

North and Mid Somerset Catchment Flood Management Plan

Summary Report June 2012



managing
flood risk

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Introduction



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

The North and Mid Somerset 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, ground water, 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 ground water 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 North and Mid Somerset catchment has a history of flood risk. Over the last 50 years numerous engineering schemes have been implemented to reduce flood risk in the catchment. At present 2,300 properties are at risk in the catchment in a 1% event (taking into account flood defences). This will increase to over 4,200 properties in the future.

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 manage flood risk in the future. We have worked with others including: Somerset County Council, Natural England, Wessex Water and the National Farmers Union to develop this plan.

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 South West Region.

A handwritten signature in black ink that reads "R. Cresswell". The signature is fluid and cursive.

Richard Cresswell
South West Regional Director

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The purpose of a CFMP in managing flood risk

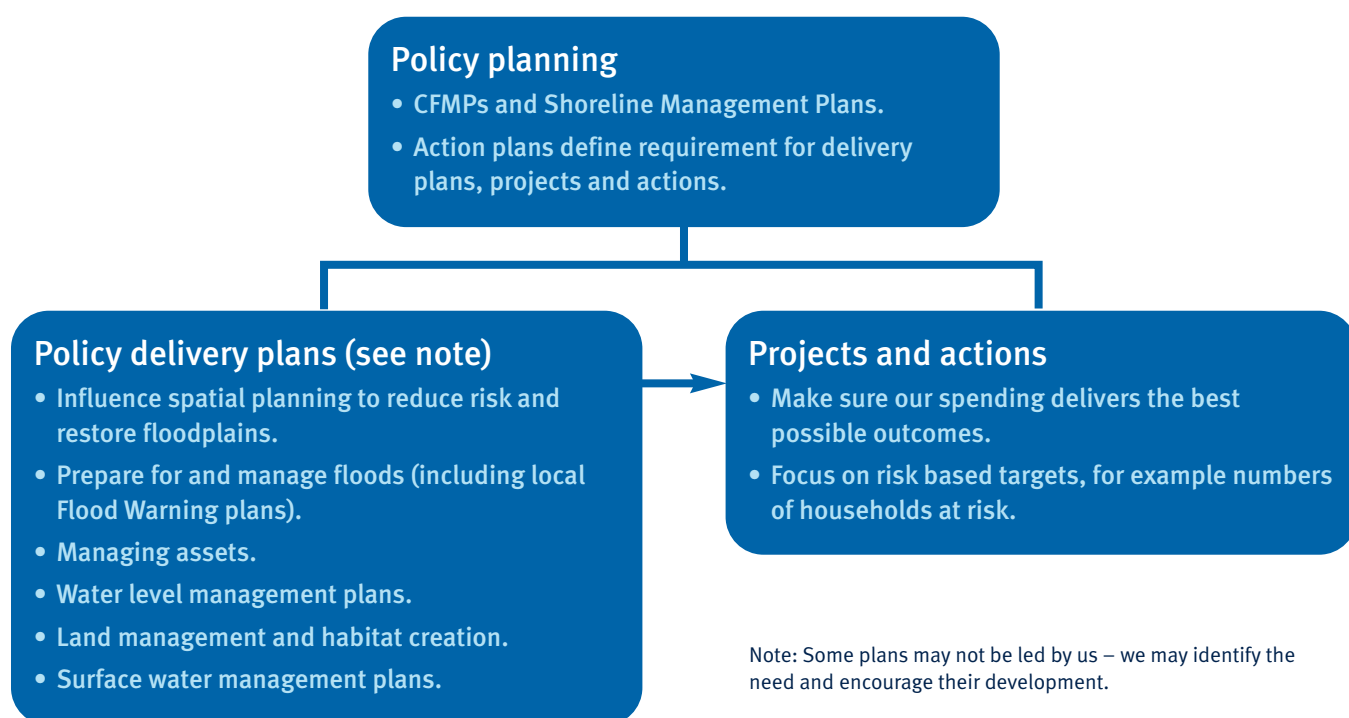
CFMPs help us to understand the scale and extent of flooding now and in the future, and set policies for managing flood risk within the catchment. CFMPs should be used to inform planning and decision making by key stakeholders such as:

- the Environment Agency, who will use the plan to guide decisions on investment in further plans, projects or actions;
- Regional Assemblies and local authorities who can use the plan to inform spatial planning activities and emergency planning;
- Internal Drainage Boards (IDB), water companies and other utilities to help plan their activities in the wider context of the catchment;
- transportation planners;
- land owners, farmers and land managers that 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

The catchment of the rivers in the North and Mid Somerset CFMP are located in the south west of England. They drain from the Mendips, flowing via various channels through the low-lying coastal plain to the Severn Estuary.

Map 1 shows the location and extent of the North and Mid Somerset CFMP area. It includes the rivers Brue, Axe, Congresbury Yeo, Land Yeo, Banwell and Portbury Ditch. The downstream limits of the CFMP area meet with the upstream boundary of the North Devon and Somerset Shoreline Management Plan (SMP) boundary at tidal sluices on the Brue and Axe, and with the Severn Estuary SMP at tidal sluices on the rest.

North Devon and Somerset and Severn Estuary SMPs deal with coastal flood management, while the CFMP considers the flood risk from tide-locking.

The overall catchment area is about 1,100 square kilometres, and has a population of around 275,000. It's a rural catchment, with urban areas making up only five per cent of the total. Its main urban areas, mainly

located on the coastal plain, include Weston-super-Mare, Burnham-on-Sea and Highbridge, Portishead and Clevedon, Nailsea, Congresbury, Cheddar, and Glastonbury and Street.

The rivers and streams flow from their source in the Mendips in the east of the catchment; they flow in a westerly direction through low-lying coastal plain, before flowing out into the Severn Estuary through tidal exclusion sluices.

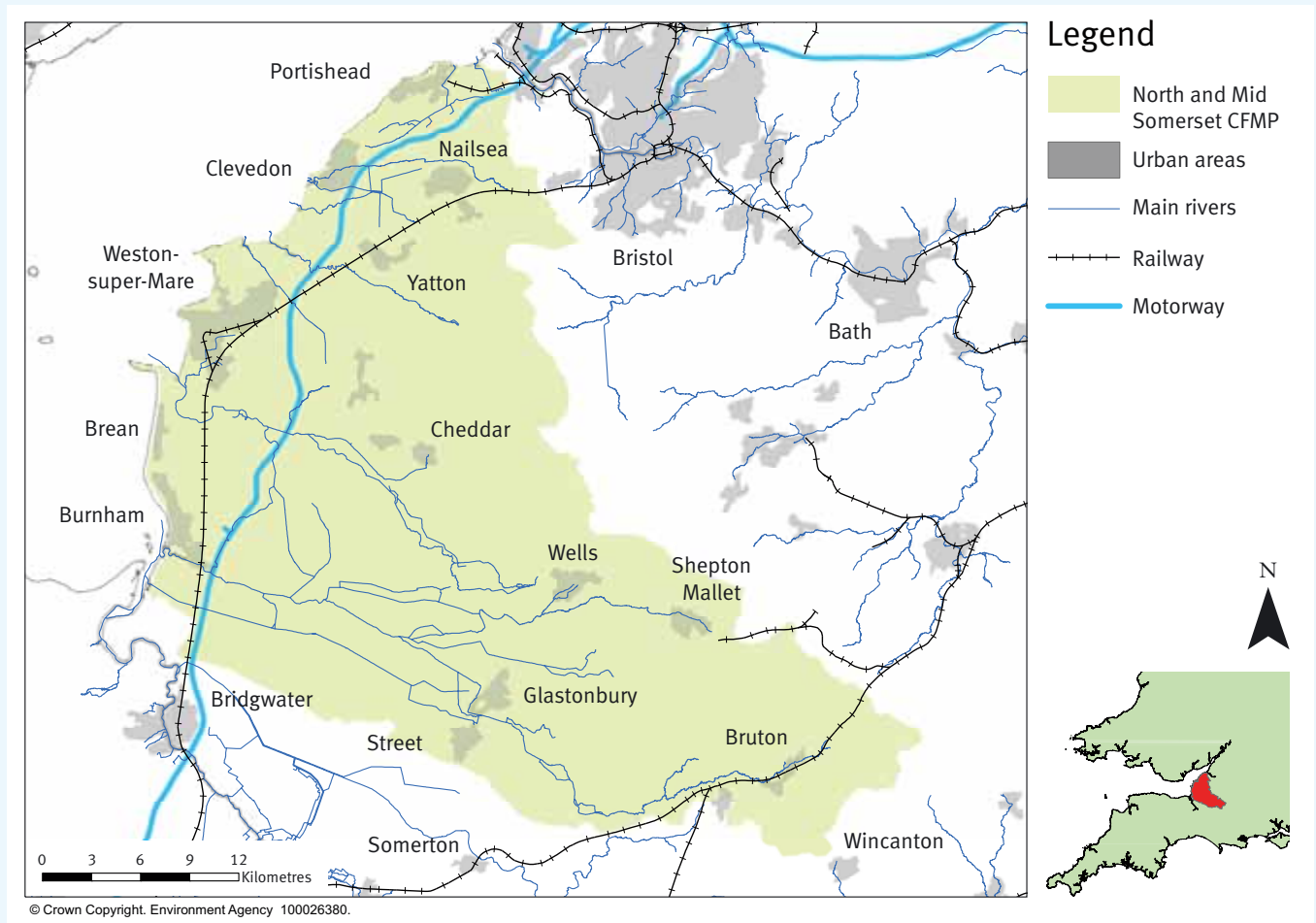
The rivers Brue and Axe flow through the Somerset Levels and Moors, where they are embanked and in some places perched above the surrounding floodplain. In the Somerset Levels and Moors, flooding is caused by long duration storms or a series of storms. The high-level embanked channels overflow and floodwater is stored in the moors before it can reach the estuary. The capacity of these channels can be significantly reduced by high tidal conditions. Internal Drainage Boards have an important role in managing land drainage within these low-lying moors.

The underlying rock has a significant influence on the catchment's response to rainfall, with high run-off from the impermeable uplands in the south east and water-logging of the clay lowlands. Permeable uplands in the north east results in many rivers' headwaters being limestone springs.

The catchment contains a number of designated sites of national and international importance. A significant part of the low-lying Somerset Moors are designated Special Protection Areas (SPA) and a Ramsar site, which depend upon flooding. The area is also rich in archaeological sites that depend on waterlogged conditions for their preservation.

Important environmental sites in the catchment include two Areas of Outstanding Natural Beauty, three Special Areas of Conservation, two Ramsar and two SPA (including the Severn Estuary), 74 Sites of Special Scientific Interest, nine National Nature Reserves and over 300 Schedule Monuments.

Map 1. Location and extent of the North and Mid-Somerset CFMP area



↑ Minor works undertaken on the River Brue near Glastonbury

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 0.01 probability of occurring in any one year, and a 0.5% flood has a 0.5% chance or 0,005 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.

This catchment has a long history of flooding, with the most significant event in recent years having occurred in Shepton Mallet in May 2008 when for the second time in 18 months 30 properties were affected by surface water and river flooding after periods of heavy rainfall.

Currently the main sources of flood risk for people, property, infrastructure and the land are:

- river flooding from the River Brue, Axe, Cheddar Yeo, Congresbury Yeo particularly in Bruton, Cheddar and Congresbury;
- Tide lock flooding from the Blind Yeo in Clevedon, and the Uphill Great Rhyne in Uphill;
- breaching/failure of embankments, which could be a problem along the Brue and Axe system across the levels and moors of the catchment;
- surface water drainage flooding, which has occurred in Shepton Mallet and Cheddar. Other towns have the potential to be at risk from surface water flooding.

What is at risk?

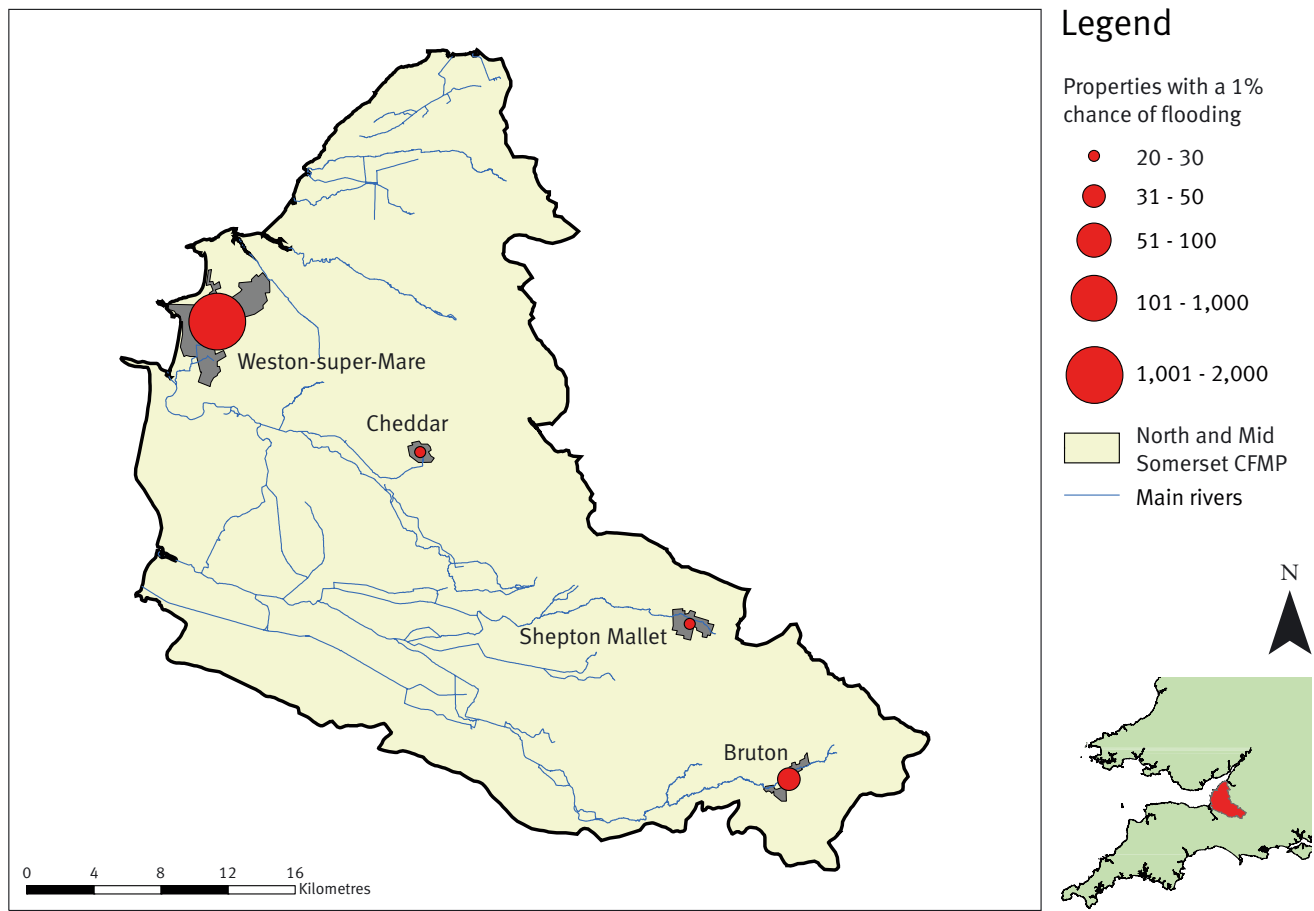
At present there are around 7,000 people and 3,000 commercial and residential properties at risk in the whole catchment from a 1% annual probability river flood, taking into account current flood defences.

This means that 2.5% of the total population living in the catchment are currently at risk from flooding.

It is difficult to assess the current impact of flooding to environmental features. Many designated sites at risk would not actually be damaged by the inundation.

Three Scheduled Monuments are at risk of flooding, but again, the actual risk of damage from flooding is limited.

Map 2. Flood risk to property in a 1% annual probability river flood, taking into account current flood defences



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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
>1,000	Weston-super-Mare
500 to 1,000	Levels and Moors
100 to 500	None
50 to 100	None
25 to 50	Bruton, Shepton Mallet, Congresbury

Table 2. Critical infrastructure at risk:

20 electricity substations, 2 police stations, 1 water treatment works, 3 waste management sites, 6 care homes, 12km of main roads, 2km of motorway, 8km of mainline railway, and 6 schools.

Where is the risk?

More than half of the people and properties that are at risk within the catchment from a 1% annual probability river flood are located in Weston-super-Mare.

The distribution of properties at risk from a 1% annual probability river flood, is illustrated in Map 2. Table 1 summarises where there is flood risk to more than 25 properties. We recognise that there is also a potential risk from surface water and groundwater flooding. However, further studies following on from the CFMP are needed by us and our partners to quantify this potential risk.

How we currently manage the risk

The catchment has a history of flood risk, generally due to the high rainfall that can lead to extensive flooding of the river valleys. Over the last 70 years, numerous engineering schemes have been implemented to reduce flood risk in the catchment, including:

- Improving flood banks of the Congresbury Yeo through Congresbury to provide a 2% to 1% protection;
- Construction of a detention reservoir upstream of Bruton to provide a 2% to 1% protection on the Brue through Bruton.

These measures have all reduced flood risk.

In addition to these engineering schemes, other flood risk management activities are carried out in the catchment. These include activities which 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 and structures, especially raised banks of the Rivers Brue, Axe and Congresbury Yeo, tidal sluices on all river outfalls, and pumping stations for evacuation of floodplain storage;
- maintaining river channels; maintenance of drainage networks by Internal Drainage Boards (IDBs) and landowners;
- maintenance of road drainage and sewers.

Activities that reduce the consequences of flooding include:

- understanding where flooding is likely by using flood risk mapping;
- providing flood forecasting and warning services;
- 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.
- 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).



↑ Large tracts of low-lying land see extensive flooding during the winter months

The impact of climate change and future flood risk

In the future, flooding will be influenced by climate change, changes in land use (for example urban development) and rural land management. In the North and Mid Somerset catchment, climate change will have the greatest impact on flood risk. The following future scenario for climate change was used in the 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 500 mm by the year 2100. This will increase the length of time watercourses will be tide locked on the lower reaches of the Brue at Burnham-on-Sea, Highbridge and Huntspill, the Uphill Great Rhyne at Uphill, the Land Yeo at Clevedon and the Portbury Ditch at Portishead, and the length of time moors will have to store floodwater before evacuation.

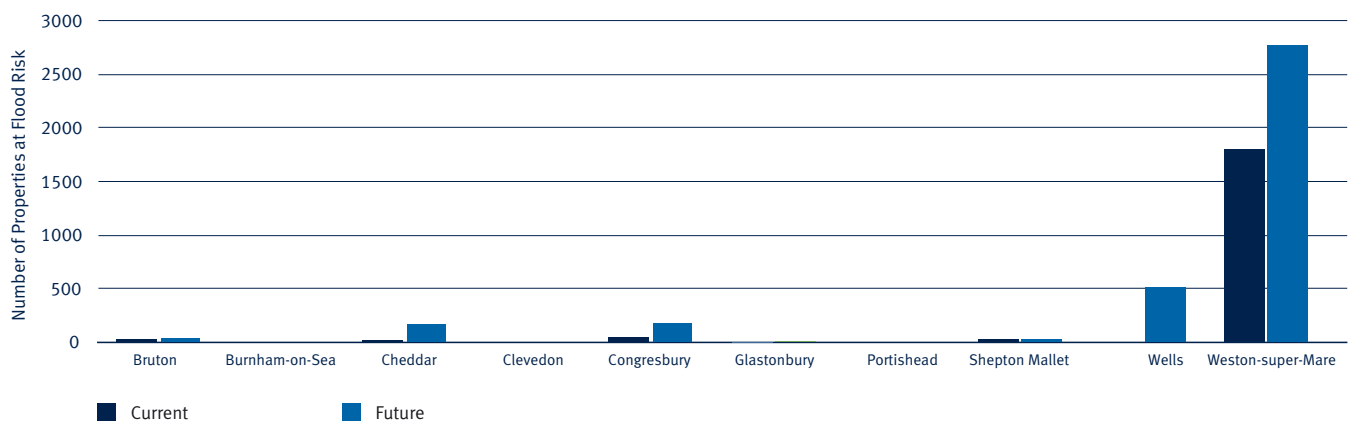
Using river models we estimate that by 2100, around 9,500 people and 4,200 properties across the catchment may be at risk from a 1% annual probability flood. Flood risk from rivers increases mainly in Congresbury, Wells and Weston-super-Mare.

The sensitivity testing undertaken showed that river flooding in the CFMP area is sensitive to climate change, as flood depths and extents increased over a wide area. The area is moderately sensitive to land use change over a wide area which leads to an increase in damages for both property and agricultural land. There is a limited pressure for development within the CFMP area, with the area most under pressure being the coastal strip. Development at the coast does not affect flooding on a catchment-wide scale.

Figure 2 shows the difference between current and future flood risks from a 1% annual probability river flood at key locations in the catchment. Following on from the CFMP, organisations need to work together to investigate flood risk from other sources (e.g. surface water and ground water 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

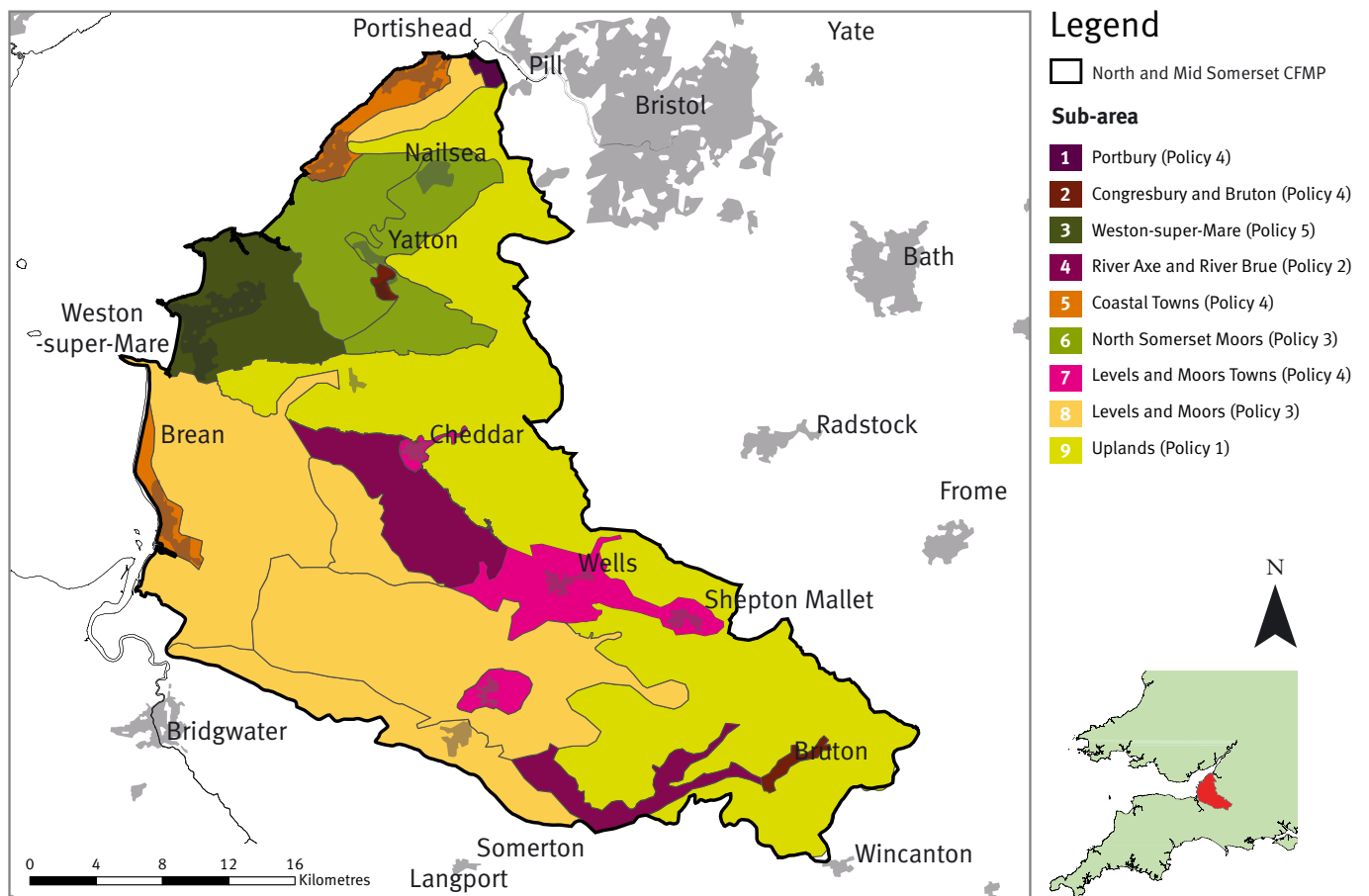
We have divided the North and Mid Somerset catchment into nine distinct sub-areas which have similar physical characteristics, sources of flooding and level of risk. We have identified the most appropriate approach to managing flood risk for each of the sub-areas and allocated one of six generic flood risk management policies, shown in Table 3.

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.



↑ Church Bridge at Bruton

Map 3. North and Mid Somerset sub-areas



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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.

Portbury

Our key partners are:

North Somerset Unitary Authority

Internal Drainage Boards

Port of Bristol Authority

Wessex Water

The issues in this sub-area

The main source of flood risk is tidal flooding, through overtopping or a breach of the coastal flood defence walls, embankments and outfall controls. Tidal flooding is addressed in the Severn Estuary Shoreline Management Plan.

Other risks are from surface water flooding as a result of tide-locked urban drainage networks, and

tidally influenced river flood risk to localised areas in extreme conditions. As the primary source is surface water and sewer flooding, flooding is shallow, relatively slow moving and confined to the low-lying land.

The Royal Portbury Docks is a key transportation link for the South West of England. The industrial area surrounding the docks includes properties with a high probability of flooding.

The industrial area surrounding the docks is currently at risk of flooding from the combined 1% annual probability river flood event.

In the future the risk is expected to increase with more surface water flooding.

The vision and preferred policy

Policy Option 4 - we are already managing the flood risk effectively, but we may need to take further actions to keep pace with climate change.

The current level of flood risk is considered to be low and acceptable. Surface water flooding is considered more likely due to tide-locked urban drainage networks.

Climate change and the potential dock development are likely to increase future levels of flood risk from surface water flooding to unacceptable levels. The chosen policy sets a framework that prevents the level of flood risk increasing in the future as a result of climate change and/or increased urban growth and would limit further key infrastructure from becoming at risk of river or surface water flooding.

Proposed actions to implement the preferred policy

Liaise with key stakeholders to:

- understand and review existing flood risk management activities undertaken within the unit;
- develop and implement a system for monitoring, recording and sharing information on flooding from other sources (sewer/surface water) in order to establish baseline information and measure the impacts of climate change.

Using this baseline information, develop an integrated drainage plan (surface water /sewer/river flooding) for the Royal Portbury Docks which aims to maintain the same standard of protection into the future, allowing for potential increases in rainfall intensity and tide-locking due to climate change. Consider the impacts of the Shoreline Management Plan in the work.

Implement the integrated drainage plan as part of the dock development.

Whilst the integrated urban drainage plan is being developed, continue with existing flood risk management activities in the Royal Portbury Docks. This includes

- routine inspection and maintenance of river channels, flood walls/embankments and the urban sewer system;
- reactive maintenance such as dredging or unblocking when required;
- discouraging re-development and intensification of development in areas with a higher probability of flooding.

Encourage the use of Sustainable Drainage Systems (SuDS) on all new developments and redevelopments.



↑ The wildlife corridor within the heavily developed Portbury docks complex.

Congresbury and Bruton

Our key partners are:

North Somerset Unitary Authority

Somerset County Council

Internal Drainage Boards

Wessex Water

The issues in this sub-area

There will be greater pressure on the urban drainage system and watercourse within Congresbury to manage the increased rates and volumes of run-off expected due to climate change. The probability of sewer flooding is expected to increase. There will be increased overtopping of embankments in the reach of main river and increased probability of failure of embankments.

Flood flows into Bruton are managed by the retention dam, which is located in rural land upstream of the town. There is a residual risk associated with a breach of the dam. Bruton has experienced surface water flooding in the past. This has primarily been caused by under capacity of the land and urban drainage systems to manage direct run-off from the surrounding steep slopes of the urban area.

The total number of properties in Congresbury and Bruton currently in the 1% annual probability flood extent is 180. This is expected to increase to 310 in the future flood extent.

The vision and preferred policy

Policy Option 4 - we are already managing the flood risk effectively, but we may need to take further actions to keep pace with climate change.

This policy would permit improvements to the existing schemes to ensure that the consequences of flooding in the future will remain the same as the current situation.

Proposed actions to implement the preferred policy

Undertake a feasibility study to assess the current and future standard of protection of the Congresbury flood alleviation scheme, with an allowance for the potential impacts of climate change. Investigate options for upgrading the scheme to maintain the same standard of protection into the future.

Undertake a supplementary study to the feasibility study (July 2007) to assess the future standard of protection of the Bruton Flood Alleviation Scheme, taking account the potential impacts of climate change. Revisit the options appraisal in light of the aim to maintain the current standard of protection into the future.

Prepare flood emergency plans for Congresbury and Bruton, taking account of the potential impacts of climate change and including scenarios of overtopping and breach of flood defence embankments.

Until the above investigations are completed, continue with existing flood risk management activities in the towns, including:

- routine inspection and maintenance of river channels, urban sewer system and flood alleviation schemes;
- reactive maintenance such as unblocking of structures when required;
- using the planning process to discourage re-development, encourage relocation and limit intensification of development in areas with a higher probability of flooding.

Encourage the use of Sustainable Drainage Systems on all new developments and redevelopments.

Weston-super-Mare

Our key partners are:

North Somerset Unitary Authority

Somerset County Council

Internal Drainage Boards

South West Regional Development Agency

Weston Vision

Wessex Water

The issues in this sub-area

Flooding from the Severn Estuary is the main source of flooding in this sub-area and this is covered in the North Devon and Somerset Shoreline Management Plan.

This is the most densely populated sub-area in the CFMP area and is under considerable pressure for development. Low lying areas of the sub-area are predominantly located on impermeable clay soil, which is particularly susceptible to drainage problems. The main non-tidal source of flooding is surface water and sewer flooding (including the impacts of tide-locking) with flooding being shallow, relatively slow moving and confined to the low-lying land. As such flooding is caused by intense rainfall there can be little warning.

As well as permanent residents, Weston-super-Mare attracts a large number of tourists each year over the summer, including those staying in

one of the many camping grounds in the area. Around 2,050 properties are affected by sewer and river flooding currently and this may increase to 3,375 in the next 100 years.

The vision and preferred policy

Policy Option 5 - we can generally take further action to reduce flood risk.

Flood risk is considered high in Weston-super-Mare at present and this is expected to increase further in the future. Additional appraisal will be required to assess whether there are socially and environmentally sustainable, technically viable and economically justified options.

Proposed actions to implement the preferred policy

Liaise with key stakeholders to:

- understand and review existing flood risk management activities undertaken within the sub-area; and
- develop and implement a system for monitoring, recording and sharing information on flooding from other sources (sewer/surface water) in order to establish baseline information and measure the impacts of climate change.

Using this baseline information and the findings of the pre-feasibility studies of the Uphill Great Rhyne and River Banwell, develop an integrated urban drainage plan (surface water /sewer/river flooding) for Weston-super-Mare which aims to improve the current standard of protection, allowing for potential increases in rainfall intensity and tide-locking due to climate change. Consider the impacts of the Shoreline Management Plan in the strategy.

Implement the strategy as part of new development / redevelopment.

Until the flood management strategy is completed, continue with existing flood risk management activities in Weston-super-Mare, including:

- routine inspection and maintenance of river channels, masonry walls and embankments, and the urban sewer system;
- reactive maintenance such as unblocking of structures when required;
- using the planning process to discourage re-development, encourage relocation and limit intensification of development in areas with a higher probability of flooding.

Encourage the use of Sustainable Drainage Systems on all new developments and redevelopments.

River Axe and River Brue

Our key partners are:

Internal Drainage Boards

Natural England

Land managers

The issues in this sub-area

River flooding from the River Axe and Cheddar Yeo affects agricultural land, and some residential properties within small communities. River Flooding from the River Brue and River Alham affects isolated properties and properties in East Lydford, agricultural land, the A37, A371 and the railway line.

Some surface water run-off and urban drainage problems exist.

Currently in the sub-area, 43 properties are at risk of flooding in the 1% annual probability flood event, and this is expected to increase to 52 properties in the future event.

The vision and preferred policy

Policy Option 2 - we can generally reduce existing flood risk management actions.

The current level of flood risk is low and it is not expected to increase in

the future, even with a reduction in maintenance.

The East Lydford Flood Alleviation Scheme is no longer active and there may be an opportunity to reduce maintenance of the scheme.

The current flood risk management activities carried out for the surface water flooding problems are considered appropriate and acceptable for the level of risk.

Proposed actions to implement the preferred policy

Through the development of System Asset Management Plans (SAMPs), identify the current annual costs of non-tidal flood risk management in the River Axe valley compared with the costs of other activities (such as water level management, legal overrides and fisheries).

Undertake a pre-feasibility study for the decommissioning of the East Lydford Flood Alleviation Scheme and implement findings.

Identify specific locations on the River Axe and devise schemes where watercourses and floodplains can be restored by reducing conveyance where appropriate, reducing incidents of tree clearance in the river corridor (where such features do not increase the flood risk) and removing or altering obstructions and implement findings.

Support implementation of water level management plans by:

- ensuring that responsible parties are identified and aware of their actions; and
- work with key stakeholders to seek improvements in the efficiency of water level management operations.

Consider the potential changes due to climate change, and the outcome of the SAMPs.

Whilst the SAMPs are being developed, continue with existing flood risk management activities. This includes:

- routine inspection and maintenance of river channels and flood defence embankments, including weed-cutting;
- operation of water level management structures in line with existing plans;
- reactive maintenance such as unblocking when required.
- in the River Brue area, discourage new development in areas more prone to flooding, encourage relocation to areas away from the floodplain and use of SuDS in all new developments and redevelopments.

Coastal Towns

Our key partners are:

North Somerset Council

Somerset County Council

Wessex Water

The issues in this sub-area

This sub-area includes the towns of Portishead, Clevedon, Burnham-on-Sea and Highbridge.

The main source of flood risk is tidal flooding, through overtopping or a breach of the coastal flood defence walls, embankments and outfall controls. Tidal flooding is addressed in the Severn Estuary and North Devon and Somerset Shoreline Management Plans.

Other risks are from surface water flooding as a result of tide-locked urban drainage networks and tidally influenced river flood risk to localised areas in extreme conditions.

Currently these towns have a total of 250 properties at risk in the 1% annual probability flood extent. This is expected to increase to 375 properties in the future extent.

The vision and preferred policy

Policy Option 4 - we are already managing the flood risk effectively, but we may need to take further actions to keep pace with climate change.

The current level of flood risk from river flooding is considered to be low and acceptable. This sub-area has a higher probability of surface water flooding than river flooding. Climate change and the potential urban development are likely to increase future levels of flood risk from surface water flooding to unacceptable levels. The chosen policy sets a framework that prevents the level of flood risk increasing in the future as a result of climate change and/or increased urban growth and would limit further key infrastructure from becoming at risk of river or surface water flooding.

Proposed actions to implement the preferred policy

Support the preparation of flood emergency plan for caravan parks, to manage the increased risk of surface water flooding in the future, taking account of the potential impacts of climate change. Make reference to the existing Coastal Flooding Loud Hailer Route in the area.

Liaise with key stakeholders to:

- understand and review existing flood risk management activities undertaken within the unit;
- develop and implement a system for monitoring, recording and sharing information on flooding from other sources (sewer/surface water) in order to establish baseline information and measure the impacts of climate change.

Using this information, develop and implement an integrated drainage plan (surface water /sewer/river flooding) for Clevedon, Portishead and Burnham which aims to maintain the same standard of protection into the future, allowing for potential increases in rainfall intensity and tide-locking due to climate change.

Whilst the integrated urban drainage plan is being developed, continue with existing flood risk management activities. This includes:

- routine inspection and maintenance of river channels, flood walls/embankments and the urban sewer system
- reactive maintenance such as dredging or unblocking when required
- discouraging re-development and intensification of development in areas with a higher probability of flooding

Encourage the use of Sustainable Drainage Systems on all new developments and redevelopments.

North Somerset Moors

Our key partners are:

Natural England

North Somerset Unitary Authority

Somerset County Council

Internal Drainage Boards

Wessex Water

Land managers

Currently, this sub-area has 72 properties at risk in the 1% annual probability flood extent. This is expected to increase to 133 properties in the future extent. Flood risk from tidal flooding through overtopping or a breach of the coastal flood defence walls, embankments and outfall controls is addressed in the Severn Estuary Shoreline Management Plan.

continued embankment maintenance (especially of the Congresbury Yeo) in the future is necessary. This sub-area is rich in environmental designations. These designations are water-based. Some moors rely on frequent flood events for their water-based environmental designations to remain in a healthy state.

The issues in this sub-area

This sub-area includes the Gordano Valley and the communities of Puxton, Kenn, Tickenham, Nailsea, Yatton and Wrington.

The main risk is from tidally influenced river flooding during tide-locked conditions and overtopping of flood embankments on the main river channels, including risk of breach.

Communities and isolated properties are at risk from surface water run-off from the surrounding higher level land and as a result of tide-locked agricultural drainage networks.

The vision and preferred policy

Policy Option 3 - we are generally managing existing flood risk effectively.

The current flood risk management activities carried out for the flooding problems are considered appropriate and acceptable for the level of risk.

At the present time we cannot generally justify increasing actions to address climate change or reduce flood risks further. The scattered nature of the problems makes such investment unlikely to be economic or sustainable.

Flood flows due to breaches in embankments are considered hazardous to life and therefore

Proposed actions to implement the preferred policy

Continue with existing flood risk management activities in Nailsea, Yatton and Wrington, including:

- Routine inspection and maintenance of river channels, flood walls/embankments, and the urban sewer system;
- Reactive maintenance such as unblocking of structures when required;
- Using the planning process to discourage re-development, encourage relocation and limit intensification of development in areas with a higher probability of flooding;
- Encourage the use of SuDS on all new developments and redevelopments.

Develop System Asset Management Plans (SAMP). Where appropriate, separate flood risk management costs. In many cases the current annual costs of non-tidal flood risk management in Puxton, Kenn and Tickenham are associated with other activities (such as water level management, conservation objectives, legal over-rides and fisheries) and flood risk benefits from the activities.

Where work is carried out purely for FCRM, assess the level of this against annual average damages of flooding, including the impact of climate change and water level management activities. If appropriate, make recommendations for improving the efficiency of existing activities and implement

Continue to support the implementation of water level management plans in the Puxton, Kenn and Tickenham areas by:

- ensuring that those responsible parties are identified and aware of their actions; and
- working with key stakeholders to seek improvements in the efficiency of water level management operations.



↑ Looking across Weston Moor from Weston in Gordano

Levels and Moors Towns

Our key partners are:

Sedgemoor District Council

Mendip District Council

Somerset County Council

Emergency Services

Wessex Water

Land managers

Department for Environment, Food and Rural Affairs

Risks also occur from surface water flooding from surrounding hill slopes and from an under capacity of the urban drainage network.

Currently, the towns have a total of 225 properties at risk in the 1% annual probability flood extent. This is expected to increase to 900 properties at risk in the future extent.

Groundwater resulting from springs emerging from the foot of permeable geology slopes can cause problems in Cheddar.

The vision and preferred policy

Policy Option 4 - we are already managing the flood risk effectively, but we may need to take further actions to keep pace with climate change.

The current level of river flood risk is low. However, flood depths and velocities are expected to increase. As a result there is the potential for hazard and risk to life to increase. The social consequences of river flooding are significant. A significant increase in surface water flooding is also expected.

Climate change (in increased flows) and urban drainage surface water incidents could significantly increase future levels of flood risk to an unacceptable level.

The issues in this sub-area

This sub-area includes the towns of Cheddar, Glastonbury, Wells and Shepton Mallet.

The main risks are from river flooding in Wells, from the Cheddar Yeo in Cheddar, the River Sheppey in Shepton Mallet and the Millstream in Glastonbury.

Proposed actions to implement the preferred policy

Liaise with key stakeholders to:

- understand and review existing flood risk management activities undertaken in Wells, Shepton Mallet and Glastonbury;
- develop and implement a system for monitoring, recording and sharing information on flooding from other sources (sewer/surface water) in order to establish baseline information and measure the impacts of climate change.
- Develop and implement a strategy to manage the potential impacts of climate change on combined surface water, sewer and river flooding in the urban and highway drainage systems in Cheddar and Glastonbury.
- revise options appraisal and recommendations for flood risk management in Cheddar paying particular attention to the 2006 and 2008 flood events and the potential impacts of climate change, in light of a policy to sustain the current scale of flood risk into the future. Implement recommendations.

Undertake a study to investigate the potential for flood warning service to be introduced in Cheddar, Shepton Mallet, Wells and surrounding villages. Consider the use of rainfall forecasting techniques in place of water level or flow gauge data for triggering flood warnings. Based on the outcomes of the study, implement a flood warning system.

Prepare a flood emergency plan for Cheddar, Wells and Shepton Mallet taking account of the potential impacts of climate change and including scenarios of sewer flooding and overtopping or a breach of sluice gates in the urban river system and include procedures for protecting the heritage sites in Wells.

Until strategy is completed, continue with existing flood risk management activities.

Encourage the use of Sustainable Drainage Systems on all new developments and redevelopments. Use the planning process to discourage re-development, encourage relocation and limit intensification of development in areas with a high risk of flooding.



↑ The Cheddar Yeo flowing through the town of Cheddar.

Levels and Moors

Our key partners are:

South Somerset District Council

Sedgemoor District Council

Mendip District Council

Somerset County Council

Internal Drainage Boards

Natural England

The Royal Society for the Protection of Birds

Wessex Water

National Farmers Union

Farming and Wildlife Advisory Group

Land managers

Department for Environment, Food and Rural Affairs

The issues in this sub-area

Numerous isolated properties, major roads, including the M5, and the Bristol to Exeter railway line are at risk from river flooding combined with surface water flooding and tidally influenced river flooding (caused by tide locking).

River flooding occurs when the capacity of the river and rhyme network is exceeded after long periods of rainfall. Flooding occurs relatively slowly, at a shallow depth, and over a wide area. Floodwaters

remain for a considerable length of time due to the flat topography and slow drainage. Flooding also occurs if the embankments along the main river channels fail. This type of flooding is more hazardous to properties close to the breach as there is less warning, and flood flows and velocities are higher. Surface water run-off from the sloping topography and urban drainage surface water flooding from under capacity drainage networks are also issues.

Currently the sub-area has 165 properties at risk of flooding in the 1% annual probability flood event. This is expected to increase to 215 properties in the future extent.

The vision and preferred policy

Policy Option 3 - we are generally managing existing flood risk effectively.

The current level of flood risk is low, including very few isolated properties being affected and it is not expected to increase in the future.

The current flood risk management activities carried out for the surface water flooding problems are considered appropriate and acceptable for the level of risk.

Flood flows due to breaches in embankments are considered hazardous to life, and this is a major focus for maintenance now and in the future

Environmental designations affected are water-based and rely on frequent flood events to remain in a healthy state. Flooding is not expected to negatively affect these sites now or in the future and in most cases additional flooding would be beneficial.

Proposed actions to implement the preferred policy

Continue with existing flood risk management activities. This includes:

- Working with Local Council's to undertake routine inspection, maintenance and upgrade of urban/land drainage system in Wedmore and Polden Hills;
- Routine inspection and maintenance of river channels, flood walls/embankments, and the urban sewer system in the Huntspill area;
- Reactive maintenance such as unblocking when required;
- Encourage the use of SuDS on all new developments and redevelopments;
- Continuing to promote catchment sensitive farming around Wedmore.

- Use the planning process to discourage re-development, encourage relocation and limit intensification of development in areas of high risk of flooding around Huntspill;

Undertake an investigation to identify opportunities to work with environmental organisations to integrate day to day flood management with environmental management.

Carry out a study to identify opportunities to link flood management with priority restoration/enhancement of Biodiversity Action Plan habitats, internationally/nationally designated environment sites and national nature reserves and produce 'opportunity maps'.

Work with farming related bodies to identify and promote adaptive farming techniques in floodplain areas.

Through the development of System Asset Management Plans (SAMPs), identify the current annual costs of non-tidal flood risk management in North, South Drain and River Brue, compared with the costs of other activities (such as water level management, legal over-rides and fisheries).

Improve the efficiency of existing flood risk management activities in line with the recommendations.

Support implementation of water level management plans by:

- ensuring that responsible parties are identified and aware of their actions; and
- work with key stakeholders to seek improvements in the efficiency of water level management operations.

Whilst the studies are being undertaken, continue with existing flood risk management activities in North, South Drain and River Brue areas. This includes:

- Routine inspection and maintenance of river channels and rhynes, including weed-cutting;
- Operation of water level management structures in line with existing plans, including operation of the large pumping stations at North Drain and Gold Corner;
- Routine inspection and maintenance of flood defence embankments on the main rivers and on small-scale private flood defence schemes;
- Flood warning service on the River Brue.



↑ The River Brue near Clewer

Uplands

Our key partners are:

South Somerset District Council

Mendip District Council

North Somerset Unitary Authority

Bath and North East Somerset
Unitary Authority

Somerset County Council

Internal Drainage Boards

Natural England

Wessex Water

National Farmers Union

Farming and Wildlife Advisory Group

Land managers

The issues in this sub-area

This sub-area is essentially rural, featuring forestry and all grades of agricultural land. The sub-area is rich in environmental and landscape designations.

The main source of flooding is surface water and flooding from rivers which are small in nature. Being of permeable geology, the percentage run-off from land in the northern portion is generally low, although steep slopes in some areas can increase run-off rates locally. In the southern portion the less permeable geology can result in higher run-off rates and the steep

topography can resist the extent of flood flows causing water levels to rise quickly, with little roaming. The catchments in this area are small, resulting in relatively small peak flows.

Currently 27 properties are at risk of flooding in the 1% annual probability flood extent. This is likely to increase to around 30 properties in the future extent.

The vision and preferred policy

Policy Option 1 - we will continue to monitor and advise.

We do not currently undertake any flood risk management in this sub-area. We are not aware of any other Stakeholders undertaking flood risk management in this sub-area although it is possible that very small scale activities are carried out and some areas to protect individual properties from surface water flooding. Given the generally permeable geology and sparse population, we do not expect a significant number of properties to be affected in the future.

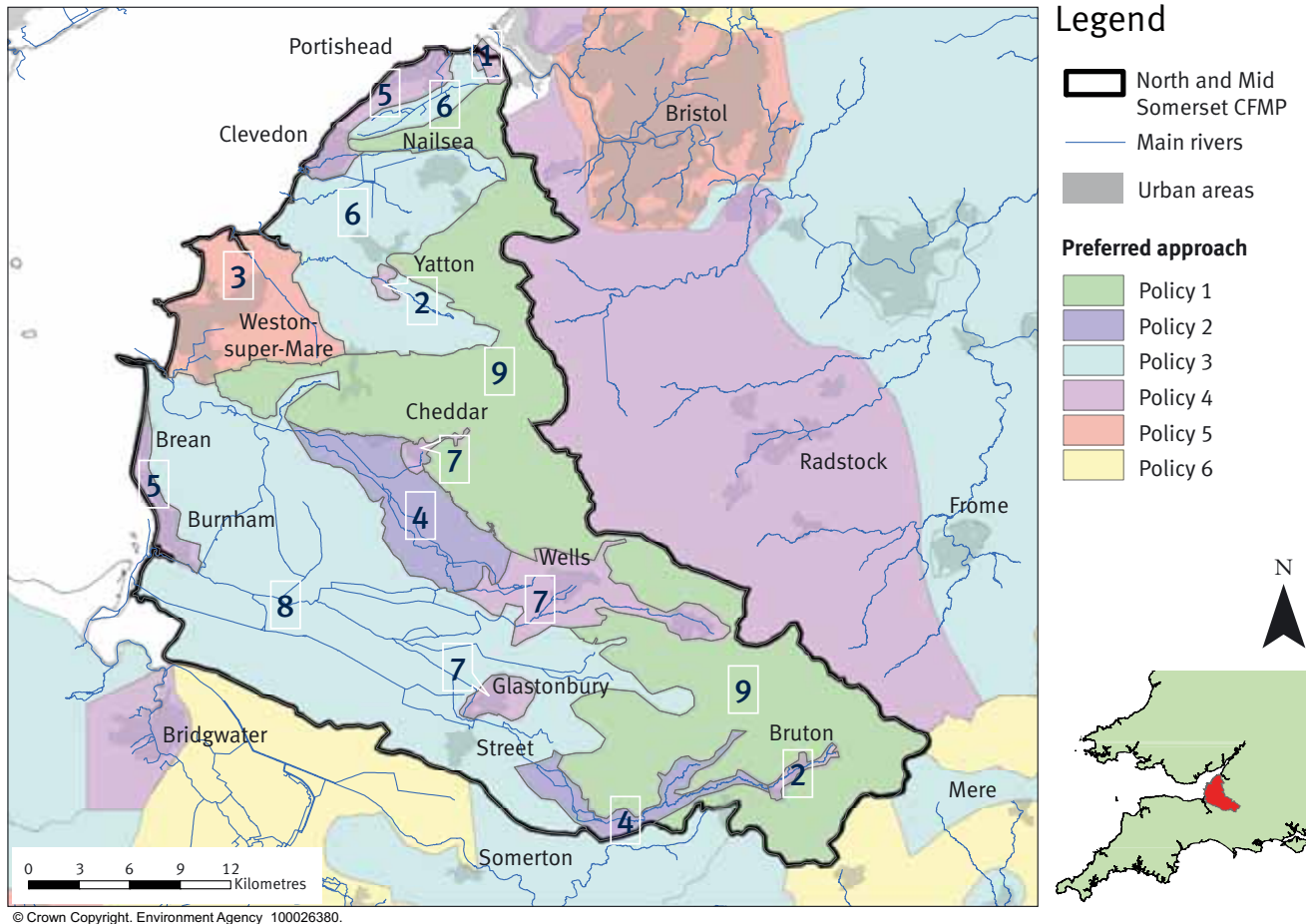
No critical infrastructure sites are expected to be affected during the 1% annual event probability flood, although there may be some localised flooding of roads.

Proposed actions to implement the preferred policy

No specific actions have been identified in this sub-area. We will continue to monitor and advise.

Map of CFMP policies

Map of the policies in the North and Mid Somerset catchment



The sub-areas

- 1 Portbury
- 2 Congresbury and Bruton
- 3 Weston-super-Mare
- 4 River Axe and River Brue
- 5 Coastal Towns
- 6 North Somerset Moors
- 7 Levels and Moors Towns
- 8 Levels and Moors
- 9 Uplands

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