LIT 10212

Flood risk management plan

Severn river basin district summary

December 2015

What are flood risk management plans?

Flood risk management plans (FRMPs) describe the risk of flooding from rivers, the sea, surface water, groundwater and reservoirs. FRMPs set out how risk management authorities will work together and with communities to manage flood and coastal risk over the next 6 years. Risk management authorities include the Environment Agency, Natural Resources Wales, lead local flood authorities (LLFAs), local councils, internal drainage boards, Highways England, South Wales Trunk Road Agency , North Wales Trunk Road Agency (NWTRA) and water and sewerage companies.

Each EU member country must produce FRMPs as set out in the EU Floods Directive 2007. Each FRMP covers a specific river basin district. There are 11 river basin districts in England and Wales, as defined in the legislation. A river basin district is an area of land covering one or more river catchments. A river catchment is the area of land from which rainfall drains to a specific river.

Each river basin district also has a river basin management plan, which looks at how to protect and improve water quality, and use water in a sustainable way. FRMPs and river basin management plans work to a 6-year planning cycle. The current cycle is from 2015 to 2021. We have developed the Severn FRMP alongside the Severn river basin management plan so that where possible flood defence schemes can provide wider environmental benefits.

The Severn RBD FRMP is a joint plan prepared by the Environment Agency and Natural Resources Wales in partnership with 5 LLFAs. The FRMP includes information relating to 'main rivers' (larger rivers and streams which are marked on an official document called the main river map), the sea and reservoirs for the whole river basin district. It also includes information on local flood risk in the 5 LLFA areas, including surface water flooding (flooding which happens when drainage systems become overloaded with high volumes of rainfall), groundwater flooding and flooding from 'ordinary watercourses'. 'Ordinary watercourses' are smaller rivers, streams, ditches and so on, which are not marked on the main river map). Some water companies have provided measures relating to sewer flooding.

Flood risk in the Severn river basin district

The Severn river basin district covers 21,500km^2. The River Severn is the longest river in Britain, stretching 350km from its source to the mouth of the Bristol Channel. The Warwickshire Avon and the Teme are the River Severn's main tributaries (smaller rivers flowing into the main river).

The River Severn goes through a varied landscape within the river basin district, from the uplands of Wales, down through valleys and rolling hills through central England, to the lowlands of the Severn Estuary.

The river basin district also covers the rivers that drain directly into the Severn Estuary in south-east Wales, including the Wye, Usk and Taff, and in the south-west, including the Bristol Avon.

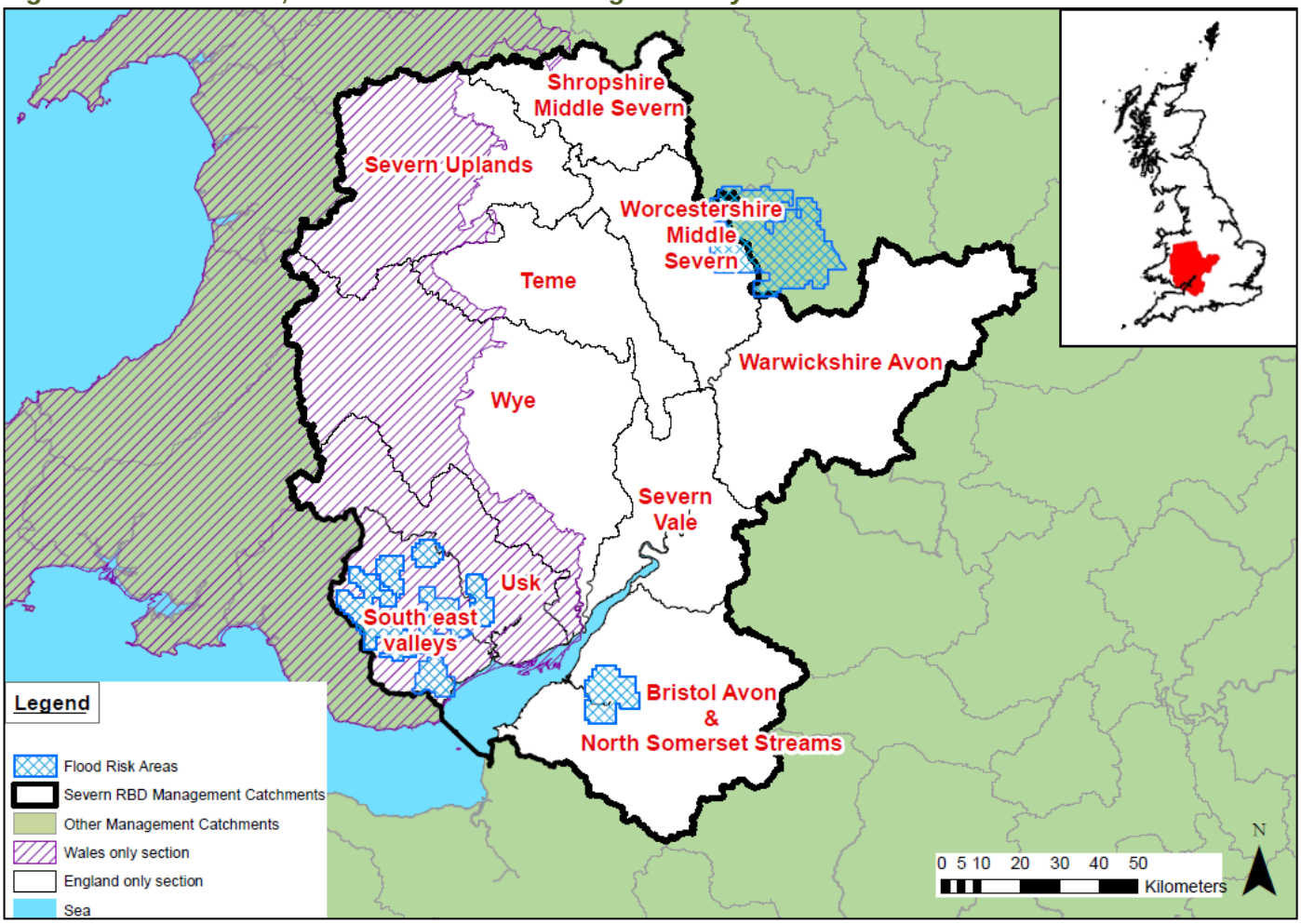
The river basin district is made up of 10 catchments (2 in Wales, 6 in England and 2 cross-border catchments) and 8 flood risk areas (6 in Wales and 2 in England), as shown in figure 1. Flood risk areas (FRAs) are specifically defined areas with a high risk of surface water flooding.

In the Severn river basin district:

- about 32,600 people are at high risk of flooding from rivers and the sea (more than a 1 in 30 (3.3%) chance of being flooded in any year);

- 67,400 people are at medium risk of flooding from rivers and the sea (less than a 1 in 30 (3.3%) but more than a 1 in 100 (1%) chance of being flooded in any year);
- 260,000 people are at risk of flooding from reservoirs;
- about 120,000 people are at medium to high risk of surface water flooding;
- flooding from sewers occurs in some towns and cities.

Figure 1: Catchments, FRAs and Wales and England only areas in the Severn river basin district



Characteristics of the Severn river basin district

Part B of the FRMP gives a full description of each catchment, including the factors affecting flood risk and statistics for the river basin district.

Severn Uplands, Teme and Shropshire Middle Severn catchments

In the north of the Severn river basin district, the rivers Severn and Teme run through steep valleys. Here the rivers respond rapidly to rainfall, so flooding can happen relatively quickly.

Llyn Clywedog

Reservoirs, such as Llyn Clywedog and Lake Vyrnwy, provide flood storage and are used to regulate flows downstream on the River Severn. They are also used for public water supply.

Further downstream the land becomes flatter as the rivers reach the Shropshire plain. The area where the River Vyrnwy joins the River Severn is important for flood storage and plays a key role in reducing flood risk downstream to places such as Shrewsbury.

On the Shropshire plain, flooding can last for several weeks. Similarly where the Teme meets the River Severn, flooding can last for long periods during the winter.

Wye, Usk and South East Valleys catchments

The rivers in these catchments start in the uplands hills in the west and flow south-east through steep-sided valleys, characterised by a mixture of woodland and managed grassland.

Several rivers run through the steep valleys of the South East Valleys catchment and there are many towns in narrow valley floors. These rivers respond quickly to rainfall and are prone to surface water flooding. Flood levels can rise suddenly, increasing risk to life.

In the lower Wye and Usk catchments the flood plains widen and are intensively farmed. There is frequent flooding of farmland here. Natural water storage areas, including the Letton Lakes in the Wye catchment, help reduce and control river flows. During flooding, these lakes help reduce peak flow downstream in Hereford.

Glasbury, River Wye

Towns at risk of fluvial flooding from the Wye and its tributaries include Builth Wells, Glasbury, Hereford, Monmouth, Hay-on-Wye, Ross-on-Wye and parts of Leominster on the River Lugg. A number of smaller towns and villages are also at risk from the Wye and its tributaries.

The rivers drain into the Severn Estuary, with a number of major towns and cities at risk of tidal flooding.

Worcestershire Middle Severn, Severn Vale and Warwickshire Avon catchments

In the east of the river basin the River Severn runs north to south, with the Warwickshire Avon joining it at Tewkesbury. The landscape is characterised by woodland and open farmland on undulating hills, leading to a broader, flatter flood plain further downstream.

There is a long and well documented history of river flooding in this area. The most recent flooding happened in 2007 and early 2014. In 2007 properties flooded in riverside towns along both the Severn and Warwickshire Avon. Since 2007, risk management authorities have constructed or improved flood defence schemes, reducing flood risk for a number of communities, for example the Horsbere Brook and Daniels Brook schemes in Gloucestershire, and at Broom on the River Arrow in Warwickshire.

Horsbere Brook flood defence scheme, Gloucester

The River Severn has flood plains over 1 mile wide as it gets closer to the Severn Estuary. When the river floods, water can take many weeks to drain from the flood plain, which delays the recovery of communities affected by flooding. Gloucester and villages along the Severn from Haw Bridge to Minsterworth are at risk of both river and tidal flooding, with tidal flooding dominating downstream of Minsterworth.

Bristol Avon and North Somerset Streams catchment

In the south of the river basin district, the Bristol Avon catchment has areas of both tidal and river flood risk.

Much of the catchment benefits from flood defences, however there are still a large number of properties at high risk of flooding. This is because the flood plain is so large and there are over 1.3 million people living in the catchment. The River Avon goes through some large urban areas including Malmesbury, Chippenham, Melksham, Bradford on Avon, Bath, Keynsham, Bristol and Avonmouth.

Flat land next to the Severn Estuary is at risk from tidal flooding. Sea walls protect Weston-super-Mare and Clevedon from flooding.

Sea wall at Weston-super-Mare

Existing flood risk management in the Severn river basin district

Flood defence schemes

Risk management authorities have worked together to reduce the risk to many thousands of properties. Since 2007, risk management authorities have constructed or improved flood defence schemes in the Severn river basin district reducing the risk of flooding to communities. These include:

- flood defence schemes along the River Severn, at Welshpool, Llandrinio, Shrewsbury, Bewdley, Worcester (Hylton Road), Kempsey, Upton–upon-Severn, Uckinghall, Deerhurst, Prestbury and Cheltenham;
- flood defence schemes on the River Wye, protecting areas of Hereford, Hampton Bishop and Ross-on-Wye;
- flood defence schemes on Horsbere and Daniels brooks, protecting parts of Gloucester;
- a flood defence scheme on the Warwickshire Avon in Rugby protecting large parts of the town;
- a flood storage area to the north of Kidderminster, which reduces the risk of flooding in the town centre from the River Stour;
- a new flood alleviation scheme in Newport in the Usk catchment;
- new flood defences in the Bristol Avon catchment, protecting communities such as Wrington, Chew Magna and Radstock.

There have also been a number of other flood defences constructed in smaller communities, including community-led schemes. Many of these schemes protected properties from flooding in 2012 and 2014.

Risk management authorities have also trialled temporary flood defences in several locations including at Ironbridge and Bewdley.

Following the flooding of early 2014, the Environment Agency assessed the damage to flood defences and carried out repair works during the summer and autumn of 2014.

Risk management authorities are considering schemes in the future which include:

- building upstream storage areas, such as reservoirs;
- improving existing defences and constructing new defences;
- introducing measures to prevent surface water flooding, such as retrofitting SuDS into established drainage systems;
- providing property-level protection, such as door barriers.

When managing flood and coastal erosion risks, risk management authorities consider opportunities to work with ‘natural solutions’ wherever possible. For example appropriately located and designed woodland can help reduce flood risk. Opportunity mapping is being used to identify and then promote locations where woodland creation can deliver multiple benefits for flood risk, water quality and the wider environment.

Natural Resources Wales is developing a new ‘ecosystem approach’ to managing all aspects of the environment, including flood risk. The Rhondda valley in the South East Valleys catchment is a pilot study for the new approach. This includes work to restore large areas of upland peat bog, which will help slow run-off rates. This will mean rainwater will take longer to reach rivers, which is important following intense rainfall.

Improving knowledge, flood forecasting and warning

Risk management authorities use computer models to improve their knowledge of flood risks and simulate how rivers could react to high flow rates. This is called ’hydraulic modelling’. Hydraulic modelling can tell us how deep the water could be and the potential extent of flooding.

Natural Resources Wales is carrying out a modelling exercise in the south-east of Wales, including tidal flood risks as part of the risk prioritised approach. Natural Resources Wales developed a flood forecasting model for the Usk catchment in early 2014 and is now developing a model for the Upper Wye.

The Environment Agency has built trial Gloucester tributary forecasting models to help understand the complex urbanised flooding. It has also improved the existing Gloucestershire Frome forecasting model. It is currently improving the River Chelt model and will extend the River Wye model to include forecasts at Ross-on-Wye and other locations. The models will improve the existing flood warning service in these catchments..

Incident management planning and raising awareness

Risk management authorities develop multi-agency flood response plans and work closely with communities to help them prepare for and recover from floods.

Development planning and control

The Environment Agency, Natural Resources Wales and local councils also manage and reduce flood risk through the planning system. Planning officers use advice from the Environment Agency and Natural Resources Wales to assess new developments to make sure they are appropriate and safe, and will not increase the risk of flooding elsewhere.

Maintenance

Watercourses and existing flood defences require ongoing maintenance. Risk management authorities carefully prioritise maintenance activities to sections of rivers and the coast that provide the most benefit to people and property. The aim of maintenance activities is to provide a sustainable way of managing flood risk whilst minimising the environmental impact of maintenance operations. The Environment Agency and Natural Resources Wales carry out routine inspections of flood defences, maintenance and clearance of sluices and weed screens, aquatic weed cutting, grass cutting, various repair works and enforcement action.

Roles and responsibilities

Managing flood and coastal risks, and particularly local flood risks, requires risk management authorities to work together.

In the Severn river basin district, the Environment Agency and Natural Resources Wales work with 29 LLFAs, 9 internal drainage boards (6 in England and 3 internal drainage districts in Wales, which have been incorporated into NRW), Highways England, the Trunk Road Agencies in Wales, and water and sewerage providers to manage flood risk.

The Environment Agency and Natural Resources Wales have permissive powers to manage flood risk from ‘main rivers’, the sea and reservoirs. They can use enforcement powers to require landowners to take action to minimise flood risk to others. Individual owners have primary responsibility for protecting their land and property from flooding. Main rivers are larger streams and rivers that are marked on an official document called the ‘main river map’. All other rivers are known as ‘ordinary watercourses’.

Table 1: Summary of responsibilities for risk management authorities

Flood Source	EA / NRW	LLFAs	District	Water Company	Highways Authority	Internal Drainage Boards[2]
Strategic overview for all sources of flooding & coastal erosion	✓					
Main River	✓					
The Sea	✓					
Surface Water		✓				✓
Surface Water (on or coming from the Highway)					✓	
Sewer Flooding				✓		
Ordinary Watercourse		✓	✓			✓
Groundwater		✓				
Reservoirs	✓*	✓*	✓*	✓*	✓*	✓*

* Please note RMAs have different responsibilities for reservoirs such as regulation, asset management and flood incident response

[2] As of 1 April 2015 in Wales the 3 Internal Drainage Districts that were operated by independent boards were incorporated into NRW in April 2015.

You can find out more about which risk management authority is responsible for different types of flooding in Part A of the FRMP.

Objectives of the FRMP

The risk management authorities have agreed social, economic and environmental objectives for 2015 to 2021 following discussion and consultation with other organisations and communities. You can see the objectives for the whole river basin district in section 8 of Part A of the FRMP. There are more detailed objectives for individual catchments, which you can see in section 4 of Part B of the FRMP.

The FRMP objectives build on the aims and objectives in the 'National flood and coastal erosion strategy for England' (www.gov.uk/government/publications/national-flood-and-coastal-erosion-risk-management-strategy-for-england) and the 'National Flood and Coastal Erosion Risk Management Strategy for Wales' (http://gov.wales/topics/environmentcountryside/epq/flooding/nationalstrategy/strategy/)

Measures for 2015 to 2021

The actions in FRMPs are known as 'measures'. These are specific projects or investigations to work towards achieving the objectives. They explain where and how risk management authorities will focus effort and investment to reduce flood risk.

The measures in FRMPs are grouped under 4 categories: preventing risk, preparing for risk, protecting from risk, and recovery and review. You can read more about the categories in Section 4 of Part A in the FRMP.

Examples from the Severn river basin district for each category:

Preventing risk

Measures in the Severn river basin district to prevent flood risk include:

- avoiding inappropriate development in flood risk areas;
- encouraging sustainable development that takes account of the potential impacts of climate change;
- operating and maintaining existing flood defences and providing appropriate levels of river and watercourse maintenance;
- encouraging people who own land by a river to fulfil their riparian owner responsibilities;
- encouraging others, e.g. utility providers, to assess the resilience to flooding of their assets.

Preparing for risk

Measures in the Severn river basin district to prepare for risk include:

- maintaining and improving the flood forecasting, flood warning and flood incident response management service;
- working with local resilience forums to enable them to reduce the impact of flooding;
- working with partners and communities, especially those in catchments that respond quickly to rainfall, to understand the risks of flooding and developing plans to manage the risks;
- working with communities and partners to encourage land management to reduce flood risk.

Protecting from risk

These measures are to reduce the likelihood of flooding affecting people and property in specific locations or in locations that have flooded in the past. Measures to protect from risk, include:

- continuing to inspect flood defences and river channels and to carry out maintenance where necessary;
- continuing to provide a flood warning service to communities at risk;
- reviewing the effectiveness of raised defences and carrying out a programme to replace or refurbish flood defences;
- working with communities to investigate, develop and implement new flood defence schemes or improve existing defences;
- exploring opportunities to restore flood plains in rural areas.

Recovery and review

Measures in the Severn river basin district for recovery and review include:

- continuing to improve and develop services based on lessons identified following flooding and feedback from communities and partners;
- LLFAs carrying out investigations after flooding to produce a recommendations report and help communities to recover from floods more quickly;
- developing procedures for recording floods to help rapid recovery.

Further information on measures in the Severn river basin district

For details of measures see Part B of the FRMP.

You can also see a full list of all measures and the categories they relate to in Part C of the FRMP.

Monitoring progress

There is no guarantee that every measure in the FRMP will be completed. This is because priorities change, new data may become available or funding may change, which may mean the programme changes.

Over the 6-year cycle, the Environment Agency and Natural Resources Wales will monitor the measures and report on progress. All the risk management authorities involved will work together to achieve the objectives and reduce costs.

How we listened to your comments

We carried out a consultation on the FRMP between 10 October 2014 and 31 January 2015. As a result of feedback from the consultation we have improved the information on existing flood risk management and made clearer links between the FRMP and river basin management plans. The FRMP now shows more clearly how flood management actions help to improve the environment.

We've split the FRMP into 4 sections to make it easier to understand. The sections are as follows:

Section	Who is the section for?
Summary document	For people who want an overview of the plan.
Part A: background and river basin district-wide information	For people who want some legislative background and river basin district-wide information.
Part B: catchment summaries	For people who want the detail of the sub-areas and flooding statistics. Includes the catchments based on the Water Framework Directive management catchments, Flood Risk Areas (identified through the Preliminary Flood Risk Assessment) and other strategic areas across the river basin district.
Part C: appendices	For people who want to see the measures for implementation across the river basin district and the measures for individual communities in England.

The measures that relate to Wales only are found in the Welsh Strategic Area. The measures tables for all Welsh catchments are reported in Part B and not in the Part C: Appendices, as the Welsh measures relate to the highest risk communities by catchment. The Welsh measures are continually updated and the measures in the FRMP are indicative although correct at time of reporting. The RBD-wide measures that affect Welsh Catchments are found in the Appendices.

The measures that relate to the River Basin District, the English Strategic Area and English catchments are contained in the appendices.

Further information about your flood risk

Find Part A, Part B and Appendices for the Severn FRMP (https://www.gov.uk/government/publications/severn-river-basin-district-flood-risk-management-plan)

Find FRMPs for other river basin districts (www.gov.uk/government/collections/flood-risk-management-plans-frmps-2015-to-2021)

Look at the river basin management plan for your area (https://www.gov.uk/government/collections/river-basin-management-plans-2015)

In England

Check your current risk of flooding on our live flood warning service (www.gov.uk/check-if-youre-at-risk-of-flooding)

Check your risk of flooding from different sources on our interactive maps (www.gov.uk/prepare-for-a-flood/find-out-if-youre-at-risk)

In Wales

Check your current risk of flooding (naturalresources.wales/flooding/alerts-and-warnings/flood-alerts-and-warnings)

Check your risk of flooding from different sources on our interactive flood risk maps (naturalresources.wales/our-evidence-and-reports/maps/flood-risk-map)

Partners

This is a joint plan prepared by the Environment Agency and Natural Resources Wales in partnership with the following risk management authorities: