

River Adur Catchment Flood Management Plan

Summary Report December 2009



managing
flood risk

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Introduction



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

The River Adur 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 main source of flood risk in the Adur CFMP area is from both localised river flooding, which is made worse by the influence of the tide, and surface water flooding, which is also a problem in some urban areas caused by under capacity or blockages in the drainage network. The risk is mainly located in Steyning and Upper Beeding, Brighton and Hove and Worthing.

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. The key partners we have worked with are Adur District Council, Arun District Council, Brighton and Hove City Council, Defra, Horsham District Council, Mid Sussex District Council, Natural England, Southern Water, West Sussex County Council, Worthing Borough Council.

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 Southern Region.

A handwritten signature in black ink, appearing to read 'T. Willison'.

Toby Willison
Regional Director, Southern Region

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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:

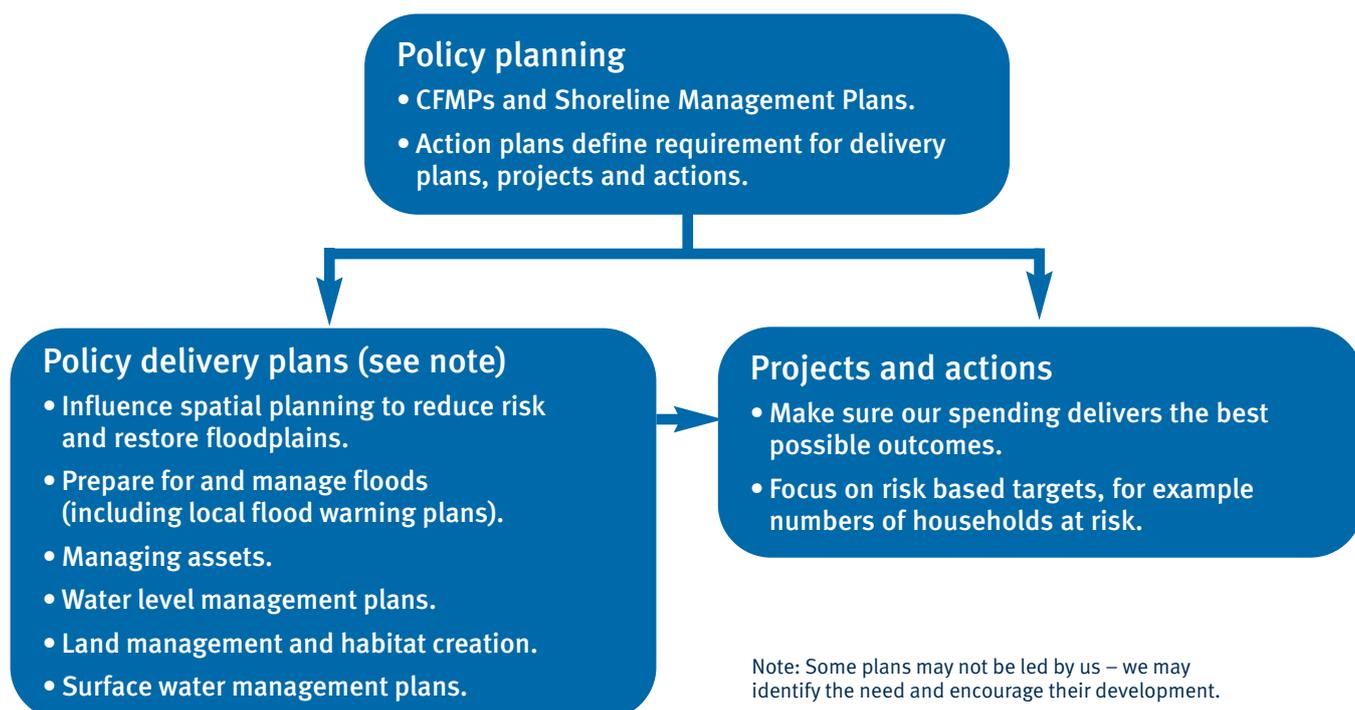
- The Environment Agency, who will use the plan to guide decisions on investment in further plans, projects or actions;
- Regional planning bodies and local authorities who can use the plan to inform spatial planning activities and emergency planning;

- IDBs, 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 River Adur CFMP covers an area of 600 square kilometres and is home to around 550,000 people. The main urban centres are located along the coast, including Worthing, Shoreham, and the city of Brighton and Hove. Inland towns include Burgess Hill, Steyning and Upper Beeding, as well as smaller settlements, such as Hassocks, Henfield, and Partridge Green.

The history, landscape and natural beauty of the area make it an important recreational and tourist destination. There are numerous scheduled monuments, listed buildings and registered historic

parks and gardens within the catchment. It also includes the High Weald and South Downs, both designated as Areas of Outstanding Natural Beauty (AONBs). Much of the South Downs is also classified as an Environmentally Sensitive Area (ESA). The catchment encompasses eight Sites of Special Scientific Interest (SSSIs), designated because of their ecological or geological importance. The Adur Estuary SSSI is of particular significance due to its saltmarsh habitat.

The chalk outcrop of the South Downs rises gently from the coastal

plain. The Low Weald north of the South Downs is characterised by low-lying and gently undulating clay vales. The landscape is a mixture of fields, hedgerows and woodland.

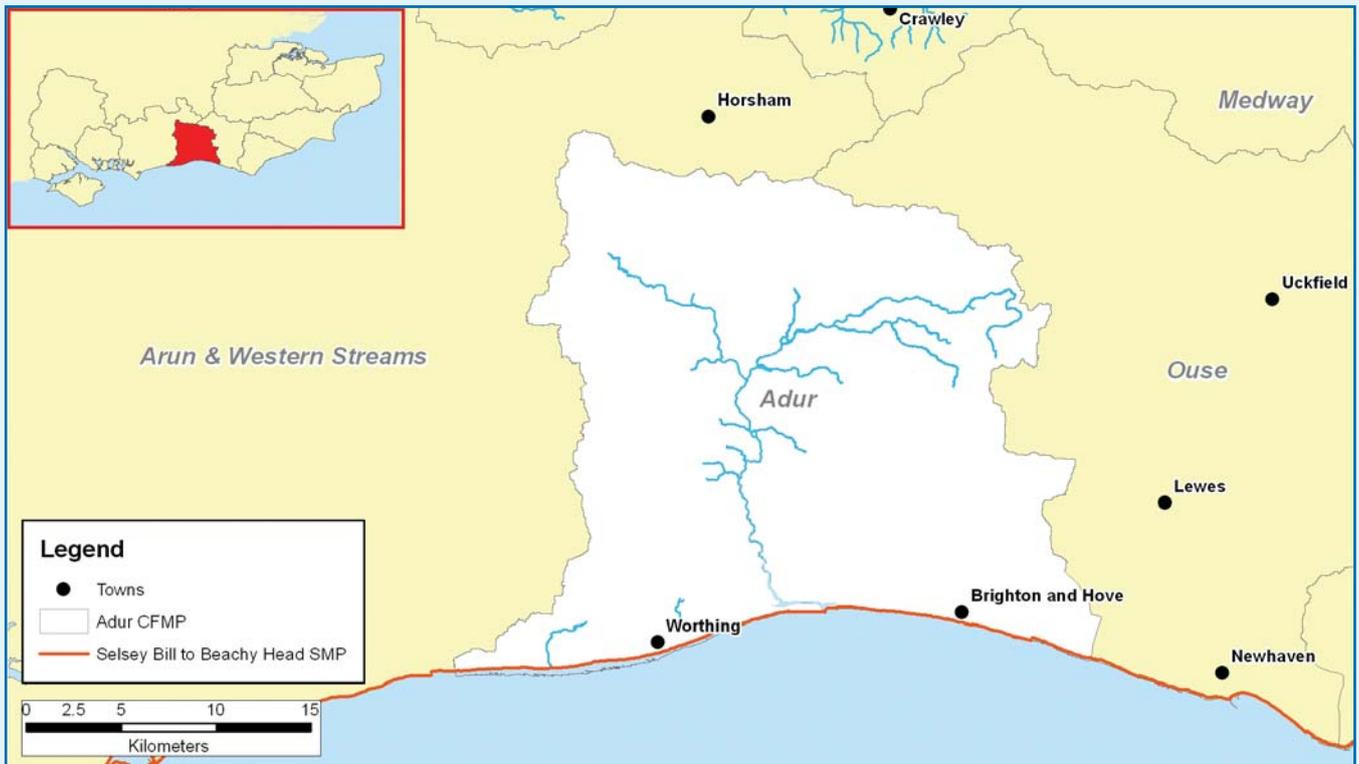
The watercourses within the CFMP include the main River Adur and its tributaries which drain the Low Weald area through the South Downs, flowing out to sea at Shoreham. The physical characteristics of the River Adur play an important role in the highly valued landscape character of the area. Other watercourses of note are the Ferring Rife and Teville Stream which drain the coastal area to the west of the River Adur.

‘The physical characteristics of the River Adur play an important role in the highly valued landscape character of the area.’



← Shoreham Harbour. Shoreham is a key coastal urban area, typical of where flood risk and development pressures need to be managed.

Map 1. Overview map of The Adur CFMP.



‘The catchment topography and geology both have a significant influence on the flooding characteristics of the catchment.’

Current and future flood risk

Overview of the current flood risk

Flood risk is the combination of the likelihood of a flood occurring and the consequences when it does. We have assessed flood risk across the CFMP area using broad-scale computer modelling, though making best use of existing knowledge and models where appropriate. Flood risk figures take into account current flood defences. Serious flooding does not occur very often in the River Adur CFMP area, and extreme flooding is very rare. Regular small flood events in the rural upper catchment are likely to have a beneficial environmental effect.

The main source of flooding in the River Adur CFMP area is from rivers. Tidal conditions influence flooding

on the lower reaches of the Adur, on the Ferring Rife and on Teville Stream. There is also a risk of flooding from groundwater, surface water run-off from the land, and overloaded drainage networks.

There have been several river flooding events over the last century and a number of groundwater flooding incidents. Groundwater flooding affects areas along the coastal plain. Surface water flooding is also an issue within the catchment. Serious flooding caused by surface water run-off from the South Downs has occurred in areas such as Worthing, Brighton and Hove.

Where is the risk?

The map on page 10 illustrates the consequences of a 1% annual probability event (1 in 100 year) occurring in the CFMP area.

The areas with the highest concentration of properties currently at risk from river flooding are tabulated opposite:



← The Adur floodplain looking north from the Chalk escarpment.

How we currently manage the risk

Flood risk management in the Adur catchment has historically relied on embankments acting to defend areas at risk and we are therefore looking for opportunities to revert the catchment back to its natural state. Our activity is prioritised on a risk basis and our main activities include:

- **The maintenance of existing and the construction of new or replacement flood defences and structures** such as the flood defence embankments along the River Adur north of the A259 road bridge, beyond Steyning and Upper Beeding in to the Upper Adur sub-area.
- **Flood forecasting and warnings**, which are currently sent to approximately 1,200* properties and aim to give at least two hours lead time ahead of river flooding.
- **Development control** to influence spatial planning so that new developments are sited away from flood risk areas, or take appropriate mitigation measures.
- **Flood risk mapping.**
- **Strategic planning** to plan long term investment.
- **Environmental improvements.**

*the number presented here includes properties which receive warnings for coastal flooding.

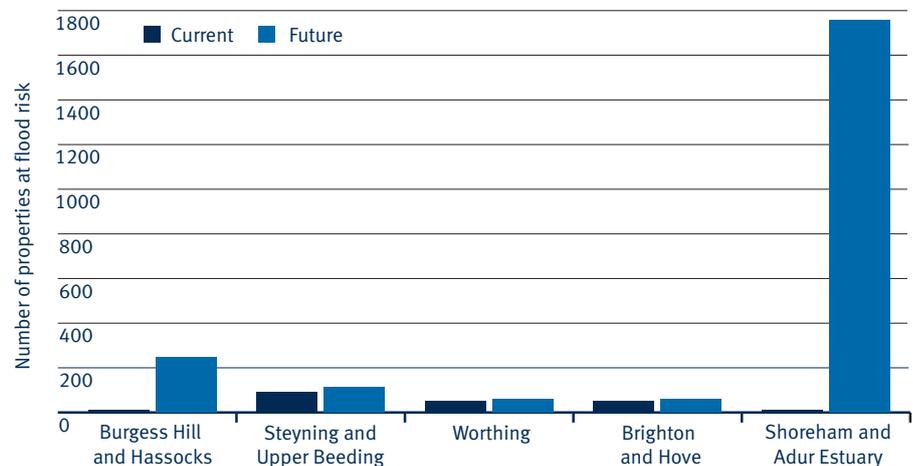
Table 1. Locations of towns and villages with 25 or more properties at risk in a 1% annual probability river flood.

| Number of properties at risk | Locations |
|------------------------------|---|
| >1000 | None |
| 500 to 1000 | None |
| 100 to 500 | None |
| 50 to 100 | Steyning and Upper Beeding, Worthing, Brighton and Hove |
| 25 to 50 | None |

Table 2. Critical infrastructure at risk:

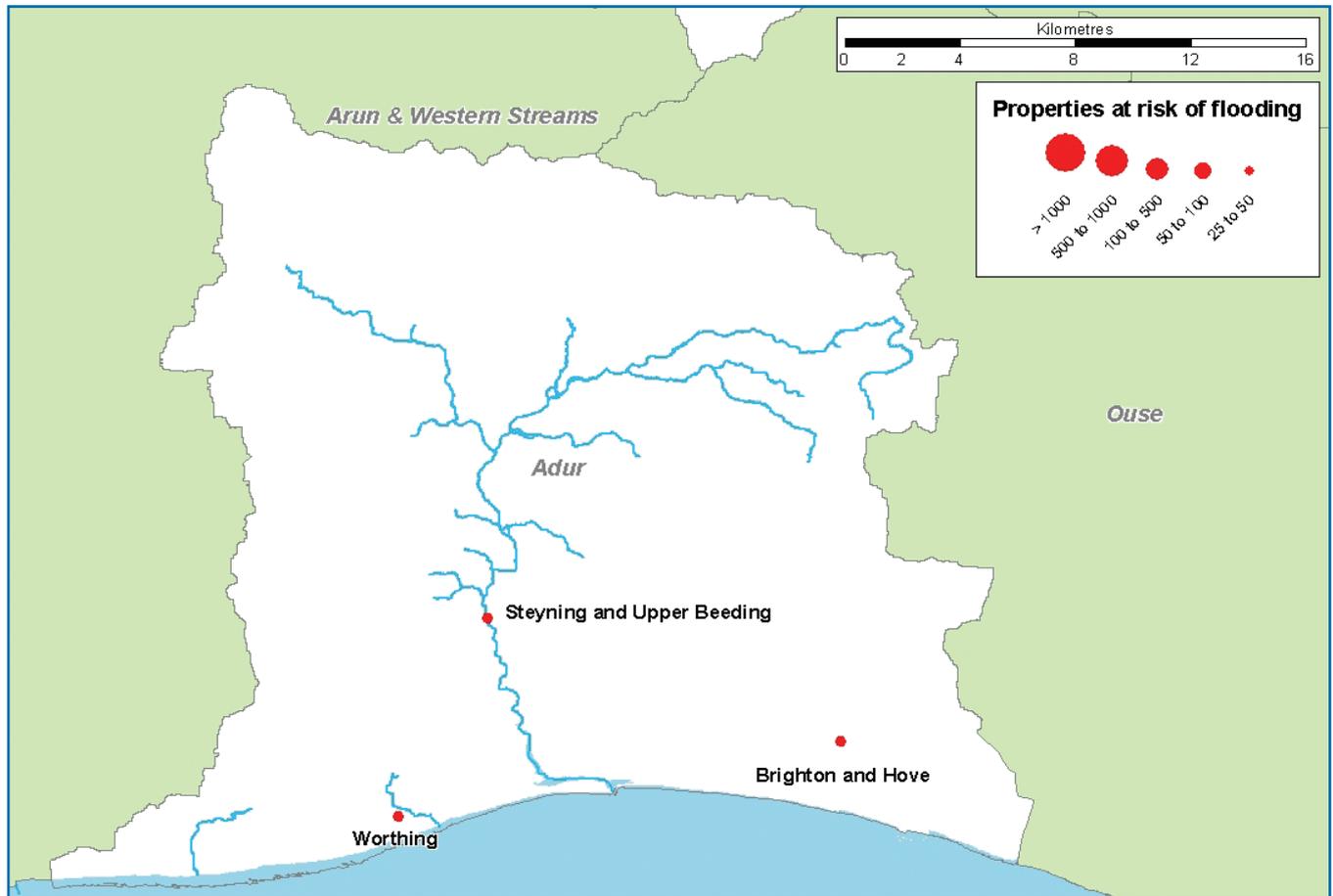
| |
|--------------------------------|
| 1 sewage/water treatment works |
|--------------------------------|

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



↑ River Adur from south of the Upper Beeding bridge.

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



The impact of climate change and future flood risk

The effect that flooding will have in the future is influenced by a range of issues such as climate change, changes in land use such as development, and changes in how land is managed.

Predictions of future change are based on understanding the existing condition of the catchment, an extrapolation of trends over the long term (up to 100 years), and a high level review of likely future change based on research findings and knowledge. Urban development and changes to land use and land use management have very little negative impact on flood risk within the Adur catchment area. The scenario which has the greatest effect on future

flood risk is climate change with up to 20% increase in peak flood flows. This scenario is used to assess likely impacts in the catchment.

In the Adur catchment the future flood risk is likely to be from river flooding and some surface water flooding. Our appraisal of the future risk in the catchment reveals the number of properties at risk to the 1% annual probability event will increase from 156 to 2178 properties by the year 2100. The majority of these properties are located in Shoreham and the Adur Estuary, with some in Steyning and Upper Beeding, and Burgess Hill. Please note that the broadscale modelling, used to calculate

properties at risk to flooding, does not distinguish between fluvial and tidal events.

The key trends are:

- More frequent and intense storms causing more widespread and regular flooding from drainage systems and some rivers.
- More rain in winter, increasing the likelihood of large scale flood events.
- Warmer, drier summers reducing the length of groundwater recharge period, may reduce the likelihood of future groundwater flooding events.

Future direction for flood risk management

Approaches in each sub-area

We have divided the Adur 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.

Map 3. Sub-areas and flood risk management policies.

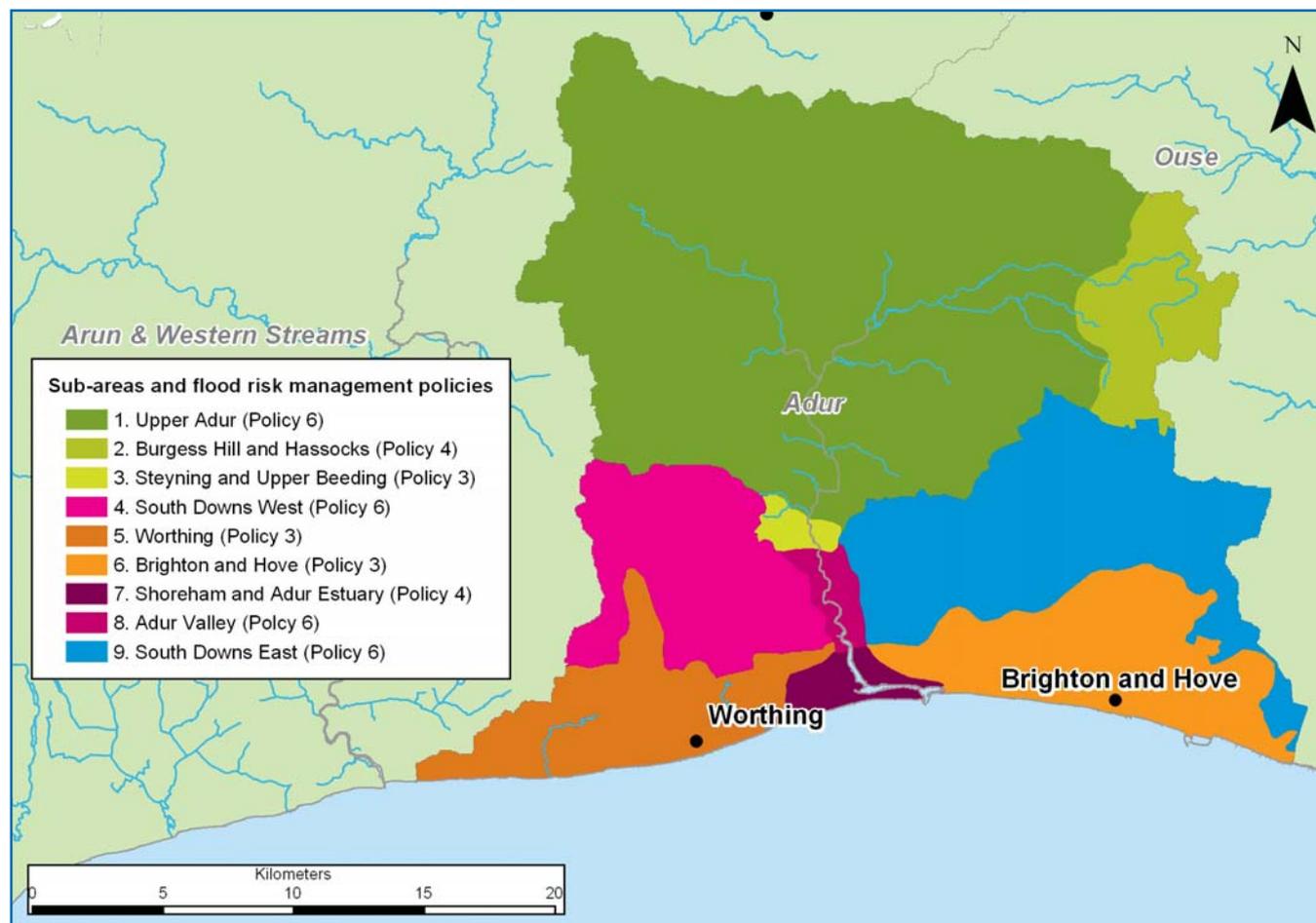


Table 3. Policy options.

→ 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.

Upper Adur

Our key partners are:

Mid Sussex District Council

Horsham District Council

Natural England

National Farmers Union

Defra

The issues in this sub-area

There is currently a relatively low risk of river flooding from the Adur in this sub-area. Flood defences extend from the south of the sub-area to Bines Green on the Adur West Branch and Shermanbury on the Adur East Branch. River flooding is predicted to get worse in the future, however the increase in flood risk in this sub-area is predicted to be relatively small. There are a small number of residential properties within the 1% annual probability flood extent, and most of the land at risk during such an event is moderate grade agricultural land. There are areas of existing woodland that would benefit from increased flooding frequency.

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.

Impact of a 1% annual probability flood event

| | Today | Future (2100) |
|------------------------------|--------------|---------------|
| Number of properties at risk | Less than 10 | Less than 10 |

The key messages

This policy supports economic and social sustainability by providing opportunities for environmental gains in the area and flood risk reduction in other sub-areas. More detailed studies will be carried out before any policy actions to increase flooding are implemented.

The implementation of this policy will assist in controlling or reducing flood risk in downstream urban areas such as Steyning, Upper Beeding, and Shoreham. The increased flooding could result in an increase of wetland around the River Adur Water Meadow and Wyckham Wood Site of Nature Conservation Interest/Importance (SNCI).



↑ River Adur at Haterell's Bridge.

Proposed actions to implement the preferred approach:

- Adur tidal strategy (for entire tidal reach) to include investigation of locations for large-scale flood attenuation and wetland creation on the River Adur.
- Set up working groups to explore the use of agri-environment and woodland schemes grants to help fund the change of land use and land use management to increase the water retention in the catchment.
- Develop a System Asset Management Plan (SAMP) to review maintenance regimes.
- Encourage and influence the uptake of Whole Farm Plans to provide advice on better land use practice with respect to run-off generation.
- Undertake a study to investigate removal of Environment Agency owned and maintained defence structures where additional storage of water on the floodplain could reduce flood risk to downstream areas, restore rivers and floodplains to a naturally functioning state, and contribute to meeting biodiversity action plan targets.

Burgess Hill and Hassocks

Our key partners are:

Mid Sussex District Council

Lewes District Council

Horsham District Council

Southern Water

The issues in this sub-area

There is currently a relatively low risk from river flooding in this sub-area, however a combination of surface water flooding, urban drainage problems and under capacity of local streams causes localised areas of combined fluvial and urban flooding. There is significant pressure for urban expansion and development in this sub-area. This development pressure combined with a future predicted increase in river flooding resulting from climate change are likely to cause a significant increase in flood risk for this sub-area.

Impact of a 1% annual probability flood event

| | Today | Future (2100) |
|------------------------------|-------|---------------|
| Number of properties at risk | 13 | 250 |

The vision and preferred policy

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

The key messages

The selected policy applies where the current risk is acceptable but future changes are expected to have a significant impact. This policy supports economic and social sustainability by addressing the potential for greater flood risk in the future through taking action. Management activities will be developed to respond to the potential increases in flood risk.

The implementation of this policy will reduce the likelihood of an increase in flood risk. The proposed measures will prevent an increase in the frequency of flooding resulting from climate change and/or urban growth, or an increase in the impact of flooding.

Proposed actions to implement the preferred approach:

- Strengthen development control advice, including the use of Sustainable urban Development Systems (SuDS), through local develop framework policies. Policies should promote no increase in run-off from new developments and seek opportunities to reduce current run-off rates, where possible, to mitigate future increase in and around Burgess Hill.
- Work in partnership to develop a Surface Water Management Plan (SWMP) for Burgess Hill including a review of receiving watercourses/catchments, foul and surface water drainage, and consideration of the implications of climate change.
- Review actions recommended in the Wivelsfield land drainage study and revise as necessary to make sure they address future flood risk.
- Increase the coverage of the Floodline Warnings Direct service in Burgess Hill and Hassocks to make sure the impact of flooding on people and property does not increase due to future changes. This may include creating a flood warning area for the Burgess Hill and Hassocks community.
- Work with others to improve and develop emergency response plans.
- Install water level gauges on the streams within Burgess Hill and Hassocks to increase the efficiency of the Floodline Warnings Direct service to reduce the potential consequences of flooding to people and property.
- Assess the potential for improving current defences, installation of demountable defences, and channel and flood defence management programmes as part of the System Asset Management Plan (SAMPs).



← Channel through Burgess Hill on Fairbridge Road.

Steyning and Upper Beeding

Our key partners are:

Horsham District Council

Impact of a 1% annual probability flood event

| | Today | Future (2100) |
|------------------------------|-------|---------------|
| Number of properties at risk | 91 | 112 |

The issues in this sub-area

The River Adur through this area is tidally influenced and a combination of high tide and increased river levels can lead to overtopping of the defences. A small number of listed buildings and heritage sites are within the floodplain, and almost 100 residential properties are at risk during the 1% annual probability flood event. Flood risk from surface water and urban drainage also causes localised flooding. Flood risk is predicted to increase slightly in the future. Extended periods of high water levels in the River Adur prevent drainage from land behind the defences, often causing the land to become seasonally waterlogged. This can produce a flashy response to heavy rainfall resulting in surface water flooding. This can also, on occasions, overwhelm nearby urban drainage systems resulting in localised urban flooding.

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 key messages

The policy chosen for this sub-area supports economic and social sustainability by maintaining the level of flood risk management at an appropriate level. Within the current level of flood risk management, it is intended that we will continue to look for opportunities to improve efficiencies and the effectiveness of what we do. This will allow us to change how we focus our work to adapt to uncertainties in future changes. This sub-area will also benefit from the policy adopted for the Upper Adur sub-area.

Proposed actions to implement the preferred approach:

- Work with the local planning authority to continue to apply government guidance in Planning Policy Statement 25 and make sure that flood risk issues identified in the CFMP and the strategic flood risk assessment are used to allocate and manage development at Steyning and Bramber.
- Continue with existing level of asset maintenance, looking for efficiencies and improvements.
- Continue to provide a Floodline Warnings Direct service in Steyning and Upper Beeding to make sure the impact of flooding on people and property continues to be managed.



↑ View of the South Downs from Steyning bowl.

Adur South Downs (West)

Our key partners are:

Horsham District Council

Adur District Council

Worthing Borough Council

Arun District Council

Natural England

National Farmers Union

South Downs Joint Committee

The issues in this sub-area

Although there are no watercourses within the sub-area, the key flood risk issues are related to the rapid run-off of water during intense storms which can cause ‘muddy’ flooding in adjacent urban areas such as the Findon Valley north of Worthing. Land management practices are therefore an important flood risk management tool. There are currently no properties at risk in this sub-area, now or in the future.

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.

Impact of a 1% annual probability flood event

| | Today | Future (2100) |
|------------------------------|-------|---------------|
| Number of properties at risk | 0 | 0 |

The key messages

The policy chosen for this sub-area supports economic and social sustainability by providing the possibility for environmental gains in the area and flood risk reduction in other sub-areas. This will make sure, sensible, practical and appropriate options are selected and there will be no net losses incurred. The implementation of this policy will assist in controlling or reducing surface water flood risk in the downstream urban areas such as Lancing, Worthing, and Findon. The implementation of measures to reduce run-off of water on the South Downs could include the creation of new habitats and the introduction of land management practices that also reduce soil erosion.



↑ South Downs near Fulking.

Proposed actions to implement the preferred approach:

- Set up working groups to explore the use of agri-environment and woodland schemes grants to help fund the change of land use and land use management to increase the water retention in the catchment and reduce the risk of flooding in the Worthing sub-area.
- Encourage and influence the uptake of whole farm plans in the South Downs (West) catchment to provide advice on better land use practice with respect to run-off generation and reduction of flood risk in the Worthing sub-area.
- Work with the South Downs Joint Committee (merger of the Sussex Downs Conservation Board and the East Hampshire Area of Natural Beauty (AONB) Joint Advisory Committee) to achieve the targets set in the Sussex Downs AONB management strategy to maximise the opportunities for natural processes to reduce flooding through the adoption of wetland creation, whilst enhancing landscape character. These actions will reduce the risk of flooding in the Worthing sub-area.

Worthing

Our key partners are:

Worthing Borough Council

Adur District Council

Arun District Council

Southern Water

Sussex Police and other
emergency services

The issues in this sub-area

This sub-area is relatively urban and contains two watercourses, the Ferring Rife and Teville Stream. Near the coast, river flooding may be affected by high tide levels, which prevent flood waters from discharging into the sea. A combination of river, groundwater, and surface water flooding (including ‘muddy’ flooding) contribute to flood risk in this sub-area. Flood risk in the future is not predicted to increase significantly, however there is some uncertainty regarding current and future flood risk along the Teville Stream due to the limited availability of information.

The vision and preferred policy

Policy Option 3 – areas of low to moderate flood risk where we are generally managing existing flood risk effectively.

Impact of a 1% annual probability flood event

| | Today | Future (2108) |
|------------------------------|-------|---------------|
| Number of properties at risk | 52 | 60 |

The key messages

The selected policy applies where the current level of flood risk management is appropriate to the level of flood risk and future changes are not expected to have a significant impact.

The current level of risk is acceptable and is set to remain at an acceptable level into the future. This sub-area may also benefit from the selection of a Policy 6 in South Downs (West) sub-area.

Proposed actions to implement the preferred approach:

- Strengthen development control advice, including the use of Sustainable urban Development Strategy (SuDS), through local development framework policies promoting no increase in run-off from new developments and seeking opportunities to reduce current run-off rates, where possible, to make sure flood risk continues to be managed through the planning process.
- Work in partnership to develop a Surface Water Management Plan (SWMP) for Worthing with a review of receiving watercourses/catchments, foul and surface water drainage and implications of climate change.
- Understanding of flood risk in this sub-area should be enhanced through a detailed flood risk study. This should concentrate on the present flood risk associated with the Teville Stream catchment and include obtaining LiDAR (an optional remote sensing technology) data, carrying out topographical surveys, creating models and undertaking a hydrological study. Options for restoring the channel should be considered including at Homefield and Teville Gate.
- Continue to provide a Floodline Warnings Direct service, including installation of a Flood Warning level gauge and service on the Teville Stream.
- Continued practice and development of the emergency response plan.

Brighton and Hove

Our key partners are:

Brighton and Hove City Council

Adur District Council

Southern Water

Brighton University

Network Rail

Sussex Police and other emergency services

The issues in this sub-area

The Brighton and Hove sub-area is the most densely populated within the CFMP study area. There are no rivers within this sub-area, and the main flood risk issues are from groundwater, surface water, and urban drainage system flooding. The steep hills result in rapid run-off and intense storms can cause ‘muddy’ flooding as water flows off the South Downs.

Impact of a 1% annual probability flood event

| | Today | Future (2100) |
|------------------------------|-------|-------------------|
| Number of properties at risk | 50 | Between 50 to 200 |

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 key messages

Due to the nature of flood risk in this area there is greater uncertainty regarding how flood risk will change in the future. A policy 6 option for the Adur South Downs (East) sub-area may provide benefit to the Brighton and Hove sub-area in the future through land management practices that store more water on the South Downs and reduce ‘muddy’ flooding.

Proposed actions to implement the preferred approach:

- Strengthen development control advice, including the use of Sustainable urban Drainage Systems (SuDS), through local develop framework policies promoting no increase in run-off from new developments.
- Work in partnership to develop a Surface Water Management Plan (SWMP) for Brighton and Hove .
- Review the CFMP Policy when further information is available concerning surface water and groundwater.
- Undertake a study to investigate groundwater flooding and develop a flood warning system.
- Work with others to improve and develop the emergency response plans.



← South Downs above Brighton.

Shoreham and Adur Estuary

Our key partners are:

Adur District Council

Southern Water

Sussex Police and other emergency services

The issues in this sub-area

This sub-area is mainly urban and includes the River Adur from the coast to the A27. This area is heavily tidally influenced, which can lead to defences being overtopped. Surface water flooding is an issue, particularly to Shoreham airport and the surrounding area. Run-off from the South Downs can also result in flooding. The Adur Site of Special Scientific Interest (SSSI) is located partially within this sub-area. Current flood risk from fluvial flooding is low, however in the future if a fluvial event combined with a significant tidal influence resulting from climate change, it is expected that a large number of properties will be at risk.

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.

Impact of a 1% annual probability flood event

| | Today | Future (2100) |
|------------------------------|-------|---------------|
| Number of properties at risk | 11 | 1,757 |

The key messages

The selected policy supports economic and social sustainability by maintaining the current level of flood risk within the sub-area in the future. This is likely to be achieved through carrying out appropriate works to the wall defences along the River Adur.

The level of future flood risk in Shoreham needs to be addressed. Local defences will need to be

maintained and improved over time to mitigate the affects of climate change, and this is recognised in the Rivers Arun to Adur flood and erosion management strategy and resulting schemes. This policy also supports the regeneration proposals for Shoreham, although it must be stressed that future development and regeneration needs to comply with all relevant planning policy guidance.



↑ River Adur adjacent to the Norfolk Bridge.

Proposed actions to implement the preferred approach:

- Strengthen development control advice, including the use of Sustainable urban Drainage Systems (SuDS), through Local Development Framework policies promoting no increase in run-off from new developments and seeking opportunities to reduce current run-off rates, where possible, to make sure the impact of flooding does not increase in the future. Investigate how developer contributions can be used to help sustain the current scale of flood risk into the future.
- Work in partnership to develop a Surface Water Management Plan (SWMP) for Shoreham-By-Sea with a review of receiving watercourses/catchments, foul and surface water drainage, and implications of climate change.
- Undertake a study to investigate the future flood risks to Shoreham-By-Sea as a result of predicted sea level rise and the development of the Adur tidal walls scheme including consideration of a barrier option.
- Work with others to find improve and develop the emergency response plan.
- Increase the coverage of the Floodline Warnings Direct service.
- Undertake System Asset Management Plans (SAMPs) to review maintenance regimes, to assess future investment needs and to maintain current level of risk.



↑ The old Toll Bridge (left) and rail crossing (right) at Shoreham.

Adur Valley (north of A27 to south of Steyning)

Our key partners are:

Adur District Council

Horsham District Council

Natural England

National Farmers Union

South Downs Joint Committee

The issues in this sub-area

This sub-area consists of the rural landscape immediately adjacent to the River Adur and contains a few isolated properties. This section of the River Adur corridor includes part of the Adur Estuary Site of Special Scientific Interest (SSSI) and consists of relatively flat low-lying ground in a valley between the South Downs. The defences along this stretch of river will not generally overtop unless the fluvial flooding is influenced by the tidal conditions. Flood risk is currently low in this area and is not expected to increase significantly in the future.

Impact of a 1% annual probability flood event

| | Today | Future (2100) |
|------------------------------|-------|---------------|
| Number of properties at risk | 0 | Less than 5 |

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.

The key messages

The chosen policy supports economic and social sustainability by providing the possibility for what are estimated to be significant environmental gains and improved sustainability of flood risk management in the Shoreham and Adur Estuary sub-area. More detailed studies may be carried out before any policy actions to develop water storage areas are implemented. This will make sure sensible, practical and appropriate options are selected and there will be no net losses incurred.

An increase in flooding could result in an increase of wetland around the River Adur meadows, Shoreham-by-Sea and the Mill Hill, Shoreham-by-Sea, Sites of Nature Conservation Importances (SNICIs). This policy provides potential for improving local biodiversity in the area, leading to an eventual increase in extent, quality and diversity of wetland habitats with opportunities for recreation and landscape.

Proposed actions to implement the preferred approach:

- Develop the River Adur strategy (for entire tidal reach) to include investigation of large-scale flood attenuation and wetland creation on the River Adur.
- Set up working groups to explore the use of agri-environment and woodland schemes grants to help fund the change of land use and land use management to increase the water retention in the catchment.
- Encourage and influence the uptake of whole farm plans in the Adur Valley catchment to provide advice on better land use practice with respect to run-off generation.
- Work with the South Downs Joint Committee (merger of the Sussex Downs Conservation Board and the East Hampshire Area of Natural Beauty (AONB) Joint Advisory Committee) to achieve the targets set in the Sussex Downs AONB management strategy to maximise the opportunities for natural processes to reduce flooding through the adoption of wetland creation, whilst enhancing landscape character. These actions will reduce the risk of flooding in the Steyning and Upper Beeding, and Shoreham and Adur Estuary sub-areas.
- Undertake a study to investigate the removal of Environment Agency owned and maintained structures (flood embankments) where additional storage could reduce flood risk to Steyning, Upper Beeding and Shoreham-By-Sea, restore rivers and floodplains to a naturally functioning state and contribute to meeting biodiversity action plan targets.



← View across Adur Valley from Mill Hill.

Adur South Downs (East)

Our key partners are:

Adur District Council

Horsham District Council

Mid Sussex District Council

Brighton and Hove City Council

Lewes District Council

Natural England

National Farmers Union

South Downs Joint Committee

The issues in this sub-area

Although there are no watercourses within the sub-area, the key flood risk issues are related to the rapid run-off of water from the South Downs during intense storms, which can cause ‘muddy’ flooding in adjacent urban areas such as Brighton and Hove. Land management practices are therefore an important flood risk management tool in this area. Increased storminess due to climate change may increase soil erosion and localised flash flooding in neighbouring areas. There are currently no properties at risk in this sub-area, now or in the future.

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.

Impact of a 1% annual probability flood event

| | Today | Future (2100) |
|------------------------------|-------|---------------|
| Number of properties at risk | 0 | 0 |

The key messages

The policy chosen for this sub-area supports economic and social sustainability by increasing flood water storage and infiltration of rainwater locally in this sub-area. This large rural sub-area presents opportunities for changing land use and developing possible flood storage mechanisms to reduce rapid run-off generated from land use activities and the steep slopes. Water storage and changes in land management can also benefit biodiversity and reduce soil erosion. More detailed studies may be carried out before any policy actions to develop water storage areas are implemented. This will make sure sensible, practical and appropriate options are selected and there will be no net losses incurred.

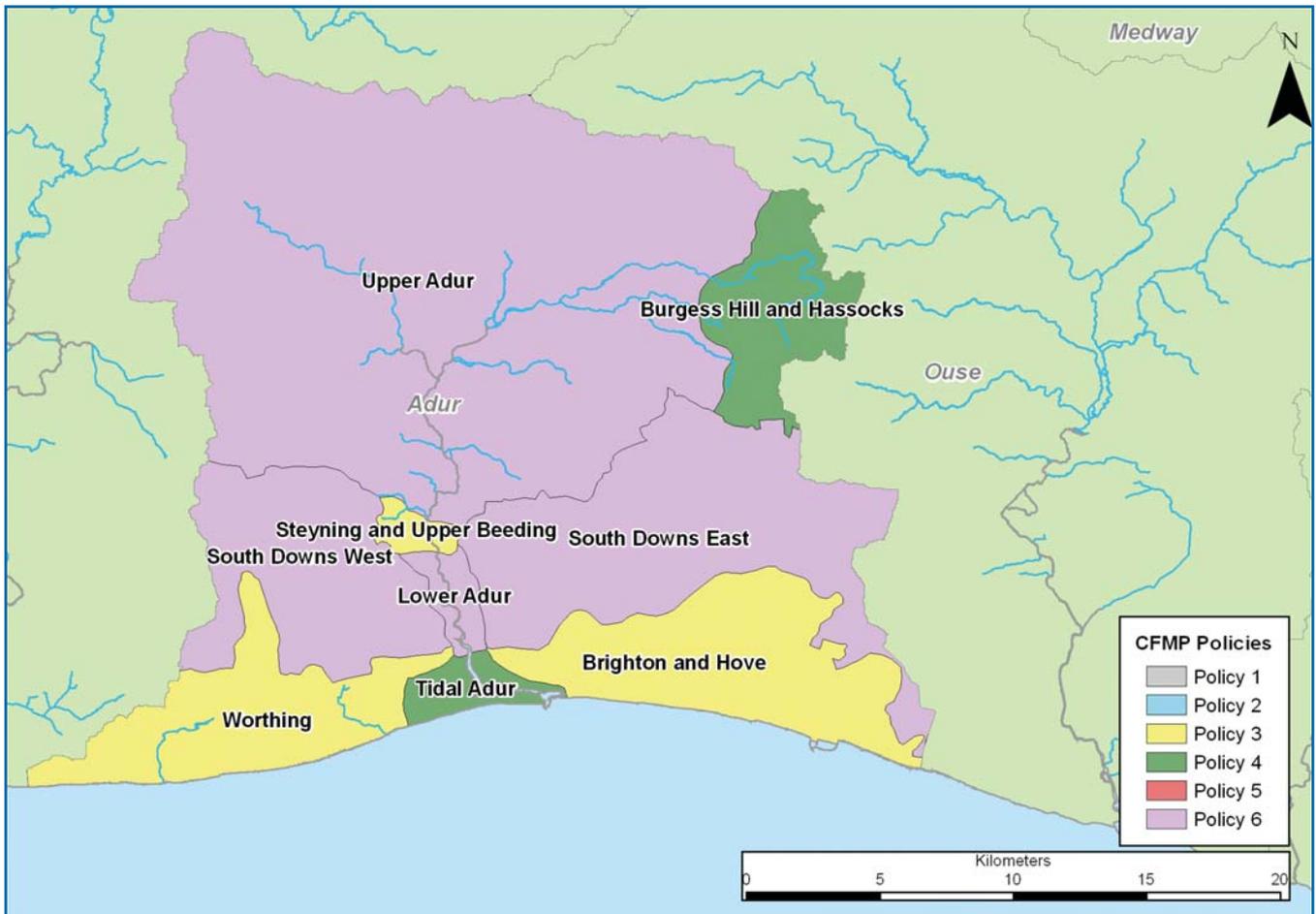
The implementation of this policy will assist in controlling or reducing flood risk (particularly from ‘muddy’ flooding) in adjacent urban areas such as the suburbs of Brighton and Hove.

Proposed actions to implement the preferred approach:

- Set up working groups to explore the use of agri-environment and woodland schemes grants to help fund the change of land use and land use management to increase the water retention in the catchment.
- Encourage and influence the uptake of whole farm plans in the South Downs (East) catchment to provide advice on better land use practice with respect to run-off generation and reduction of flood risk in the Brighton and Hove sub-area.
- Work with the South Downs Joint Committee to achieve the strategic targets including the adoption of wetland creation.
- Support the recommendations implemented from the *Flood Defence Assessment of Downland Flooding* (Binnie, Black and Veatch 2001).

Map of CFMP policies

Map of the policies in the Adur catchment.



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