

# River Wyre Catchment Flood Management Plan

Summary Report December 2009



managing  
flood risk

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# Introduction

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

The River Wyre 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.

The Wyre is steep and rural in its upper catchment with rapid runoff. The Lower Wyre is at a low elevation, urbanised and sometimes at or below sea level.

Approximately 7,600 residential and commercial properties are at a 1% annual risk of fluvial flooding (from rivers) within the catchment; 90% of which are concentrated in the towns of Fleetwood, Cleveleys, Poulton-le Fylde and Thornton. In the future, it is estimated that over 9000 properties will be at risk from a 1% fluvial event after taking into account climate change.

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 local authorities, United Utilities, DEFRA, Natural England, and Lancashire Wildlife Trust.

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](mailto: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:

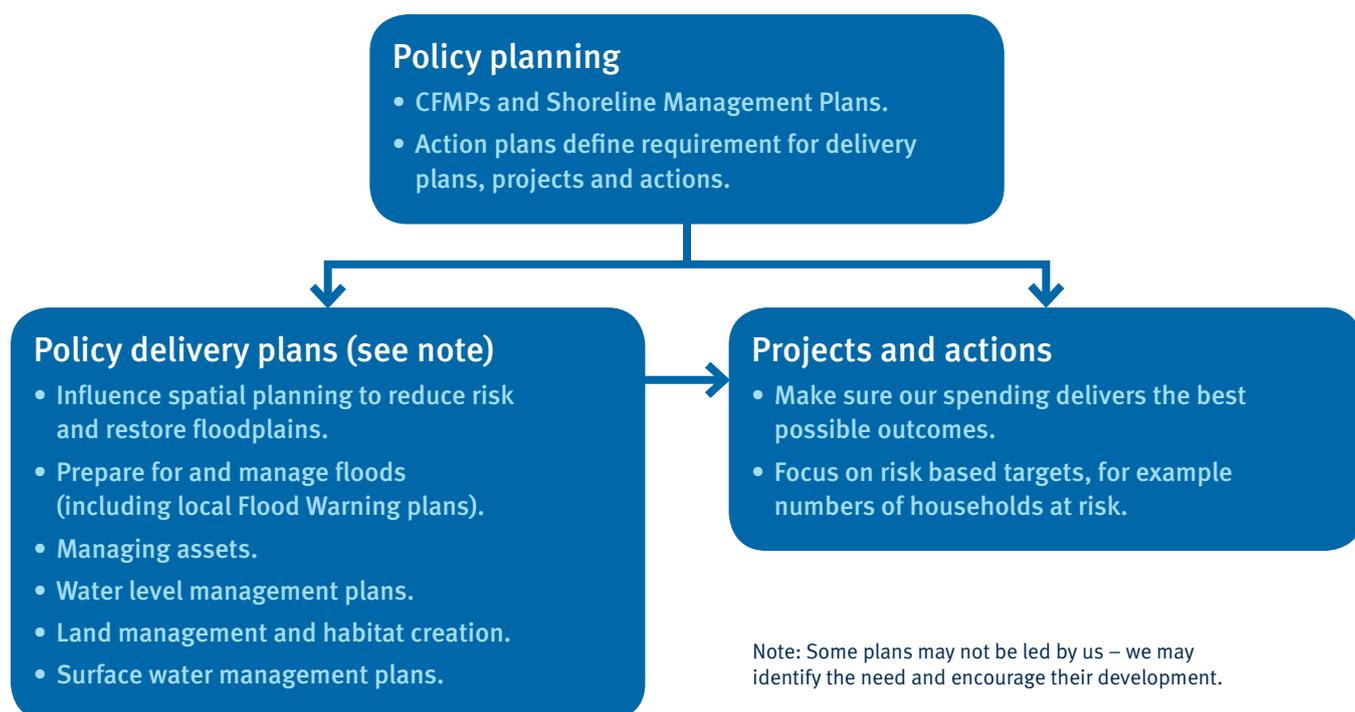
- The Environment Agency, who will use the plan to guide decisions on investment in further plans, projects or actions.
- Regional planning bodies and local authorities who can use the plan to inform spatial planning activities and emergency planning.

- 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

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It is useful to draw out some general characteristics that are most important in our management of flood risk. The River Wyre catchment area extends from the high moorland of the Forest of Bowland fells in the upper, eastern part of the catchment to the lower lying central area and flat plains of the Fylde peninsular found adjacent to the Wyre estuary. The upper tributaries of the Wyre are steep, resulting in a rapid runoff response following rainfall. The watercourses within the Lower Wyre catchment are at a low elevation and sometimes at or below sea level. Rainfall over these tributaries often has difficulty in draining away, leading to ponding of surface water, which is exacerbated by the urban nature of these catchments.

The majority of the middle and lower reaches of the Wyre catchment have been managed for mixed agricultural uses, and as a result a large network of modified watercourses and embanked rivers has been created to support agricultural production. In the past, rivers have also been modified at urban locations to convey water more efficiently, and this has been done through artificial and straightened river channels. Flood defences are typically raised earth embankments protecting the main urban areas and agricultural land at risk of flooding. Pumping stations within the lower reaches of the Wyre also protect properties at risk when high tide levels prevent river flows

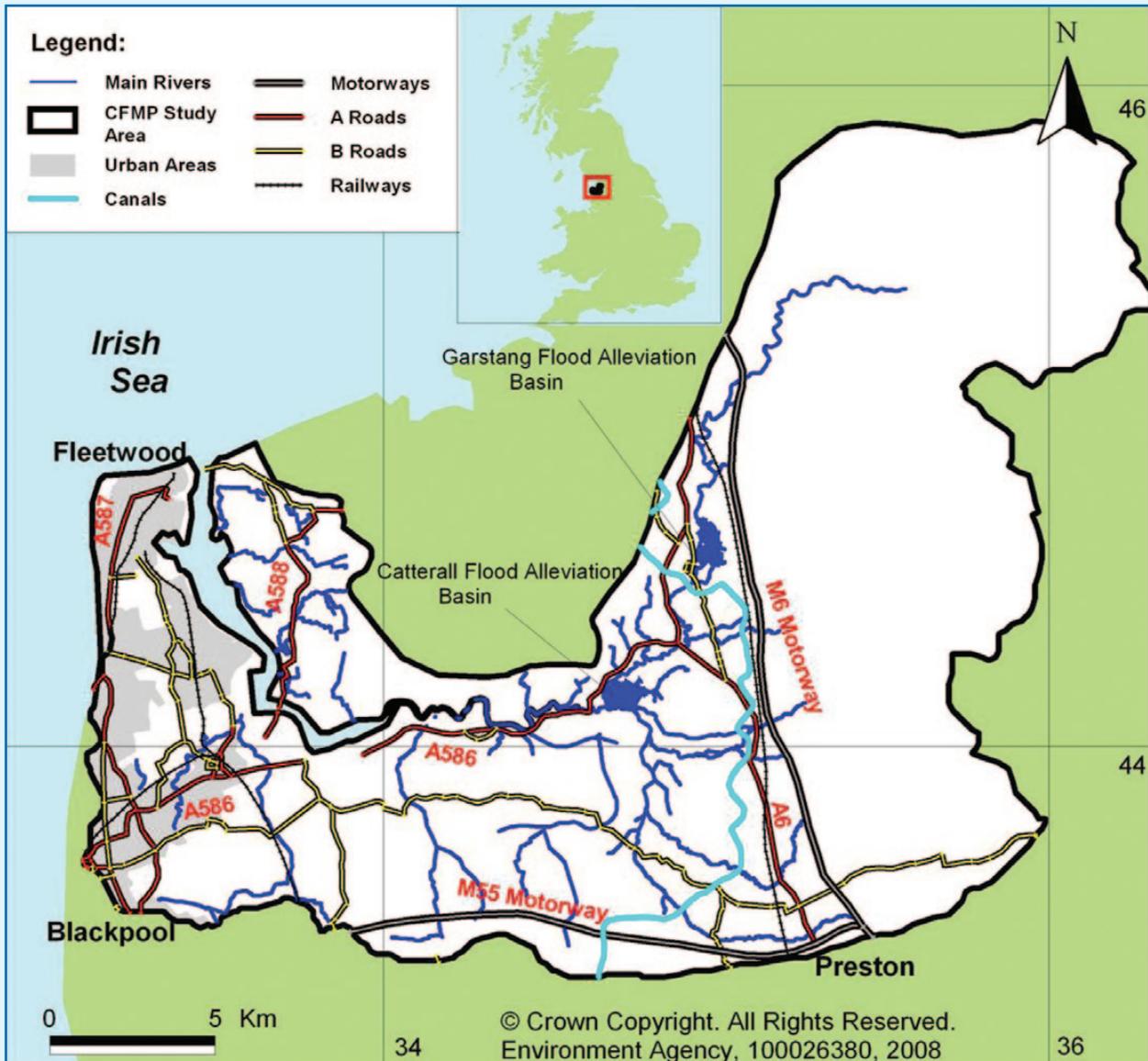
reaching the estuary. In addition, the Catterall and Garstang flood alleviation basins, constructed in the 1980s, protect properties in Garstang, Catterall and St. Michaels-on-the-Wyre.

Within the Wyre catchment, urban development accounts for approximately 10% of land use. The greatest concentration of properties (more than 90%) is in the west of the Wyre estuary, extending from the northern part of the coastal resort of Blackpool almost continuously through to the port of Fleetwood, and includes the towns of Poulton-le-Fylde, Thornton, and Cleveleys. Outside of this main centre of urbanisation, there is the market town of Garstang, and the villages of Catterall, St Michaels and Great Eccleston in the middle of the catchment. However, as the majority of the catchment is rural, it is predominantly dotted with small villages, hamlets, and isolated farm dwellings. There are currently approximately 7,600 properties across the catchment at risk from river flooding. Our approach to management in these high risk locations is focussed around improvements in existing flood risk management, development control, flood warning and flood resilience.

The Wyre CFMP area has a particularly high environmental and landscape value, reflected in its two main designations: Bowland Fells Special Protection Area and Area of Outstanding Natural Beauty, and

the Estuary and Morecambe Bay which has international, European and national environmental designations. The CFMP takes account of opportunities and constraints for future flood risk management from improved environmental management.

Map 1 Main features



↑ Garstang Flood Basin in operation

# Current and future flood risk

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## 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 already in place.

The Wyre catchment has a long history of flooding but recently there have been two major events. In November 1977, a severe storm coincided with a spring tide, resulting in flooding in Thornton-Cleveleys and Knott End-on-sea. In 1980 a breach to one of the flood embankments resulted in flooding in the village of St Michaels, costing millions of pounds.

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

- River flooding from the River Wyre has historically been an issue of concern, especially within the areas of Garstang, St. Michaels-on-Wyre and Great Eccleston. Following severe flooding in 1980, the flood basins at Garstang and Catterall were constructed to help alleviate future flooding. Since their construction, there have been several flood events, most notably in 1995 and 2000. However, the basins prevented major flooding to property. Despite this, flooding to a number of rural properties, roads and agricultural land have occurred.
- Tidal flood risk remains a key issue for the downstream reaches of the River Wyre and the tributaries directly entering the Wyre Estuary in the lower catchment. Tidal flooding typically occurs along the coastline and in the Wyre Estuary when high tides, combine with a storm surge, wind and wave action to raise the sea level over the top of the coastal defences. Tidal flooding and coastal processes will be assessed in the next stage of the Shoreline Management Plan (SMP2) process, which is expected to be completed in summer 2010.
- Groundwater flooding is not thought to be a significant issue in this catchment, due to its geology. However, there is a risk from localised groundwater ponding in the Knott-End-on-Sea area due to low lying land and the presence of shallow sand and gravel aquifers.
- Surface water flooding does occur in the Wyre catchment, but there are relatively few records of properties flooding.
- Sewer flooding has been recorded in the urban areas stretching from Blackpool northwards to Fleetwood, and in the middle of the catchment between St Michaels and Garstang.

## Where is the risk?

The main sources of risk are river and tidal flooding, with a smaller risk from sewer and surface water. Using a broad-scale model and flood maps where no models exist we estimate 7,600 residential and commercial properties in the catchment have a 1% chance of flooding in any one year from rivers.

There is little fluvial flood risk associated with a 10% probability event. The majority of the catchment has existing defences that protect property and agricultural land to a standard of protection between 2% and 3%.

Tidal flood risk remains a key issue for the downstream reaches of the River Wyre and the tributaries directly entering the Wyre estuary in the lower catchment. This is not assessed as part of the CFMP.

The distribution of flood risk to properties across the catchment is illustrated on the map overleaf.

There is one Scheduled Ancient Monument (Claughton Hlaew) at risk of fluvial flooding, but there are no other designated sites at risk from a 1% event.

We recognise the potential risk from surface water and sewer flooding; following on from the CFMP further study will be undertaken to quantify this 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 Wyre Borough at Cleveleys, Thornton
151 to 500	In the Wyre Borough at St. Michaels–on-the-Wyre, Bilsborrow, Fleetwood, Poulton-le-Fylde
51 to 150	In the Wyre Borough at Great Eccleston, Garstang

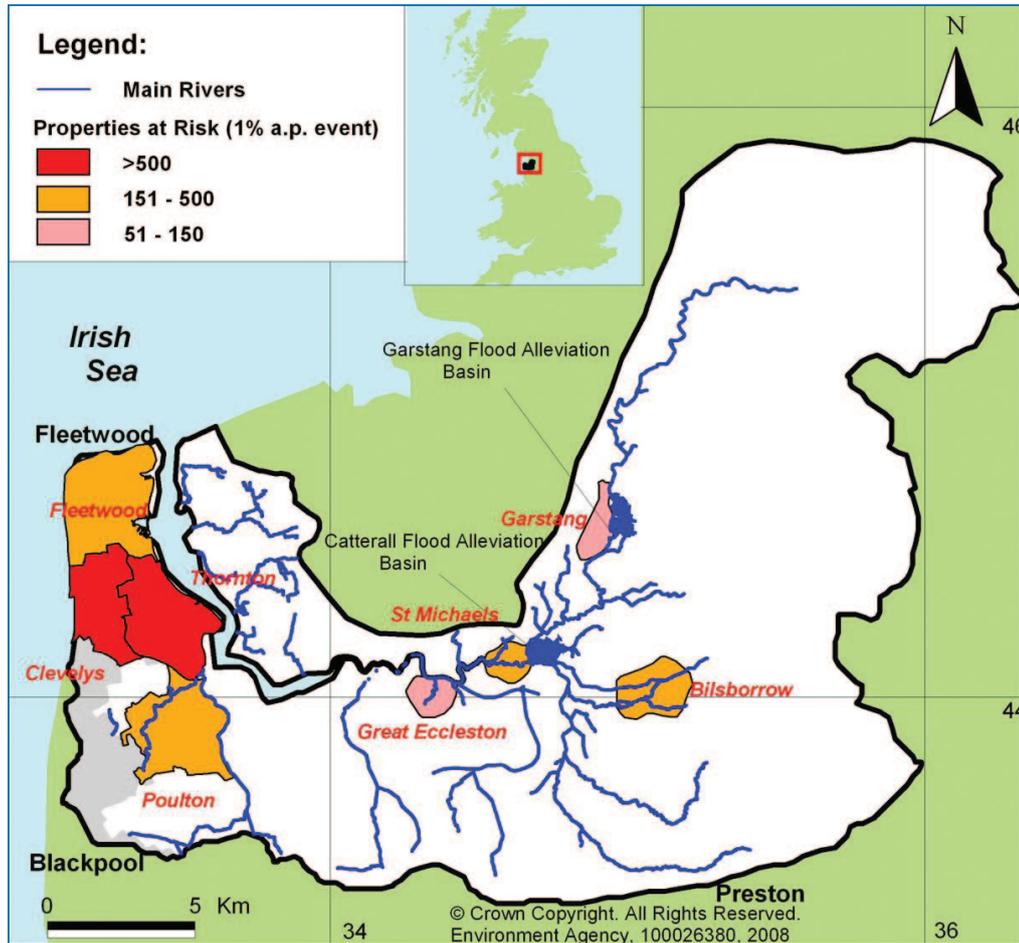
**Table 2. Critical infrastructure at risk:**

Four care homes, five power and gas stations, one sewage treatment works, four emergency response centres, three telephone exchanges, one waste management site, eight schools



↑ Wyre Flood Basins

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



## How we currently manage the risk in the catchment

More than 90% of the properties at risk are concentrated in the towns of Fleetwood, Cleveleys, Poulton-le-Fylde and Thornton. These towns are affected by tidally influenced fluvial flooding and have benefited, together with other towns, from engineering schemes put in place over the last 30 years or more. These include:

- Flood alleviation basins were constructed at Garstang and Catterall in the 1980s and benefit Garstang, St. Michael's-on-Wyre and other downstream areas.
- Raised defences along the River Wyre and major tributaries were

built or improved in the 1980s. The total length of flood defences in the CFMP area is approximately 422km and the average design standard of protection is able to cope with a 2.5% annual probability event.

- Pumping stations constructed at Yoad Pool and Raikes Brook.

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:

- identifying and promoting new flood defence schemes where appropriate;
- maintaining and improving existing flood defences, structures and water courses;
- enforcement where riparian owners and others carry out work detrimental to flood risk, or neglect their responsibilities;
- working with local authorities to influence the location, layout and design of new and redeveloped

## The impact of climate change and future flood risk

property while 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, this helps to understand where flooding is likely to occur;
- operation of floodline and warning services to over 29,000 properties (mostly for tidal flooding);
- 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 addition to our measures and activities, flood risk management activities are also undertaken by local authorities, such as Wyre Borough Council. They maintain several ordinary watercourses as well as sections of coastal defence and a number of pumping stations within Thornton-Cleveleys.

In the future flooding will be influenced by climate change, changes in land use (for example urban development) and rural land management. In the River Wyre catchment, sensitivity testing revealed that climate change has the greatest impact on flood risk, followed by land management change, and then urbanisation. In this catchment land management change has the effect of reducing the time to peak of the main rivers. 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 following future scenarios for climate change were used in the River Wyre CFMP:

- 20% increase in peak flow in all watercourses. This will increase the probability of large-scale flood events;

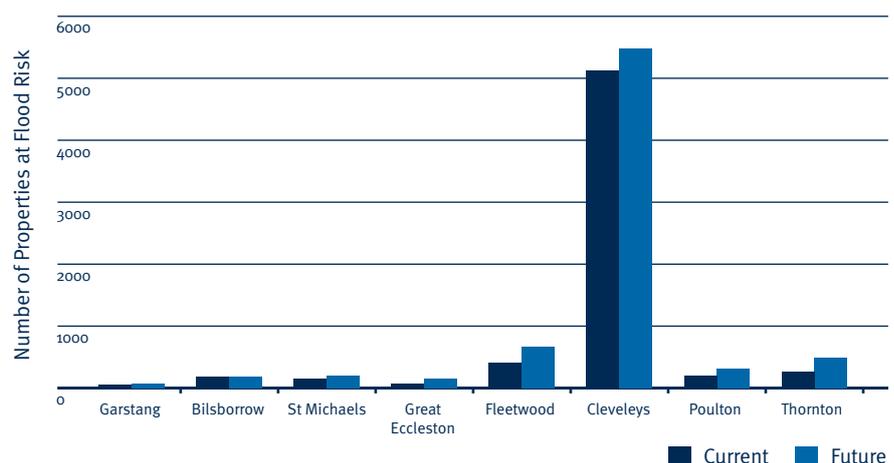
- a total sea level rise of 843 mm by the year 2100. This will increase the probability of tidal flooding and increase the length of time watercourses will be tide locked.

We estimate that by 2100, flooding will become more frequent. By using river models developed as part of the CFMP, a 1% annual probability event will put approximately 9,000 properties at risk of fluvial flooding. This is a 19% increase on the current number of properties at risk across the catchment. Flood depths are expected to increase by 0.3m in Garstang and St. Michaels on the Wyre and by 0.8m in Thornton and Cleveleys.

The graph below shows the difference between current and future flood risks from a 1% event at key locations across the catchment. Following on from the CFMP, organisations need to work together to investigate flood risk from other sources (e.g. surface water and sewer flooding) in more detail.

In general, it is unlikely that the impact of flooding on environmental sites will change significantly in the future.

**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

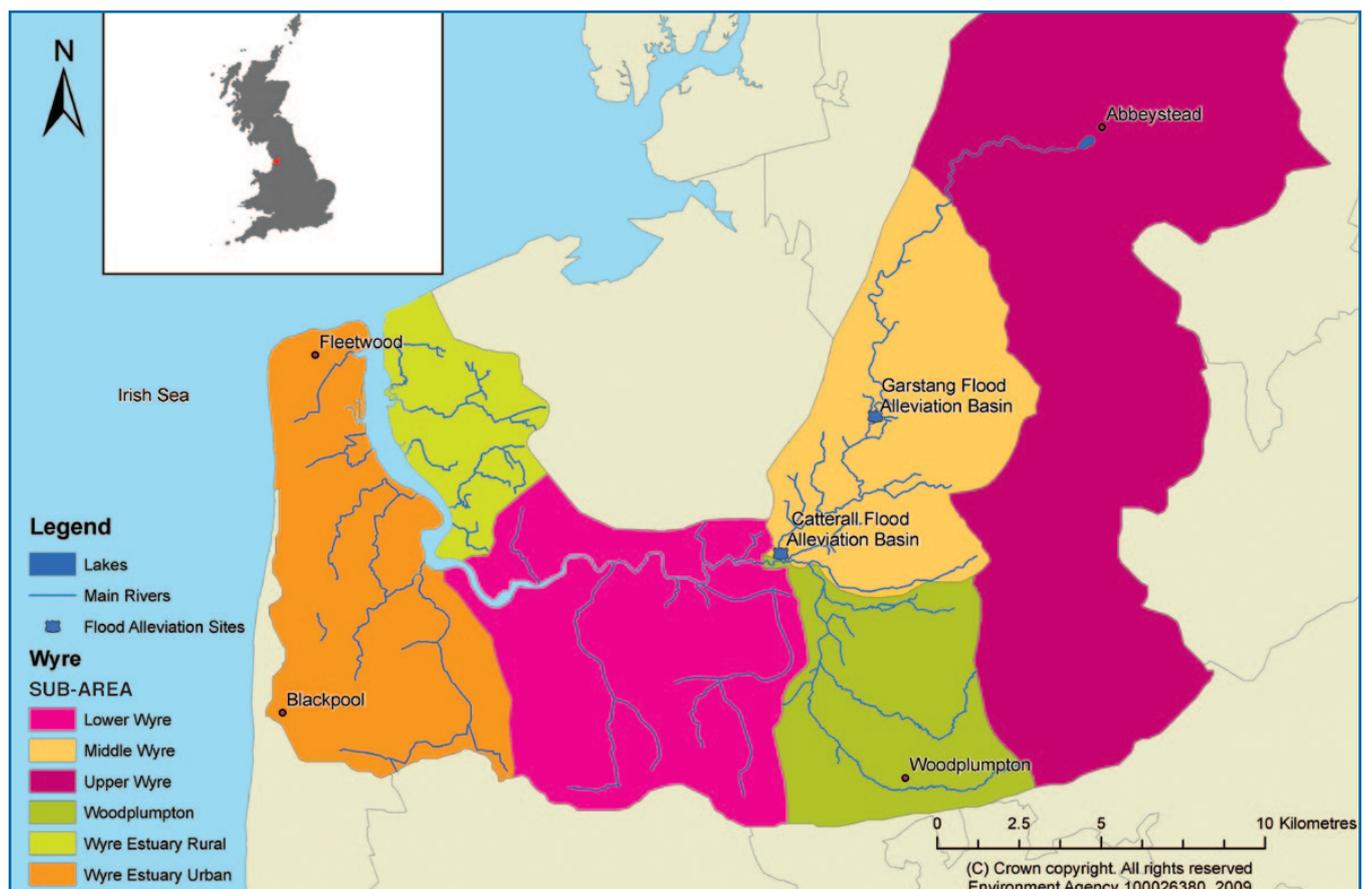
We have divided the Wyre CFMP area into six distinct sub-areas based on their physical characteristics, sources of flooding and levels of risk. These sub-areas will allow us and the key stakeholders to promote flood risk management approaches, policies and actions that are most appropriate in that area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

building and raising defences. This is why we have to look at the whole catchment and 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 that 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.

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### → 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.

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### → 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.

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### → 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.

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### → 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.

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### → 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.

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# Upper Wyre

## Our key partners are:

Wyre Borough Council

Lancaster City Council

Preston City Council

Natural England

Landowners / reservoir undertakers

Lancashire County Council

United Utilities

## The issues in this sub-area

This sub area is predominantly rural, although there are a number of small villages such as Dolphinholme and Abbeystead. The sub area covers the upper reaches and tributaries of the rivers Wyre and Brock, and encompasses part of the Forest of Bowland Area of Outstanding Natural Beauty (AONB), Bowland Fells Special Protected Area (SPA) and Site of Special Scientific Interest (SSSI), in addition to Tarnbrook Meadows SSSI, and Rough Hey Wood SSSI. The topography and the steep gradients of the watercourses result in fast runoff and ‘flashy’ catchment characteristics. Abbeystead reservoir is within this sub area and could potentially be used for managing flood risk in the future. There are no known properties or critical infrastructure at risk in this sub area.

## 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.

Flood risk is low in the Upper Wyre, and remains so over the next 100 years given our climate change projections. Due to the rural nature of the catchment, there are no development pressures within the sub area. However, by implementing our preferred policy, we are hoping to realise opportunities which exist within the Upper Wyre to restore natural processes, and to provide attenuation in the upper catchment, which will bring benefits to downstream sub areas and create environmental benefits within the sub area itself.

## The key messages

- Restoration of the moorland habitat by grip blocking, to better attenuate rainfall and run-off.
- Investigation into the use of Abbeystead Reservoir to provide upstream flood storage in the catchment.
- Changes in land and soil management practices to reduce erosion rates and increase water retention locally.
- To effectively achieve the aims of the preferred policy, effective communication between key stakeholders such as DEFRA, Natural England, NFU and landowners must exist.

## Proposed actions to implement the preferred policy

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

- Investigate further flood storage opportunities, setting back of existing embankments, and land management changes in the sub area.
- Undertake a pre-feasibility study for Abbeystead Reservoir to assess the current and potential capacity for flood storage, and how this can potentially attenuate flood flows from the outfall to the Wyre downstream of the reservoir.
- To identify suitable sites, and promote the use of grip blocking through consultation with United Utilities, Natural England, RSPB, and landowners, to reduce erosion and flashiness in the upper catchment.



↑ Abbeystead Reservoir

# Middle Wyre

## Our key partners are:

Wyre Borough Council

Lancaster City Council

Natural England

Landowners

Lancashire County Council

United Utilities

## The issues in this sub-area

This sub area is semi rural and covers the middle reaches of the River Wyre and Brock. The main urban areas are Garstang, St. Michaels and Catterall. A typical characteristic of this sub area is the significant length of narrow, but embanked, channel which, together with the Garstang and Catterall flood basins, forms part of the Wyre Flood Alleviation Scheme constructed in the 1980s. A large amount of sediment and gravel is transported by the watercourses in this sub area and erosion has been known to damage raised defences in a number of locations. Approximately 180 properties are at risk in the 1% annual probability event (APE). This rises to approximately 250 properties by 2100, with approximately 120 of those properties at risk of flooding from deep and fast flowing water. There are three infrastructure and community assets at risk and no statutory environmentally designated sites at risk from flooding in this sub area.

## 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.

Our preferred policy seeks to ensure that flood risk is sustained at the current level, which will require actions from the Environment Agency and key stakeholders to mitigate primarily for the risk associated with climate change. To achieve the aims of the preferred policy in the longer term, consideration must be given to the creation of further flood storage areas, and the possible setting back of existing flood embankments to increase channel capacity.

## The key messages

- The continued effective timely operation and optimum use of Garstang and Catterall flood storage basins.
- To promote the most effective use of maintenance expenditure through asset system and major asset management plans.
- To identify and investigate further flood storage and land management opportunities to benefit flood risk in the medium to long term.
- Effective management of proposed new development through PPS25 and the promotion of sustainable drainage systems (SUDS).

## Proposed actions to implement the preferred policy

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

- Continue to maintain existing defences and major assets to their current standard, and improve assets where they fail to meet current targets. Expenditure should be risk based through the completion of System Asset Management Plans (SAMPs). (SAMPS - a forward looking plan for the repair and maintenance of flood defence structures).
- Investigate further flood storage opportunities, setting back of existing embankments, and land management changes in the sub area to ensure no increase in flood risk in the medium to long term.
- Encourage and assist the Regional Assembly and local planning authorities to produce Regional and Strategic Flood Risk Assessments (SFRAs) to inform future development and minimise flood risk from all sources.



↑ Garstang Flood Basin

# Woodplumpton

## Our key partners are:

Wyre Borough Council

Preston City Council

Natural England

Landowners

Developers

United Utilities

## The issues in this sub-area

This sub area is situated in the south of the catchment, and is formed principally by the Woodplumpton Brook, Barton Brook, and lower Brock catchments. It is predominantly rural in nature with the villages of Woodplumpton and Bilsborrow. Flood risk management consists primarily of maintenance of the channel and the raised embankments of the lower Brock, New Draught, Woodplumpton Brook, and Barton Brook. Approximately 250 properties are at risk in the 1% APE. This rises to approximately 260 properties by 2100. Infrastructures and community assets at risk include part of the A6 road at Barton and Bilsborrow, and a police station, school, and health centre in Bilsborrow. There are no statutory environmentally designated sites at risk from flooding in this sub area.

## The vision and preferred policy

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

The current flood risk management measures are of clear benefit to the people and properties in Bilsborrow and Myerscough. Flood risk is expected to rise by 2100 in these areas but not of a significant nature. Our vision is to continue to manage the residual risks by making sure that our flood risk management expenditure is risk based. We may need to look at alternative ways of managing flood risk in the sub area, such as land management change and flood warning. Appropriate planning is also necessary so that future development does not cause any additional flood risk issues.

## The key messages

- Continue with existing maintenance regime in the short term.
- Seek to develop and improve the flood warning service over time.
- Investigate alternative actions to sustain the current level of flood risk.

## Proposed actions to implement the preferred policy

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

- Continue to maintain existing defences and major assets to their current standard, and improve assets to an appropriate standard where they fail to meet target conditions. Expenditure should be risk-based through the completion of SAMPs.
- Investigate further flood storage opportunities, setting back of existing embankments, and land management changes in the sub area to sustain current flood risk in the medium to long term.
- Encourage and assist the Regional Assembly and Local Planning Authorities to produce Regional and SFRA to inform future development and minimise flood risk from all sources.



↑ Woodplumpton Brook

# Lower Wyre

## Our key partners are:

Wyre Borough Council

Fylde Borough Council

Natural England

Landowners

Lancashire County Council

United Utilities

## The issues in this sub-area

This sub area is formed by the lower reaches of the Wyre and its tributaries and is predominantly rural in nature, with St Michaels, Great Eccleston, Little Eccleston, Elswick, and Inskip forming the larger villages. Raised embankments and Raikes Brook Pumping Station are the major assets within the sub area. Cartford Bridge, at Little Eccleston, marks the normal tidal limit of the Wyre. An estimated 220 properties are at risk in the 1% APE, mainly in the St Michaels and Great Eccleston areas. This rises to approximately 330 properties by 2100. Around 15 properties have been affected by sewer related flooding. Four km of the A586 between St Michaels and Great Eccleston is at risk of flooding, and a school in St Michaels. The Wyre estuary as far as Windy Harbour is a designated site as part of the wider Morecambe Bay SPA, SAC, RAMSAR and SSSI.

## 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.

In this sub area, flooding occurs from both fluvial and tidal sources and, like other areas in the catchment, the Wyre is confined to a narrow, embanked channel, resulting in the loss of natural floodplain. Our modelling suggests that flood risk increases significantly over time in this sub area. So that the risk is managed to an acceptable level, and to meet the objectives of the CFMP, our preferred policy is to take action to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits, locally or elsewhere in the catchment.

## The key messages

- Continue with existing maintenance regime in the short term.
- Opportunities for flood storage should be identified within this sub area.
- Flood risk to property in areas such as St Michaels and Great Eccleston should continue to be managed at the same level.
- Reduce 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:

- Continue to maintain existing defences and major assets to their current standard, and improve assets to an appropriate standard where they fail to meet target conditions. Expenditure should be risk based through the completion of SAMPs.
- Investigate further flood storage opportunities, setting back of existing embankments, and land management changes in the sub area to sustain current flood risk in the medium to long term.
- Undertake a study to improve understanding of interaction between river flow and tide, and the impact on flood risk within the sub area. This affects communities mainly in St Michaels, Great Eccleston and Ratten Row.



↑ River Wyre at St. Michaels-on-the-Wyre

# Wyre Urban

## Our key partners are:

Wyre Borough Council

Fylde Borough Council

Blackpool Borough Council

Lancashire County Council

United Utilities

## The issues in this sub-area

This sub area is predominantly urban in nature, and includes Fleetwood, Thornton-Cleveleys, Poulton-le-Fylde, and the northern part of Blackpool. Tidal flood risk is the dominant factor within this sub area but there are still a very large number of properties at risk from fluvial flooding due to urban watercourses being tide locked. Whilst parts of the catchment, such as Hillylaid Pool, can be pumped at periods of high tide, others such as Main Dyke rely on gravity drainage alone. An estimated 6700 properties are at risk in the 1% annual probability fluvial event, mainly in Thornton-Cleveleys and Poulton-le-Fylde, with total damages to properties of £438m. This rises to approximately 7,800 properties and £523m damages by 2100. Approximately 125 incidents of sewer flooding have been recorded in the sub area. There is up to 5km of transport infrastructure at risk, 21 community facilities and 32 classified recreational assets at risk within the sub area.

The Wyre estuary is part of the Morecambe Bay SAC, SSSI, SPA & Ramsar site, and Marton Mere SSSI. Development is a key issue, and the ICI Hillhouse Thornton site adjacent to the estuary has been earmarked for development in the near future.

## 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.

Flood risk is currently unacceptable in this sub area, and is expected to rise further by 2100. Tidal flood risk is the dominant factor in this sub area but there are significant areas at risk from fluvial flooding, principally from the urban watercourses often fairly inaccessible and culverted in places. Our preferred policy will seek firstly to improve our knowledge of the flooding mechanisms of the existing watercourse network, and then further develop our strategy to reduce flood risk in the future.

## The key messages

- Promote the opening up of culverts and improvements in access to the urban watercourses.
- Improve fluvial flood mapping of urban areas through further modelling studies.

- Further development of our strategy to reduce flood risk.
- Ensure that future development is sustainable.

## Proposed actions to implement the preferred policy

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

- Continue to maintain existing defences and major assets to their current standard, and improve assets to an appropriate standard where they fail to meet target conditions.
- Undertake a strategy study for reducing fluvial flood risk from the urban watercourses in the Thornton-Cleveleys area.
- Identify and monitor culvert condition in urban areas.
- Encourage partner organisations to collaborate to produce Surface Water Management Plans (SWMPs) to help manage flooding in known problem areas in Thornton-Cleveleys.



↑ Tidal Outfall on Main Dyke

# Wyre Rural

## Our key partners are:

Wyre Borough Council

United Utilities

Natural England

Landowners

## The issues in this sub-area

This sub area is mainly rural in nature, with a small number of isolated properties at risk in its principal urban areas of Knott End-on-sea and Hambleton. Tidal flooding is the dominant type of flooding within the area. The main flood risk from rivers is in the towns of Preesall, Hambleton and Stalmine, and approximately 230 properties are at risk in the 1% APE. This rises to approximately 380 properties by 2100, with approximately 70 of these properties at risk of flooding from deep water. There are a small number of properties at risk of flooding from sewers. 1km of the A588 to the south of Hambleton and three community assets are at risk. The Wyre estuary is part of the Morecambe Bay SAC, SSSI, SPA & Ramsar site, which is situated adjacent to the sub area.

## The vision and preferred policy

**Policy option 2:** Areas of low to moderate flood risk where we can

generally reduce existing flood risk management actions.

The highest risk of flooding within this sub area is from tidal flooding, from which the sub area is largely protected by raised flood defences. We are not proposing any change to the management of the tidal defences within this CFMP, as this will be considered within the SMP. Flood risk will rise within the sub area in the future, although there are only a few additional properties which are at risk of fluvial flooding, and flooding is mainly confined to agricultural land. Our preferred policy would look to reduce existing maintenance activities, where this does not have an adverse effect on flood risk to property, thereby reducing expenditure where there are few or no properties at risk.

## The key messages

- Review current maintenance programme, and seek to identify areas where maintenance can be reduced, without adversely affecting flood risk.
- Seek to promote the development of Surface Water Management Plans, where known surface water flooding problems exist.
- Facilitate the setting up of a District Response Group, to raise awareness of flooding within the sub area.
- Flood risk to property in areas such as Hambleton, Preesall and Stalmine should continue to be managed at the same level.

## Proposed actions to implement the preferred policy

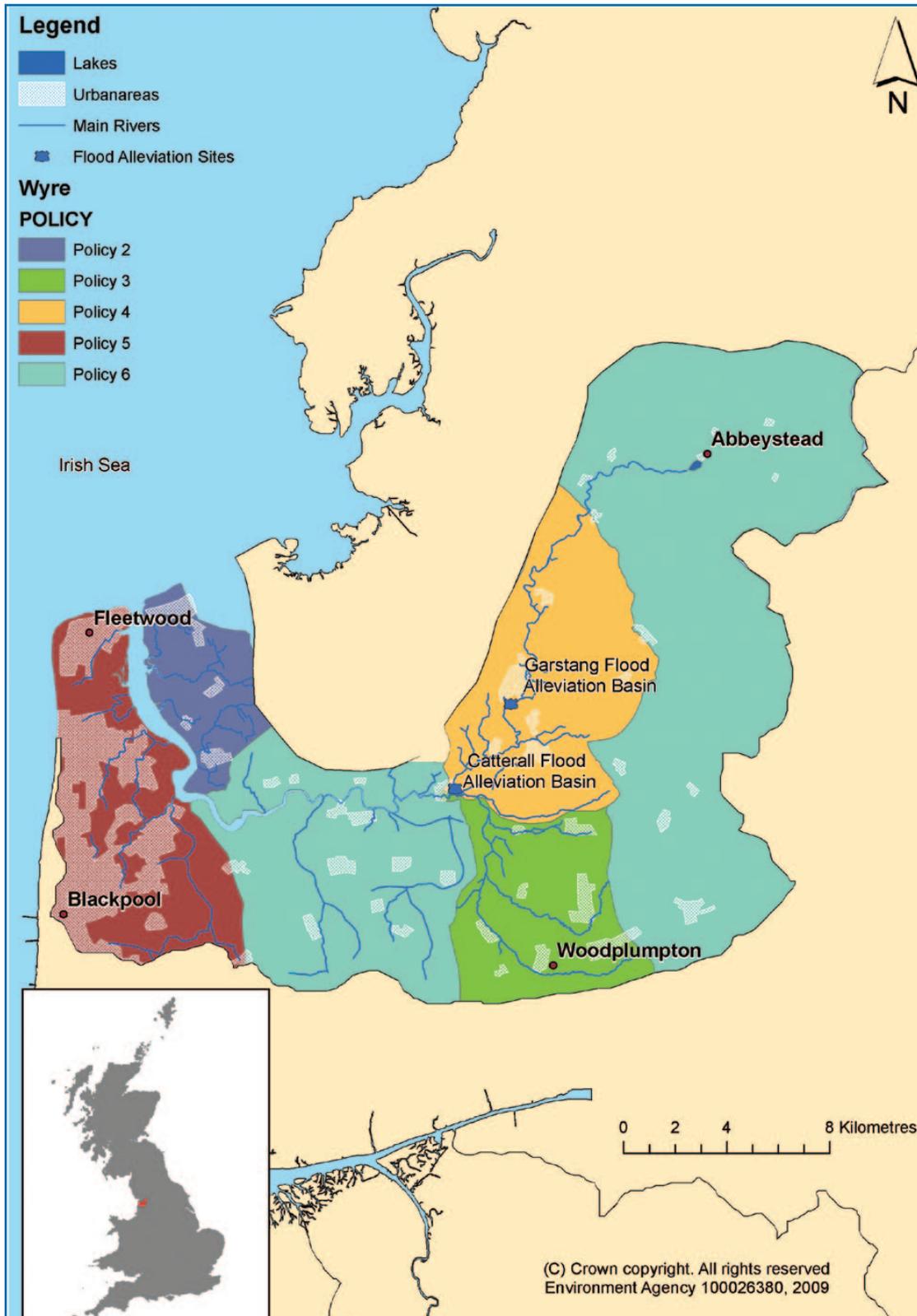
The essential actions to achieve our policy aim are listed below:

- Continue to maintain existing defences and major assets to their current standard, and improve assets to an appropriate standard where they fail to meet target conditions. Expenditure should be risk-based through the completion of SAMPs.
- Undertake a study to review existing maintenance programme, and to identify areas where maintenance can be reduced in the future.
- Improve flood contingency planning for areas at risk within the sub area, such as Preesall, Hambleton and Stalmine.
- Encourage partner organisations to collaborate to produce SWMPs to better manage flooding in known problem areas such as Preesall and Hambleton.



↑ Wardley's Pool Watercourse

# Map of CFMP policies





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