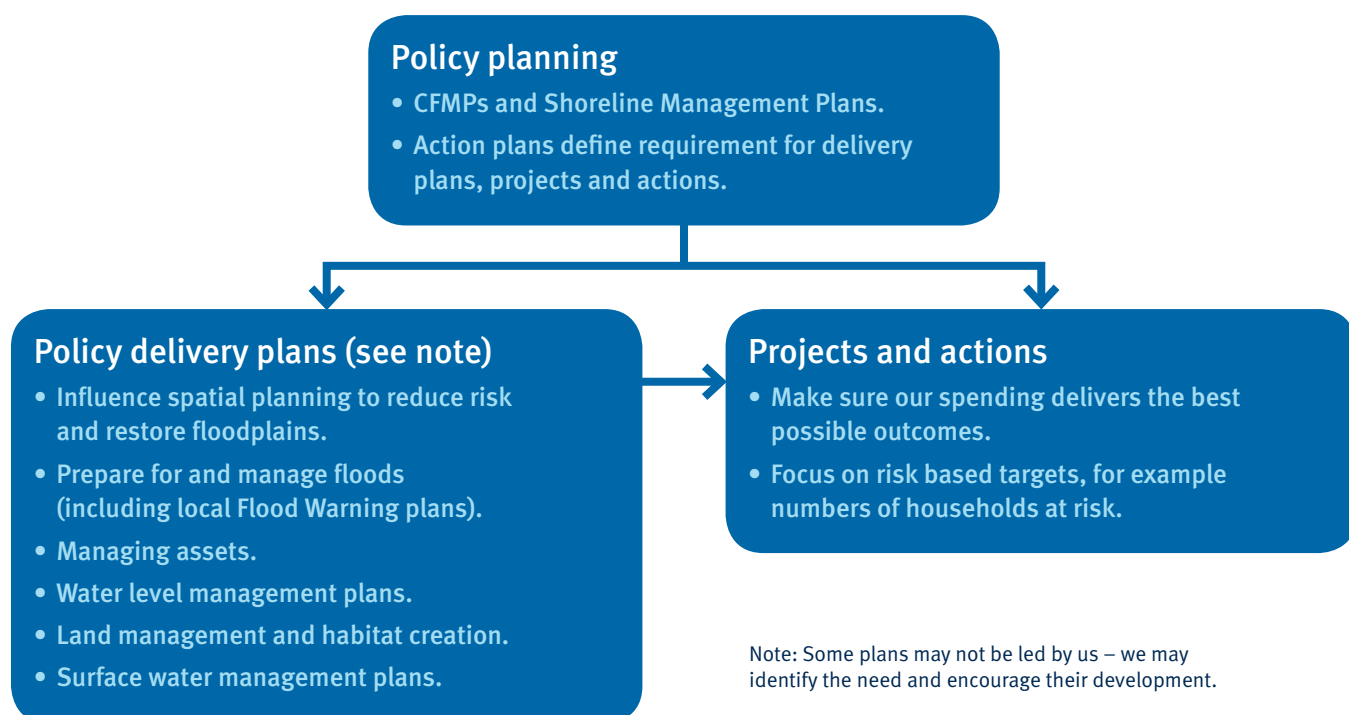
- The Environment Agency, who will use the plan to guide decisions on investment in further plans, projects or actions.
- Regional planning bodies and local authorities who can use the plan to inform spatial planning activities and emergency planning.

- Internal Drainage Board, water companies and other utilities to help plan their activities in the wider context of the catchment.
- Transportation planners.
- Landowners, farmers and land managers who manage and operate land for agriculture, conservation and amenity purposes.
- The public and businesses to enhance their understanding of flood risk and how it will be managed.

CFMPs aim to promote more sustainable approaches to managing flood risk. The policies identified in the CFMP will be delivered through a combination of different approaches. Together with our partners, we will implement these approaches through a range of delivery plans, projects and actions.

The relationship between the CFMP, delivery plans, strategies, projects and actions is shown in figure 1.

Figure 1 The relationship between CFMPs, delivery plans, projects and actions



Catchment overview

It is useful to draw out some general characteristics that are most important in our management of flood risk. The Weaver Gowy catchment is predominately rural and low lying in nature, with only 6% being urban. The Cheshire Plain forms the majority of the catchment, which is interrupted by a sandstone ridge running north-south across it. This area generally responds slowly to rainfall events. Higher ground surrounds the catchment, particularly in the Dane sub-catchment to the east, which generates a faster response to rainfall. Most rivers flow northwards into the Manchester Ship Canal which discharges into the River Mersey, however, some watercourses flow directly into the Mersey Estuary.

The upper Dane and Weaver sub-catchments have natural wide floodplains.

However, the Gowy sub-catchment has been managed for mixed agricultural uses. As a result, a large network of modified watercourses and embanked rivers was created to support agricultural production. In the past, rivers have been modified at the urban locations to convey water more efficiently. This has been done through artificial and straightened river channels. Most of the urban floodplains have been developed.

The key urban areas within the catchment lie in the industrialised areas adjacent to the River Mersey, such as Ellesmere Port and Runcorn, and also through

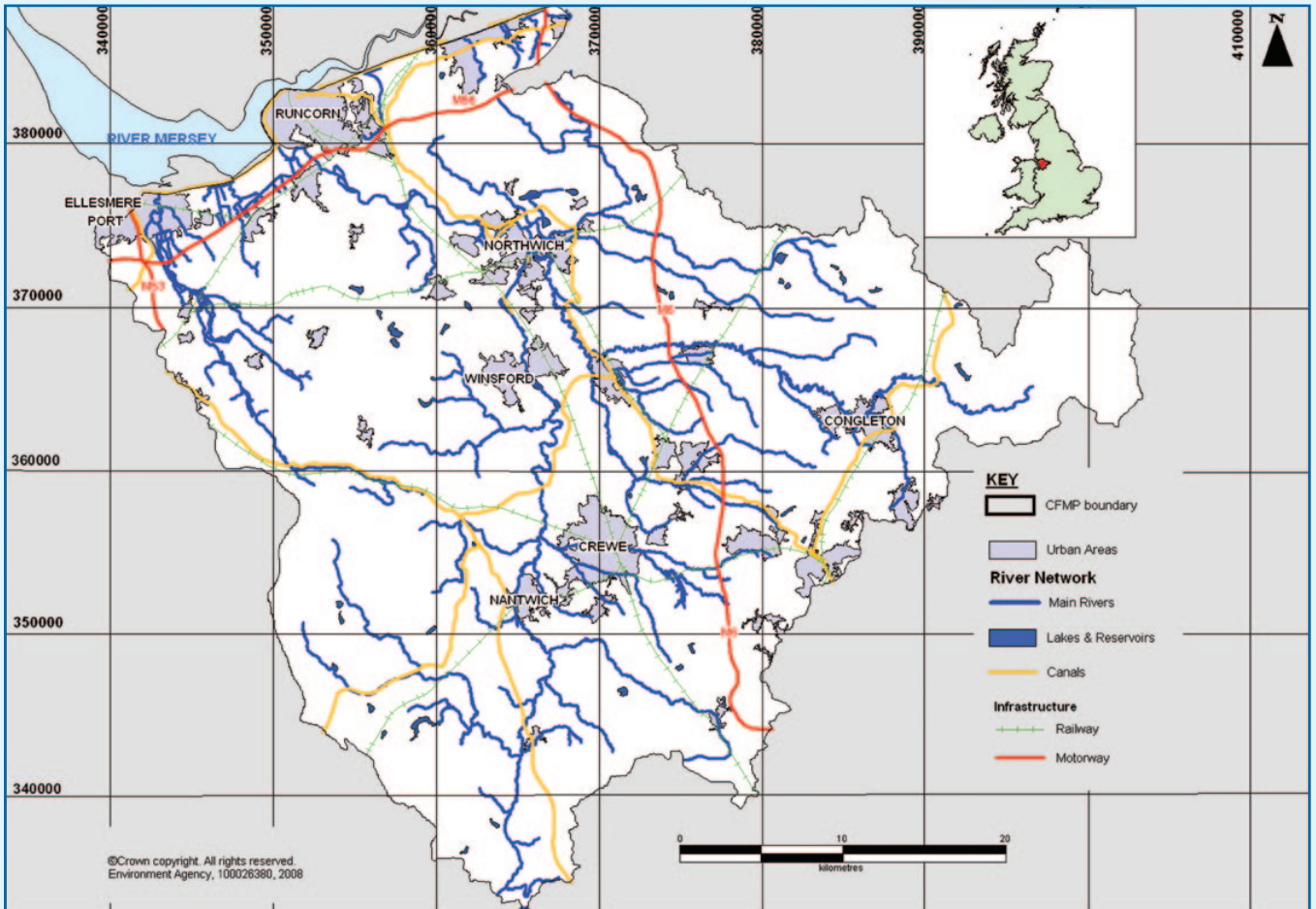
the catchment, including Crewe, Winsford and Northwich. Congleton is located to the east at the foothills of the Pennines. Stanlow oil refinery, a regionally important economic asset is located within the floodplain of this CFMP. The catchment's industrial heritage is further demonstrated by the extensive canal system, including the Weaver Navigation which runs from Winsford to the Manchester Ship Canal. There are approximately 1,130 properties across the catchment at risk from fluvial flooding in a 1% annual probability event (APE). Approximately 70% of these properties are in Northwich and Congleton. Our approach to management in these high risk locations is focussed around sustainable re-development, flood warning, resilience and the policy of Making Space for Water either locally or upstream.

The CFMP area is important for nature conservation. A number of nationally and internationally protected sites are within the floodplain. Depending on the location and nature of the designation, flooding can have a mixture of effects. For example, the River Dane Site of Special Scientific Interest (SSSI) is a dynamic system and the way flood risk is managed upstream could bring both positive and negative impacts. Many rivers in the CFMP area flow into the Mersey Estuary Ramsar (designated wetlands) site. However, the policies and actions from this CFMP will not significantly affect the ecological features of this protected site.



↑ Rural Cheshire

Map 1 Weaver Gowy CFMP – main features



↑ Floatel in Northwich

Current and future flood risk

Overview of the current flood risk

Flood risk has two components: the chance (probability) of a particular flood and the impact (or consequence) that the flood would have if it happened. The probability of a flood relates to the likelihood of a flood of that size occurring within a one year period, it is expressed as a percentage. For example, a 1% flood has a 1% chance or probability of occurring in any one year, and a 0.5% flood has a 0.5% chance or probability of occurring in any one year. The flood risks quoted in this report are those that take account of flood defences, where they exist.

In the Weaver Gowy catchment there is a history of flooding. The most significant event was in 1946 when snowmelt and heavy rain across the catchment caused Northwich to flood affecting over 300 properties. In 1977 and in 2000, Northwich flooded again after heavy rainfall, affecting 15 and 14 properties respectively. Congleton flooded in 1987 affecting 27 properties and again in 1998 where 53 properties were affected in Congleton and Biddulph. Stanlow flooded in 1997 due to failure of a tidal gate and also affected some of the oil refinery buildings.

The main sources of flooding in the Weaver Gowy catchment are as follows:

- River flooding mainly affects Northwich from the Rivers Weaver and Dane; Congleton from the River Dane. 90% of the properties at risk in this catchment are in the urban areas of Northwich, Congleton, Stanlow, Frodsham, Winsford, Middlewich, Crewe and Nantwich. The 1946 event is estimated to have had a probability of less than a 0.5% annual event.
- Tidal flooding is caused by storm surge in times of high astronomical tides. Part of the northern boundary of the catchment is in the tidal floodplain of the Mersey Estuary. The tidal flood limit reaches Bridge Trafford on the River Gowy and upstream to Frodsham on the River Weaver. Where rivers discharge into an estuary or the sea, such as the River Weaver at Runcorn, there can potentially be either a fluvial or tidal flood event or both at the same time. Therefore, flood damages in tidal and fluvial flood risk areas like Stanlow, Runcorn and Frodsham could be relatively high. Tidal flooding and coastal processes will be assessed in the next Shoreline Management Plan (SMP).
- Surface water flooding is caused by water collecting or flowing over the surface before soaking into the ground or entering a watercourse. This type of flooding can occur throughout the catchment but usually only causes a low level of risk. Our consultation showed that no specific locations are identified as being at high risk of surface water flooding.
- Sewer flooding is usually caused by an inadequate sewer capacity or blockages within the network. Isolated sewer flooding affects various locations across the catchment to some extent but no one area is reported to have a particularly extensive sewer flooding problem. The most notable problem area is Middlewich, where 18 properties have been flooded internally and 50 properties have had external flood incidents over the past few years. United Utilities have an ongoing programme of work to maintain and improve public sewers.
- Groundwater flooding has been known to occur in one location in the North East of the Ship Canal sub-catchment, at Lymm golf course. This is believed to be due to a reduction in groundwater abstraction from local industry. As groundwater flooding is a minor issue at catchment scale it is not considered in further detail in this CFMP.
- Canal flooding due to failure of the Manchester Ship Canal is considered to be unlikely. Although we have no information on the probability of this happening the maintenance undertaken on this commercial asset makes failure unlikely.

What is at risk?

Using broad-scale hydraulic models and flood maps we estimate 1,130 properties in the catchment have a 1% chance of flooding in any one year from rivers, taking into account current flood defences. There are five Sites of Special Scientific Interest and one scheduled ancient monument within the 1% annual probability flood extent.

Where is the risk?

The highest risk area is Northwich, where up to 632 properties are at risk of flooding. For the 1% annual chance flood, predicted depths range from 0.5m to 2m. The main cause for this high flood risk is the inadequate channel and floodplain capacity of the River Dane and Weaver Navigation. Congleton is also at high risk of flooding. The majority of properties at risk (147) are predicted to flood to depths of between 0.5m and 2m. The river runs through the centre of the town and is surrounded by properties, producing a high flood risk. Congleton is in the Upper Dane sub-catchment where river flows and catchment run-off rates are high, which can lead to ‘flash’ floods. As a result flood waters in Congleton are relatively fast flowing, causing increased risk to people. The map overleaf illustrates where the properties are at risk of flooding in a 1% annual probability event, taking into account defences where they exist.

We recognise the potential risk from surface water and sewer flooding. Further studies, following on from the CFMP, will be undertaken to quantify the potential risk.

Table 1. Locations of Towns and Villages with 25 or more properties at risk in a 1% annual probability river flood

Number of properties at risk	Locations
Over 500	In the Borough of Vale Royal at Northwich
151 to 500	In the Borough of Congleton at Congleton
51 to 150	In the Borough of Vale Royal at Frodsham In the Borough of Warrington at Thelwall
25 to 50	In the Borough of Crewe and Nantwich at Crewe In the Borough of Halton at East Runcorn

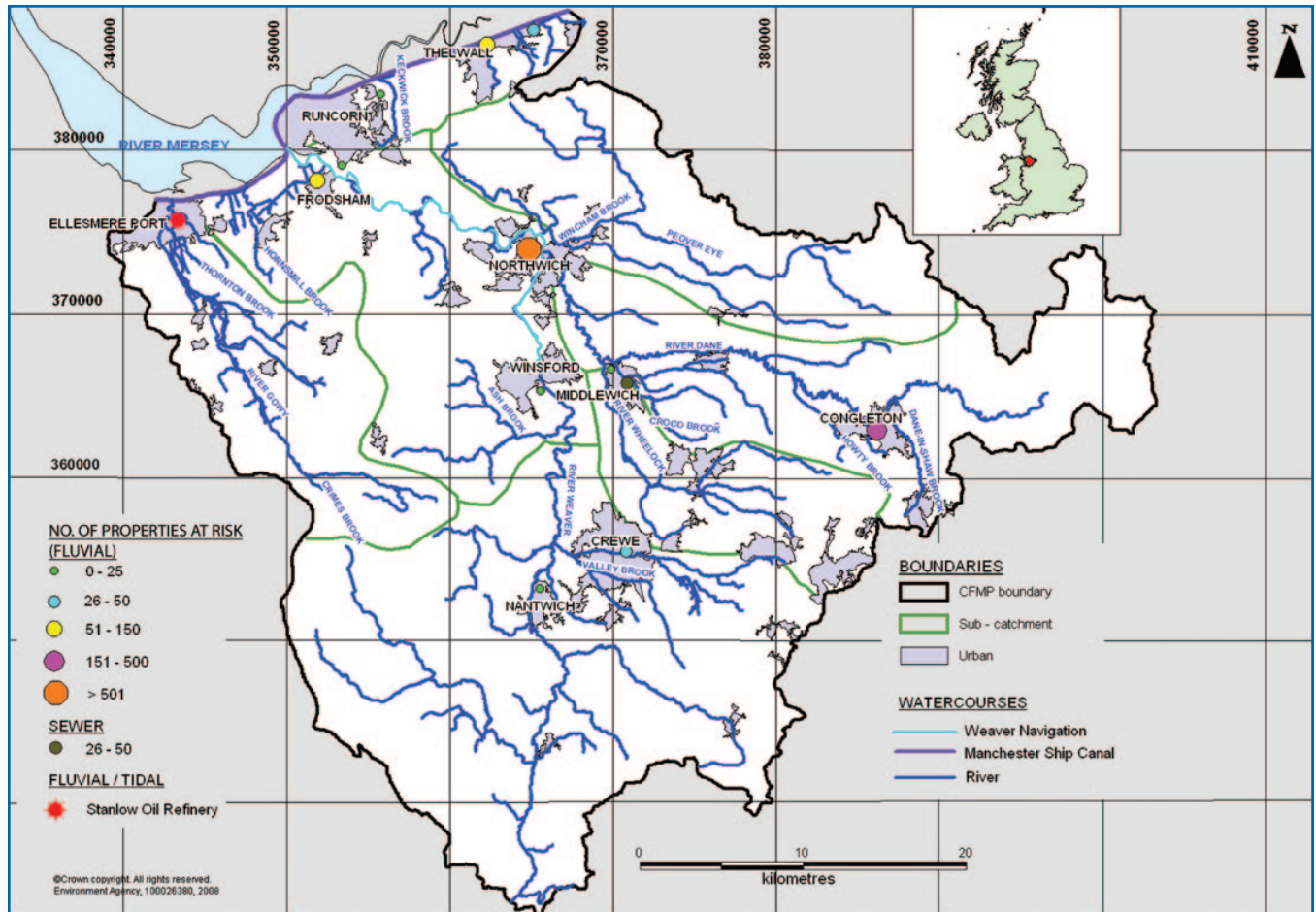
Table 2. Critical infrastructure at risk:

8 electricity substations, 4 medical centres, 3 schools, 6 sewage treatment works, Stanlow oil refinery, M56



↑ Weaver Navigation, Northwich

Map 2 Risk to property across catchment for the 1% annual probability fluvial event



How we currently manage the risk in the catchment

The Weaver Gowy catchment has benefited from engineering schemes put in place over the last 50 years. These include:

- The recent construction of the Stanlow flood alleviation scheme that now provides protection for a 1% annual probability event and a 0.5% tidal event.
- Construction of numerous raised defences, concrete walls, pumping stations and a flood basin on the Rivers Weaver, Dane and Gowy.

In addition to these engineering schemes, other flood risk management activities are carried out in the catchment. These include activities, that help to reduce the probability of flooding, and those that address the consequences of flooding.

Activities that reduce the probability of flooding include:

- Maintaining and improving existing flood defences, structures and water courses. The catchment has over 58km of raised defences,

pumping stations, sluices and screens.

- Enforcement and maintenance where riparian owners carry out work detrimental to flood risk.
- Identifying and promoting new flood alleviation schemes where appropriate, such as the Keckwick Brook Flood Alleviation Scheme that will provide improved protection for 170 properties in Frodsham. There is also strategy work ongoing in Northwich and Congleton.

The impact of climate change and future flood risk

- Working with local authorities to influence the location, layout and design of new and redeveloped property and ensuring that only appropriate development is allowed on the floodplain through the application of Planning Policy Statement 25 (PPS25).

Activities that reduce the consequences of flooding include:

- Flood risk mapping, understanding where flooding is likely to occur.
- Operation of floodline and warning services to over 900 properties in areas of Northwich, Congleton and Nantwich.
- Providing flood incident management.
- Promoting awareness of flooding so that organisations, communities and individuals are aware of the risk and are prepared in case they need to take action in time of flood.
- Promoting resilience and resistance measures for those properties already in the floodplain.

In the future flooding will be influenced by climate change, changes in land use (for example urban development) and rural land management. In the Weaver Gowy catchment, sensitivity testing revealed that climate change has the greatest impact on flood risk, with land management change, or urbanisation having a smaller effect depending on the sub-area. This catchment is sensitive to large scale changes in these drivers. Whilst we do not know exactly what will happen in the future the key trends are:

- More frequent and intense storms causing more widespread flooding from drainage systems and some rivers.
- Wetter winters increasing the likelihood of large-scale flooding.

The future scenarios used in the Weaver Gowy CFMP were:

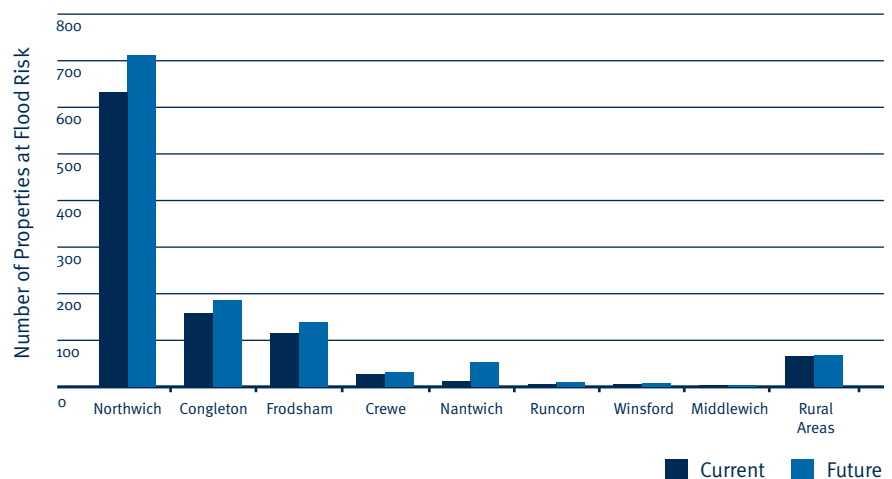
- A 20% increase in peak flow in all watercourses. The predicted increase in flow can affect the frequency, timing, scale of flooding and the flood levels.

- A total sea level rise of 860 mm by the year 2100.
- Increased urbanisation (10% urban, 5% rural) and a change in rural land use.

We estimate that by 2100 approximately 1,400 properties will be at risk of fluvial flooding. This is a 24% increase compared to the current number of properties at fluvial flood risk across the catchment. Flood depth is expected to increase by 0.5m in Northwich and Congleton, 0.6m in Frodsham and 0.7m in Nantwich by 2100. Flooding will become more frequent. No additional environmental or heritage sites are in the future 1% annual probability flood extent but the flood depth and extent of flooding is expected to increase slightly.

Figure 2 shows the difference between current and future flood risk for a 1% annual probability event at key locations in the catchment.

Figure 2 Current and future (2100) flood risk to property from a 1% annual probability river flood, taking into account current flood defences.



Future direction for flood risk management

Approaches in each sub-area

We have divided the Weaver Gowy CFMP area into seven distinct sub-areas that have similar physical characteristics, sources of flooding and levels of risk. These sub-areas will allow us and the key stakeholders to promote flood risk management approaches, policies and actions that are most appropriate in that area to deliver the various Government and regional strategies, in particular the Making Space for Water strategy. In the face of increasing risk, it often is not sustainable to keep building

and raising defences. This is why we have to look catchment wide at how we direct effort and resources to ensure sustainable solutions. We have assessed what will be the most sustainable approach to managing flood risk in each sub-area. This is presented in the following sections and they outline:

- The key issues in that area.
- The vision and preferred policy.
- The proposed actions to implement the policy.

This document does set out our policies for managing flood risk, recognising the constraints that do exist. Our future direction for managing flood risk is expressed by applying one of our six standard policy options to that sub area. To select the most appropriate policy, the plan has considered how social, economic and environmental objectives are affected by flood risk management activities under each policy option. The six policy options are explained on page 11.

Map 3 Sub-areas

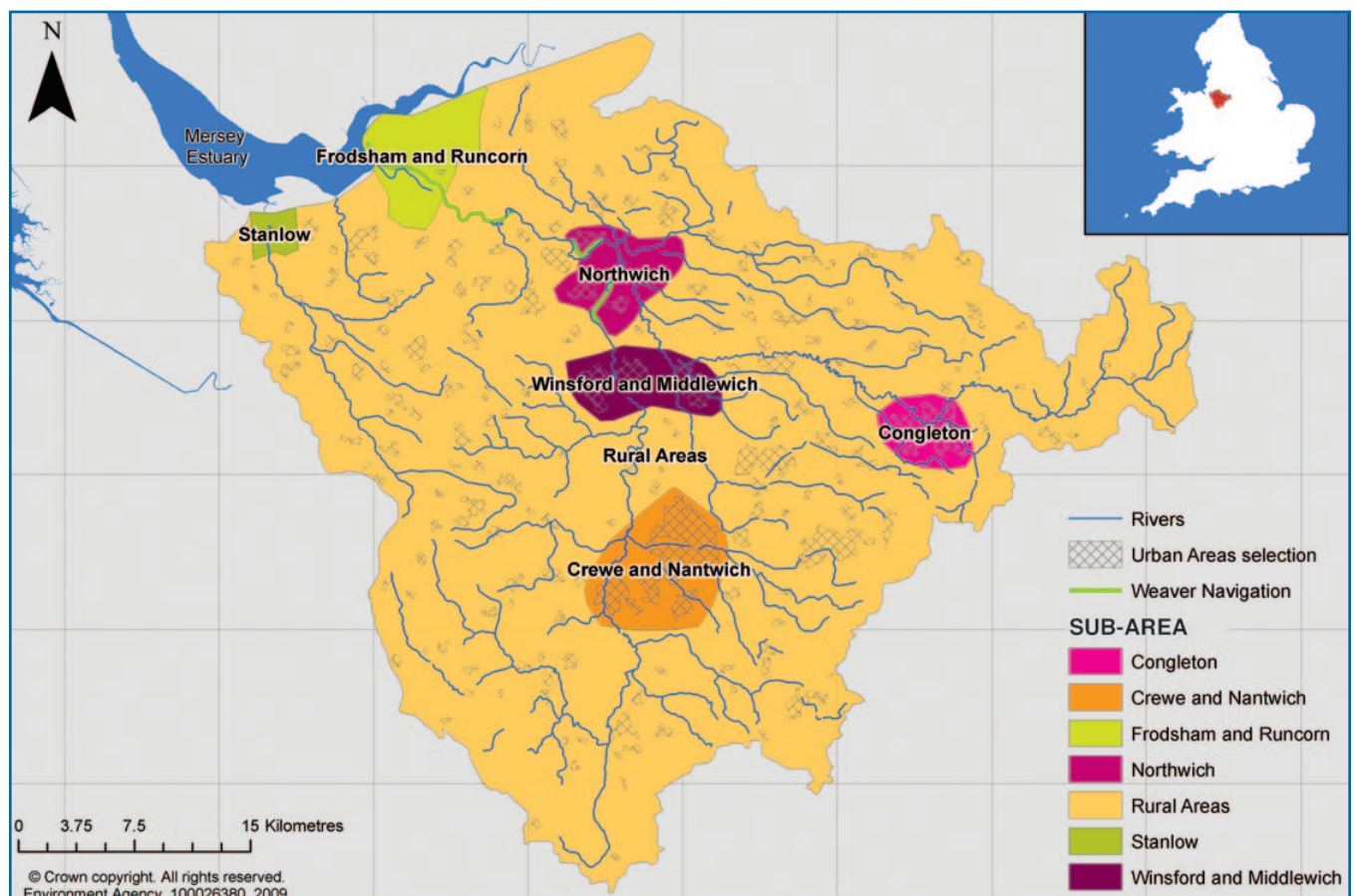


Table 3 Policy options

→ Policy 1

Areas of little or no flood risk where we will continue to monitor and advise

This policy will tend to be applied in those areas where there are very few properties at risk of flooding. It reflects a commitment to work with the natural flood processes as far as possible.

→ Policy 2

Areas of low to moderate flood risk where we can generally reduce existing flood risk management actions

This policy will tend to be applied where the overall level of risk to people and property is low to moderate. It may no longer be value for money to focus on continuing current levels of maintenance of existing defences if we can use resources to reduce risk where there are more people at higher risk. We would therefore review the flood risk management actions being taken so that they are proportionate to the level of risk.

→ Policy 3

Areas of low to moderate flood risk where we are generally managing existing flood risk effectively

This policy will tend to be applied where the risks are currently appropriately managed and where the risk of flooding is not expected to increase significantly in the future. However, we keep our approach under review, looking for improvements and responding to new challenges or information as they emerge. We may review our approach to managing flood defences and other flood risk management actions, to ensure that we are managing efficiently and taking the best approach to managing flood risk in the longer term.

→ Policy 4

Areas of low, moderate or high flood risk where we are already managing the flood risk effectively but where we may need to take further actions to keep pace with climate change

This policy will tend to be applied where the risks are currently deemed to be appropriately-managed, but where the risk of flooding is expected to significantly rise in the future. In this case we would need to do more in the future to contain what would otherwise be increasing risk. Taking further action to reduce risk will require further appraisal to assess whether there are socially and environmentally sustainable, technically viable and economically justified options.

→ Policy 5

Areas of moderate to high flood risk where we can generally take further action to reduce flood risk

This policy will tend to be applied to those areas where the case for further action to reduce flood risk is most compelling, for example where there are many people at high risk, or where changes in the environment have already increased risk. Taking further action to reduce risk will require additional appraisal to assess whether there are socially and environmentally sustainable, technically viable and economically justified options.

→ Policy 6

Areas of low to moderate flood risk where we will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits

This policy will tend to be applied where there may be opportunities in some locations to reduce flood risk locally or more widely in a catchment by storing water or managing run-off. The policy has been applied to an area (where the potential to apply the policy exists), but would only be implemented in specific locations within the area, after more detailed appraisal and consultation.

Stanlow

Our key partners are:

Cheshire West and Chester

Site operators

Landowners

Natural England

The issues in this sub-area

Stanlow oil refinery, a regionally important economic asset, is located within the floodplain in this sub area. Both fluvial and tidal flood risk are present and need to be managed to avoid economic and environmental harm. We are currently managing this by a combination of concrete flood walls, tidal flaps and embanked channels through the oil refinery complex. As a result, the watercourses contain flood flows up to the 1% annual probability fluvial and 0.5% annual probability tidal flood event. This level of protection will become less effective as sea level rises in the future. There are no properties at risk in this sub-area in a 1% event and the refinery is presently protected up to this standard. In the future the standard of protection will decrease over time due to climate change and there is an increased risk of flooding.

The vision and preferred policy

Policy option 4: Areas of low, moderate or high flood risk where we are already managing the flood risk effectively but where we may need to take further actions to keep pace with climate change.

The probability of flooding at Stanlow is high because it is located at the downstream end of the River

Gowy catchment and on the banks of the Mersey estuary. Flooding to this site would have serious economic and environmental consequences. Our vision is to sustain the current level of protection to the refinery into the future to support this important economic asset while in operation. There may be opportunities to gradually improve the layout and build greater resilience into the site. Additional measures such as maximising the floodplain in rural upstream locations would also reduce flood levels in Stanlow. This will minimise both the probability and consequence of flooding. Managing the risk of fluvial and tidal flooding will minimise the risk of a potential pollution incident from the site and avoid damaging the environmental features in the area.

The key messages

- Proactive measures to mitigate for climate change such as improved defences, flood resistance and resilience and improved site layout may be needed.
- The option of relocation is unlikely but should be kept open.
- There is an opportunity to use the floodplain in upstream locations to reduce fluvial flood risk to the oil refinery.
- Natural attenuation is available on the Gowy Meadows which would help to reduce fluvial flood risk to Stanlow.

Proposed actions to implement the preferred policy

The essential actions to achieve our policy aim are listed below:

- Undertake studies to identify areas suitable for flood storage and land use change to reduce flood risk for Stanlow.
- Consult and advise site operator to investigate what flood resistance and resilience measures are in place and whether measures could effectively manage future increase in flood risk.
- If resistance and resilience measures cannot acceptably manage future residual flood risk, assess the viability of works to sustain the current standard of protection into the future.



↑ Stanlow Oil Refinery, photo courtesy of North West England and North Wales Coastal Group

Frodsham and Runcorn

Our key partners are:

Halton Borough Council

Cheshire West and Chester

United Utilities

Developers

The issues in this sub-area

This area is characterised by a small residential community at Frodsham and a mixture of commercial, residential and industrial properties in Runcorn. There is flood risk to approximately 115 residential properties in Frodsham and several industrial properties in South Runcorn are at risk in a 1% annual probability event. Critical infrastructure at risk of flooding in this sub-area includes the M56 and 3 sewage treatment works. The causes of flooding are from fluvial, surface water and also tidal sources. We currently manage the risk of flooding to Frodsham and South Runcorn by earth embanked channels along the River Weaver. This offers a standard of protection up to the 2% annual probability fluvial event. This level of protection will gradually reduce as river flows increase in the future. A number of residential and commercial properties in East Runcorn are prone to river flooding from Keckwick Brook. The existing flood

risk management measures on Keckwick Brook are in the process of being improved. The total number of properties at risk in this sub-area is approximately 150 and due to climate change this is expected to rise to 210 by 2100 in a 1% event.

The vision and preferred policy

Policy option 4: Areas of low, moderate or high flood risk where we are already managing the flood risk effectively but where we may need to take further actions to keep pace with climate change.

The residential communities of Frodsham and Runcorn are infrequently exposed to fluvial flooding from the River Weaver and Keckwick Brook. This is expected to increase as climate change occurs, resulting in higher flood damages and hazard to people. Our vision is to sustain the current level of protection into the future, while also accepting that specific locations need improvement. For properties at risk, flood resistance and resilience opportunities should be encouraged. Wider opportunities at a catchment scale such as beneficial land management change and upstream flood storage will also play a part in ensuring there is no increase in the level of flood risk in this downstream sub-area. This will result in a safe environment in which people can live and work.

The key messages

- Review the way flood risk management is managed, especially as climate change occurs.
- Reduce risk at the most flood prone places by influencing planning to ensure development takes account of the level of flood risk.
- Encourage flood resistance and resilience to less flood prone properties within the floodplain which are unlikely to benefit from improved defences.
- We will consider a range of flood risk management measures to sustain the level of risk and enable sustainable development.

Proposed actions to implement the preferred policy

The essential actions to achieve our policy aim are listed below:

- In the short term, complete the proposed new flood defence scheme for the Keckwick Brook area.
- Develop a Strategy for Frodsham. This Strategy will detail actions required to offset flood risk from all sources which will otherwise increase over the next 50-100 years.
- Undertake studies to identify local and upstream flood storage, topping-up of existing earth embankments or land use change as part of a strategy that would reduce future flood risk for Frodsham and South Runcorn.



↑ Flooding along Keckwick Brook October 2000

Northwich

Our key partners are:

Cheshire West and Chester

British Waterways

Developers

The issues in this sub-area

Northwich is located in Cheshire on the confluence of the Weaver Navigation (part of the River Weaver) and River Dane. The greatest flood risk is from the fast flowing River Dane. Northwich has developed across the floodplain which means a high number of properties and critical infrastructure is at risk of flooding. Approximately 630 properties are at risk from the 1% annual probability event in this sub-area. This is expected to rise to over 700 properties by 2100 due to the effects of climate change. Significant critical infrastructure are also at risk (6 electricity substations, 1 sewage treatment works and 3 medical centres). Northwich has a history of flooding; the most significant event was in 1946. There is an extensive flood warning service covering over 800 properties (0.1% event). The Local Authority is considering major re-development of the town centre and this represents a good opportunity to look at new ways to reduce current flood risk and plan for the management of future flood risk.

The vision and preferred policy

Policy option 5: Areas of moderate to high flood risk where we can generally take further action to reduce flood risk

Northwich is an important residential and commercial centre. Urban regeneration is needed but this is constrained by flood risk issues. The confluence of the rivers Weaver and Dane in the town centre means that future re-development must take into account the current floodplain location across the town. Our vision is to support the regeneration of Northwich in line with the principles of sustainable development and with our understanding of flood risk. A number of measures will be required both locally (such as innovative development layouts, resilience and flood warning) and further upstream (such as providing upstream flood storage and land management change).

The key messages

- Change the character of the urban footprint through re-development so that the consequences of flooding are reduced by better layout and a greater resilience to flooding.
- Seek to increase capacity of floodplains in upstream rural areas to retain water and reduce flood risk in Northwich.
- To implement our preferred approach it is expected that a flood alleviation scheme is a desirable option, however, this may not attract funding due to national priorities and other sources of funding or alternative approaches will be investigated.

Proposed actions to implement the preferred policy

The essential actions to achieve our policy aim are listed below:

- Develop Northwich Flood Alleviation Pre-feasibility study (2007) to inform the planning process and in future bids for national funding for a Northwich Strategy Plan. A Strategy would be used to understand the level of flood risk and look for opportunities and actions (a number of measures from storage to localised land use change is likely to be needed) to reduce flood risk in Northwich and further downstream.
- Influence the planning system to ensure that inappropriate development is guided away from flood risk areas. Where development must, exceptionally, take place in areas at risk of flooding, ensure that floor levels are raised to an appropriate level (incorporating increases due to climate change), flood resilience is incorporated into buildings and it is demonstrated that safe access and evacuation can be provided during flood events.
- Advise Cheshire West and Chester to have appropriate evacuation and contingency measures in place for schools and medical centres at risk of flooding. Ensure these services adopt appropriate resistance and resilience measures. Emergency plans should take into account the vulnerability to flooding of the A559 and A533 when planning for response to flood risk.
- Assess the risk to the police stations in Northwich and ensure the station considers appropriate resistance/resilience measures.



↑ Floatel in Northwich

Winsford and Middlewich

Our key partners are:

Cheshire West and Chester

Cheshire East

Developers

The issues in this sub-area

The River Weaver runs through Winsford and Middlewich is situated between the Rivers Wheelock, Dane and Croco. When compared with urban areas elsewhere in the catchment, these areas are at a lower risk of fluvial flooding. We estimate 10 properties are at risk in this sub-area in a 1% APE. In the future, by 2100, this could increase to 11 properties due to the effects of climate change. However, there is a caravan site located to the south of Winsford which is at risk of flooding. At present the risk of flooding has been managed by undertaking channel and river asset maintenance. There have also been ongoing sewer flooding issues to 50 properties in Middlewich.

The vision and preferred policy

Policy option 3: Areas of low to moderate flood risk where we are generally managing existing flood risk effectively.

Two small residential towns in the Cheshire Plain make up this sub-area. The current flood risk management measures are limited but of clear benefit to the people and properties. Our vision for the sub-area is to continue to manage the residual flood risks by

making sure that our expenditure on flood risk management is risk based. We may need to look at alternative ways of managing the sub-area in the future, such as land management change and flood warning. Appropriate planning is also necessary so that future development does not bring about any additional flood risk issues.

The key messages

- Continue to adopt a risk based approach to flood risk management.
- Continue strong development control to prevent inappropriate new development in areas at flood risk.
- Resolve sewer flooding issues that cause community disruption.

Proposed actions to implement the preferred policy

The essential actions to achieve our policy aim are listed below:

- United Utilities to continue to investigate causes of sewer flooding (including links to water levels) followed by appropriate remedial works.
- Encourage Cheshire West and Chester BC to consider extending eligibility for home improvement grants and home loans to encompass flood protection and resilience products.
- Encourage caravans at risk from flooding to relocate outside of the floodplain. Ensure a warning and evacuation system is in place.
- Development and implementation of a Systems Asset Management Plan with whole life consideration and costing of maintenance and structure renewal to ensure most efficient and appropriate maintenance programme.



↑ River Weaver at Winsford

Crewe and Nantwich

Our key partners are:

Cheshire East Borough Council

Developers

The issues in this sub-area

Crewe and Nantwich are growth towns located in the southern part of the catchment, in the upper reaches of the River Weaver. The floodplain is relatively small and exposure to flooding is infrequent. Flood water in this area can be deep, presenting a real hazard in places, and there is critical infrastructure at risk including, 1 medical centre, 1 sewage treatment works and the A500. Flood Warning is not viable because of short lead times. Flood risk management is focussed on river asset and channel maintenance activities. In Crewe, the watercourses have been modified with straightened and culverted sections common. We estimate 39 properties are at risk in a 1% event and we expect this to increase to 84 by 2100 due to the effects of climate change.

The vision and preferred policy

Policy option 4: Areas of low, moderate or high flood risk where we are already managing the flood risk effectively but where we may need to take further actions to keep pace with climate change.

Crewe and Nantwich are expanding residential and commercial centres for the region. As the

effects of climate change manifest themselves, these urban areas will need further flood risk management measures to sustain the current level of risk. Our vision is to focus on making the ‘flood hotspots’ more resilient and resistant to flooding. We may need to review our current flood risk management measures and spend to ensure that we direct our efforts to the most vulnerable parts of the sub-area, such as along Valley Brook in Crewe and the River Weaver through Nantwich.

The key messages

- Continue to adopt a risk based approach to flood risk management.
- We will consider a range of flood risk management measures to sustain the level of risk and enable sustainable development.

Proposed actions to implement the preferred policy

The essential actions to achieve our policy aim are listed below:

- Review the Systems Asset Management Plan (SAMP) to ensure that the maintenance programme is risk based. As the flood risk increases due to climate change, the SAMP should identify opportunities to sustain the current level of flood risk.
- Encourage Cheshire East Borough Council to consider extending eligibility for home improvement grants and home loans to encompass flood protection and resilience products.
- Assess flood risk for the medical centre in Nantwich and Manchester Metropolitan University Crewe Campus. Encourage these services to adopt appropriate resistance and resilience measures.



↑ Valley Brook, Crewe

Congleton

Our key partners are:

Cheshire East Borough Council

The issues in this sub-area

Congleton is located in the east of the catchment on the upper reaches of the River Dane. Approximately 160 properties are at risk of fluvial flooding from the 1% annual probability event in this sub-area. By 2100 due to climate change the number of properties at risk in a 1% event is expected to increase to 185. The sources of flooding are from the River Dane and also from Howty Brook culvert. In 1998 culvert blockages and flood flows caused flooding to over 50 properties. Critical infrastructure is also at risk, 1 school, 2 electricity sub-stations and a sewage treatment works. Flood risk is currently managed by sections of flood defence along the River Dane, which provide protection for a 2% annual probability event. Screens across culvert entrances on Howty Brook are maintained frequently to clear blockages, reducing the risk of flooding. Congleton also has a Flood Warning service covering over 100 properties.

The vision and preferred policy

Policy option 5: Areas of moderate to high flood risk where we can generally take further action to reduce flood risk.

Congleton is a small town of valuable industrial and cultural heritage. The River Dane and Howty Brook run through Congleton resulting in flood risk to residential and commercial properties. This is set to increase as the level of protection that the flood defences provide reduces as a result of climate change. Our vision for this sub-area is to undertake further appropriate actions that will reduce the high flood risk in Congleton. We need to ensure that the most vulnerable properties are made flood resistant and resilient and encourage sustainable re-development when opportunities arise. Further improvements to the existing flood defences and beneficial land management change would also help to achieve a safer environment.

The key messages

- The potential flood risk management options need to be identified and balanced with the likelihood of investment on flood risk reduction for this sub-area.
- Properties that are prone to flooding should be made more flood resistant and resilient to manage the residual risks.

Proposed actions to implement the preferred policy

The essential actions to achieve our policy aim are listed below:

- Develop a strategy for Congleton. The study should consider the feasibility of long-term relocation of properties outside of the floodplain. Land management change, culvert redesign, improved defences and resilience measures should also be assessed as a means of managing flood risk where relocation is not feasible.
- Use Strategic Flood Risk Assessments to inform future development and minimise flood risk from all sources.
- Influence the planning system to ensure that inappropriate development is guided away from flood risk areas and, where permitted, the risks are adequately mitigated.
- Encourage Cheshire East Borough Council to consider extending eligibility for home improvement grants and home loans to encompass flood protection and resilience products.



↑ River Dane near Congleton

Rural areas

Our key partners are:

Cheshire West and Chester BC

Cheshire East BC

Halton Borough Council

Warrington Borough Council

Newcastle-under-Lyme Borough

Council

North Shropshire District Council

Peak District National Park
Authority

Staffordshire Moorlands District
Council

The issues in this sub-area

This sub-area includes the rural parts of the CFMP and the scattered small urban communities. There are few properties at fluvial flood risk across this sub-area. The Dane and Wheelock sub-catchments are sensitive to land management change, which can have an impact on the risk of flooding. There are raised embankments along some of the rural river reaches protecting mainly Grade 3 agricultural land. Current river asset and channel maintenance expenditure is relatively high considering the low level of flood risk. There are 65 properties at risk in this sub-area from a 1% event, this could rise to 67 by 2100 due to the effects of climate change.

The vision and preferred policy

Policy option 6: Areas of low to moderate flood risk where we will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits.

This sub-area is largely rural, with scattered areas at risk of flooding. Our vision is to ensure as much of the natural floodplain as possible is restored in order to provide storage, reducing flooding to downstream

areas and providing environmental and amenity benefits. To achieve this, our preferred approach is policy option 6.

The key messages

- The floodplain is our most important asset in managing flood risk. We want to safeguard the natural floodplain from inappropriate development.
- Encourage land management change to reduce run-off rates from the catchment whilst maintaining or enhancing the capacity of the natural floodplain to retain water. Combined with maintaining conveyance of watercourses in the villages, this will help reduce the impact of the more frequently experienced floods and has benefits for the natural environment.
- Expenditure needs to be proportional to risk. The completion of System Asset Management Plans will indicate where we can reduce maintenance or agricultural defences in some of the rural reaches.

Proposed actions to implement the preferred policy

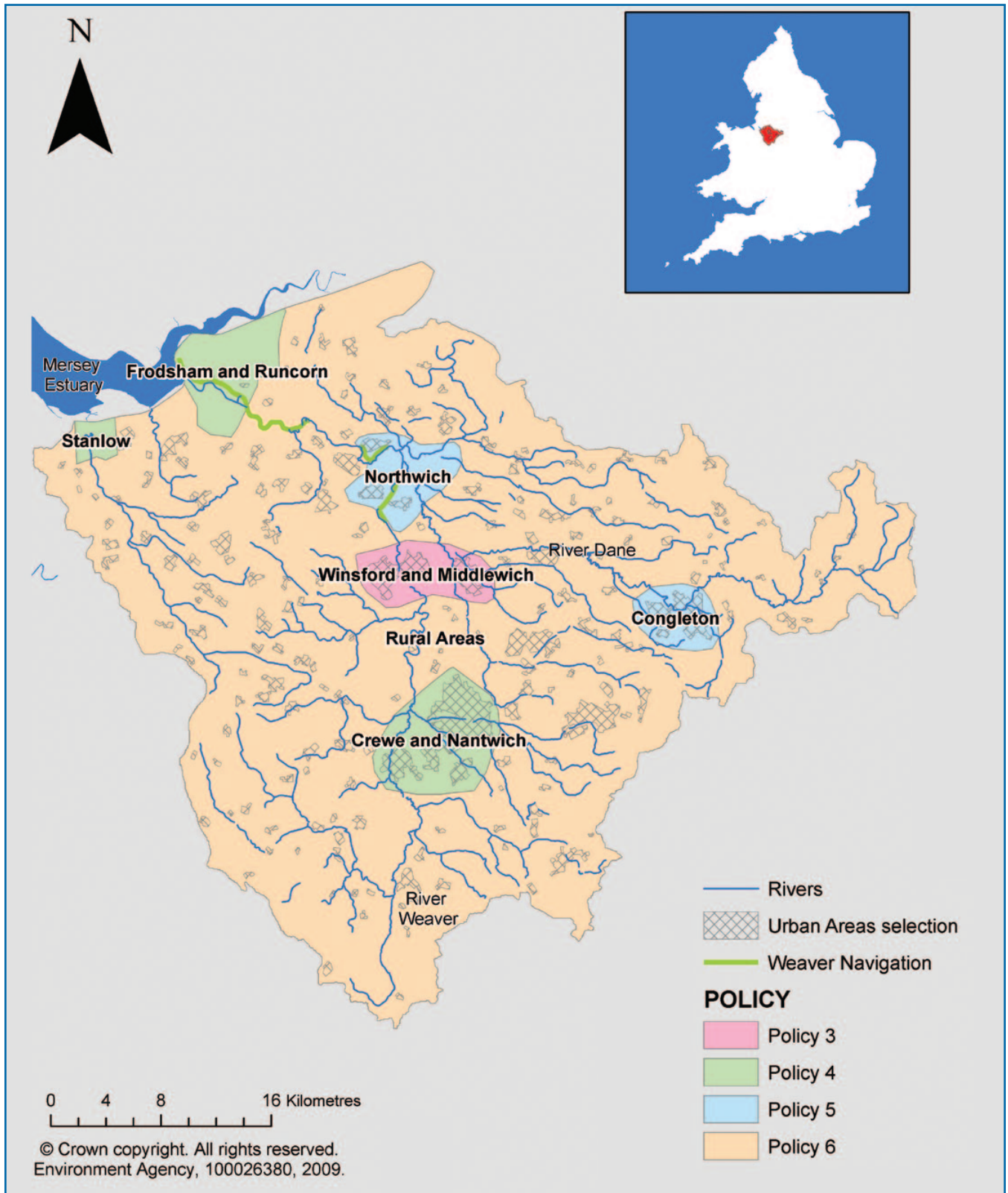
The essential actions to achieve our policy aim are listed below:

- Carry out specific studies aimed at identifying flood storage or beneficial land use change upstream of major flood risk areas in the catchment. Potential locations include upstream of Northwich on the River Dane, Weaver or Wincham Brook.
- Work in partnership with Natural England and Defra to link flood risk benefit to agricultural subsidies by catchment sensitive farming practices and Environmental Stewardship Schemes.
- Encourage targeted woodland creation to reduce run-off, liaising with initiatives such as the North West Cheshire Forest Strategy.
- Use Strategic Flood Risk Assessments to inform future development and minimise flood risk from all sources.
- Encourage local authorities covering properties at risk to consider extending eligibility for home improvement grants and home loans to encompass flood protection and resilience products.



↑ River Dane

Map of CFMP policies



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