

North Essex 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 North Essex Catchment Flood Management Plan (CFMP). This CFMP gives an overview of the flood risk in the North Essex CFMP area and sets out our preferred plan for sustainable flood risk management over the next 50 to 100 years.

The North Essex 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 groundwater flooding 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.

There are different sources of flood risk in the North Essex CFMP area. The main flood risk is from river flooding after heavy, short storms or widespread rainfall.

This mainly affects large urban areas such as Colchester, Braintree and Chelmsford. Many of these are protected by flood defences, but are still considered as being at very high risk if the defences overtop or fail during an extreme flood event. High tide levels can prevent river flows from draining away and this is called 'tide-locking'. This can affect Clacton-on-Sea and Heybridge. Other causes of flooding include surface water, sewer or groundwater flooding.

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 work with many organisations, groups and individuals with an interest in how flood risk is managed including local authorities, Internal Drainage Boards (IDBs), water companies, conservation bodies such as Natural England and the public.

This is a summary of the main CFMP document. If you would like to see the full document an electronic version can be obtained by emailing enquiries@environment-agency.gov.uk or telephoning 08708 506 506. Alternatively, paper copies can be viewed at any of our offices in Anglian Region.

A handwritten signature in black ink that reads "Paul Woodcock". The signature is written in a cursive style with a horizontal line underneath the name.

Paul Woodcock
Regional Director Anglian Region

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↑ Bures Mill, River Stour

The purpose of a CFMP in managing flood risk

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

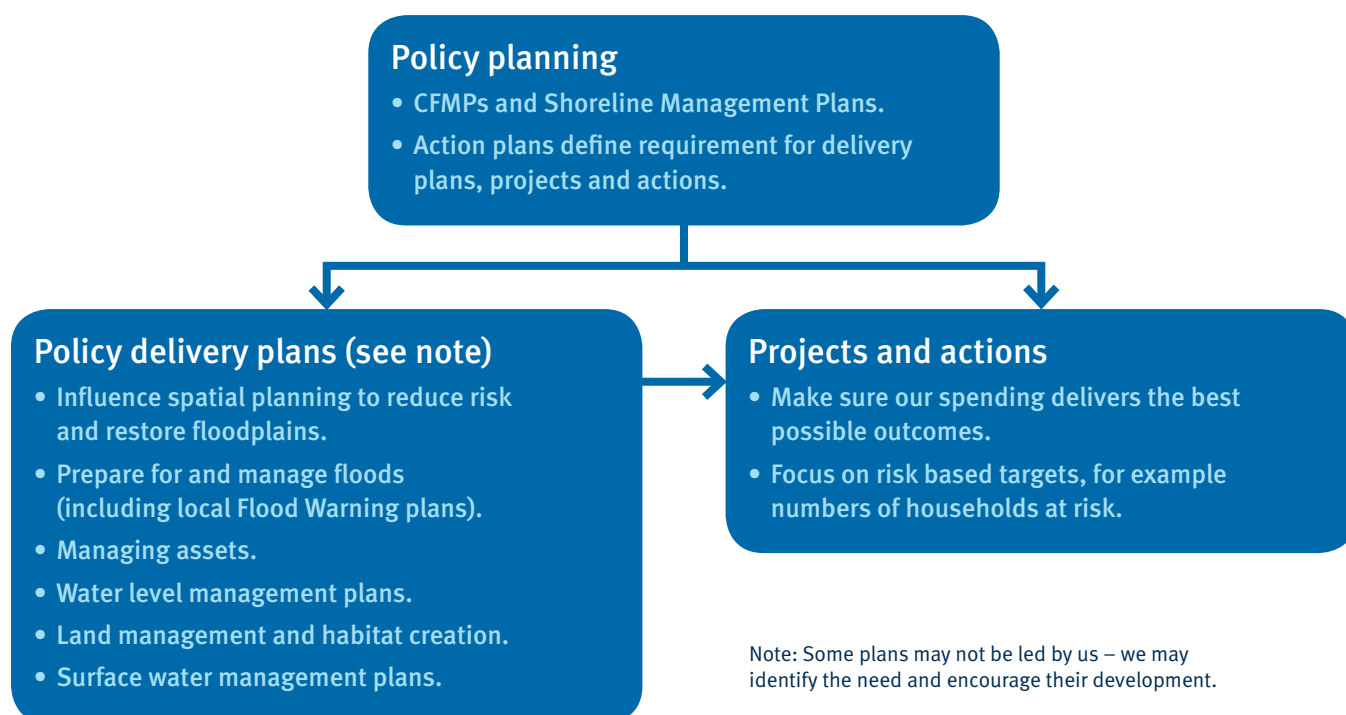
- the Environment Agency, who will use the plan to guide decisions on investment in further plans, projects or actions;
- regional planning bodies and local authorities who can use the plan to inform spatial planning activities and emergency planning;

- Internal Drainage Boards (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 North Essex CFMP is located in the east of England. Map 1 shows the location and extent of the North Essex CFMP, it includes the catchment of four major rivers: the River Chelmer, Blackwater, Colne and Stour as well as Holland Brook and other smaller watercourses. These rivers flow to estuaries and then into sea. The downstream limit of the CFMP area is located at the Essex and South Suffolk Shoreline Management Plan (SMP) boundary. The SMP deals with coastal flood management issues along its boundary from Landguard Point (on the north bank of the Orwell estuary) to Purfleet (on the north bank of the River Thames) including the estuaries up to their tidal limits.

The CFMP covers an area of around 3,000 km², and has a population of over 800,000 people. It is predominantly rural with approximately 60% of the land being used for arable crop

production. The land in the upper reaches of rivers in the Stour, Colne, Blackwater and Chelmer catchments is mainly grade two agricultural land. The poorer quality agricultural land is mainly found along rivers, tidal estuaries and the coast. The main urban areas are Chelmsford, Colchester, Braintree and Sudbury.

The area is characterised by rolling hills to the north west of the CFMP area, upstream of Hadleigh, Sudbury, Halstead and Braintree, with a flat coastal plain downstream of these settlements. Much of the area is low-lying with a maximum height of 125m above ordnance datum.

The underlying geology to the north of Sudbury and Hadleigh is chalk covered by glacial till. In the lower reaches and coastal part, south of Sudbury and Hadleigh, the underlying geology is mudstone covered by sands and gravels or

silt and clays. Where the underlying rock is mudstone, there are higher rates of rainfall runoff, and runoff flows directly into the watercourses. In the areas where there is chalk bedrock, runoff may infiltrate the rock delaying the response of rivers to rainfall and reducing peak flood flows. There is also a risk from groundwater flooding in these areas.

Within the North Essex CFMP area there are a number of sites designated for their environmental importance including Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites. Important environmental sites in the CFMP area include: Abberton Reservoir (SPA, Ramsar, Site of Special Scientific Interest (SSSI)) and the internationally significant estuaries of the Blackwater (Ramsar, SAC, SPA, National Nature Reserve (NNR)), Colne (Ramsar, SAC, SPA, NNR), Hamford Water (Ramsar, SPA, NNR) and Stour (Ramsar, SPA). These estuaries are not affected by river flooding and will be mainly affected by issues considered in the Essex and South Suffolk SMP. There are 11 SSSIs in the North Essex CFMP area. Over 100 Scheduled Monuments (SMs), designated for their heritage value, are distributed across the CFMP area.

Map 1 Location and extent of the North Essex CFMP area



↑ Holland Brook

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% annual probability flood has a 1% chance or 0.01 probability of occurring in any one year, and a 0.5% annual probability 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.

The catchment has a history of flooding, the most significant events in recent years occurred in 2000 on the Rivers Colne, Blackwater and Chelmer. Flooding in late October 2001 caused significant damage and affected over 700 properties.

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

- river flooding from the River Chelmer in Chelmsford and the River Colne in Colchester, as well as river flooding from smaller streams and ditches including the effects of blockages including Great Bardfield in the Blackwater headwaters and Great Yeldham, Sible Hedingham and Castle Hedingham along the Colne

headwaters;

- failure or overwhelming of pumping stations on some of the smaller watercourses, such as Ramsey River, causing localised flooding;
- sewer flooding to isolated properties due to the system being overwhelmed after heavy rainfall;
- surface water flooding is not currently a major source of flood risk in North Essex. However there may be some risk in towns and villages in the headwaters of the catchment where steeper slopes cause rapid run-off, such as in Steeple Bumpstead, Little Yeldham, Sible Hedingham, Chappel, Fordstreet, Shalford, Braintree, Kelvedon, Mountnessing, Finchingfield and Hatfield Peverel.

What is at risk?

Using river models we estimate that at present there are around 5,600 people and 2,500 commercial and residential properties at risk in the CFMP area from the 1% annual probability river flood, taking into account the current flood defences. This means that 0.7% of the total population living in the CFMP area are currently at risk from river flooding.

It is difficult to assess the current impact of flooding on environmental features but the internationally significant sites of the Blackwater, Colne, Hamford Water and Stour estuaries are not thought to be affected by river flooding. Abberton Reservoir (SPA, Ramsar, SSSI) is also not thought to be affected by river flooding. Ten SSSIs may be at risk from the impact of flooding during a 1% annual probability river flood. Two may see beneficial impacts from flooding, five may not be affected by flooding and three may be negatively impacted by flooding. There may also be risk to 61 Scheduled Monuments and two historic parks and gardens from the 1% annual probability river flood. Table 1 summarises where there is flood risk to more than 25 properties. Table 2 shows the critical infrastructure at risk in the catchment.

Where is the risk?

Around 41% of the people and properties at risk in the CFMP area from a 1% annual probability river flood (taking into account current flood defences) are located in Heybridge (15%), Colchester (14%) and Chelmsford (12%).

The distribution of properties at risk from a 1% annual probability river flood, taking into account current flood defences, is shown in Map 2.

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.

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
100 to 500	Heybridge, Colchester, Chelmsford
50 to 100	Clacton-on-Sea, Billericay, Boxford, Hundon, Witham, Great Yeldham
25 to 50	Kelvedon/Feering, Great Barfield, Coggeshall, Stratford St Mary, Bildeston, Castle Hedingham, Mountnessing, Cavendish, Sible Hedingham

Table 2 Critical infrastructure at risk in the catchment

	Risk from a 1% annual probability river flood
Critical infrastructure at risk	Eighteen electricity sub-stations, Four sewage treatment works, One gas works, sections of A-road



↑ River Ramsey, Harwich

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



How we currently manage the risk in the catchment

The CFMP area has a history of flooding, generally due to high rainfall that can lead to watercourses and drains being overwhelmed, flood defences being overtopped or raised embankments breached. In the past numerous engineering schemes have been implemented to reduce river flooding in the CFMP area, including:

- flood embankments and walls. Embankments on the River Can in Chelmsford provide protection from a 10% to a 2% annual probability river flood. Embankments, walls and channel works along the River Colne in Colchester and the Colne barrier provide protection from a 1.3% to a 1% annual probability river flood. The Colne Barrier also protects Colchester from a tidal surge. There are also two brick wall defences at Sudbury, brick walls and banks at White Colne and a retaining wall at Finchingfield that provide protection from river flooding;
- pumping stations. Ramsey River is fully pumped by the Parkeston Pumping Station. This provides protection to Parkeston;
- construction of diversion channels. The diversion of the river Chelmer to the Chelmer and Blackwater Navigation Channel with two flood gates provide protection to Chelmsford from a 10% to a 0.2% annual probability river flood. The Nayland bypass channel was built to protect areas upstream of Nayland;
- flood storage areas. Meldham Washlands on the River Stour provide protection to Haverhill from 1% annual probability river flood. The storage lagoons on Sugar Loaves Brook at

Sible Hedingham and areas of storage upstream of Heybridge both provide protection from river flooding. There is also a flood storage scheme which provides protection to the town of Halstead.

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;

- maintaining river channels;
- maintenance of drainage networks by landowners;
- maintenance of road drainage and sewer systems.

Activities that reduce the consequences of flooding include:

- 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);
- 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.

Combinations of engineering and other flood risk management activities are used to reduce the probability or consequences of flooding. We have investigated which activities are likely to be most effective and appropriate in different parts of the CFMP area in the future.



↑ Holland Brook, Tendring

The impact of climate change and future flood risk

In the future, flooding can be influenced by climate change, changes in land use (for example urban development) and rural land management. Using river models we tested the sensitivity of the rivers in the CFMP area to these drivers.

For urbanisation, we tested the sensitivity of the rivers in the catchment to urban growth, based on a 10% increase in urbanisation in the CFMP area up to 2100. Increasing urbanisation had an impact on flood risk.

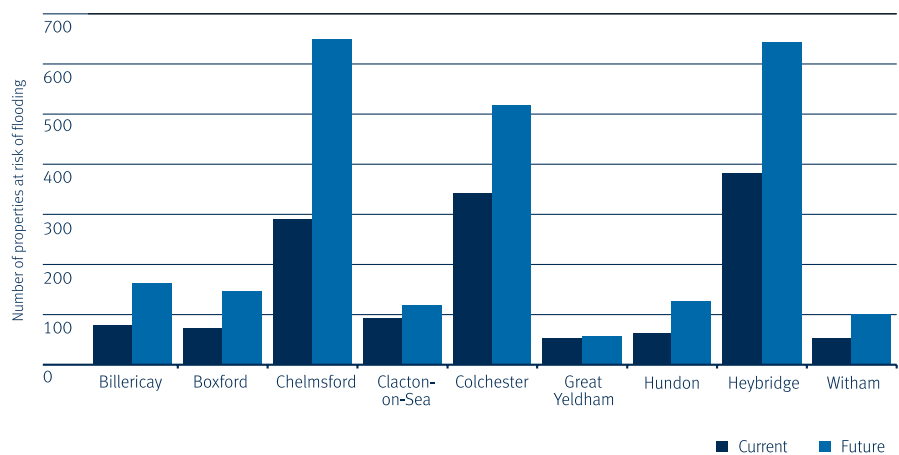
For climate change we tested the following changes up to 2100:

- 20% increase in peak flow in all watercourses. This will increase the probability of large-scale flood events;
- A total sea level rise of 300mm by the year 2100. This will increase the probability of tidal flooding and increase the length of time watercourses will not be able to flow freely to the sea at high tide (tide-locked). Climate change was shown to have a significant impact on flood risk.

For rural land management, we adjusted the river models to represent the effect of reducing and increasing intensive farming practices. At a catchment scale this had a limited impact on flood risk. Therefore, changes in rural land management were not taken forward into the final future scenario.

In the North Essex CFMP area, climate change and urbanisation were shown to have the greatest impact on flood risk. Therefore, the scenario used to model future flood risk was based on urbanisation and climate change as described.

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



Using river models we estimate that by 2100, 10,500 people and 4,500 residential and commercial properties will be at flood risk across the CFMP area from the 1% annual probability river flood. These figures take account of current flood defences. River flood risk increases mainly in Heybridge, Chelmsford and Colchester.

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



↑ River Colne, Nunnery Bridge

Future direction for flood risk management

Approaches in each sub-area

We have divided the North Essex catchment into eight 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

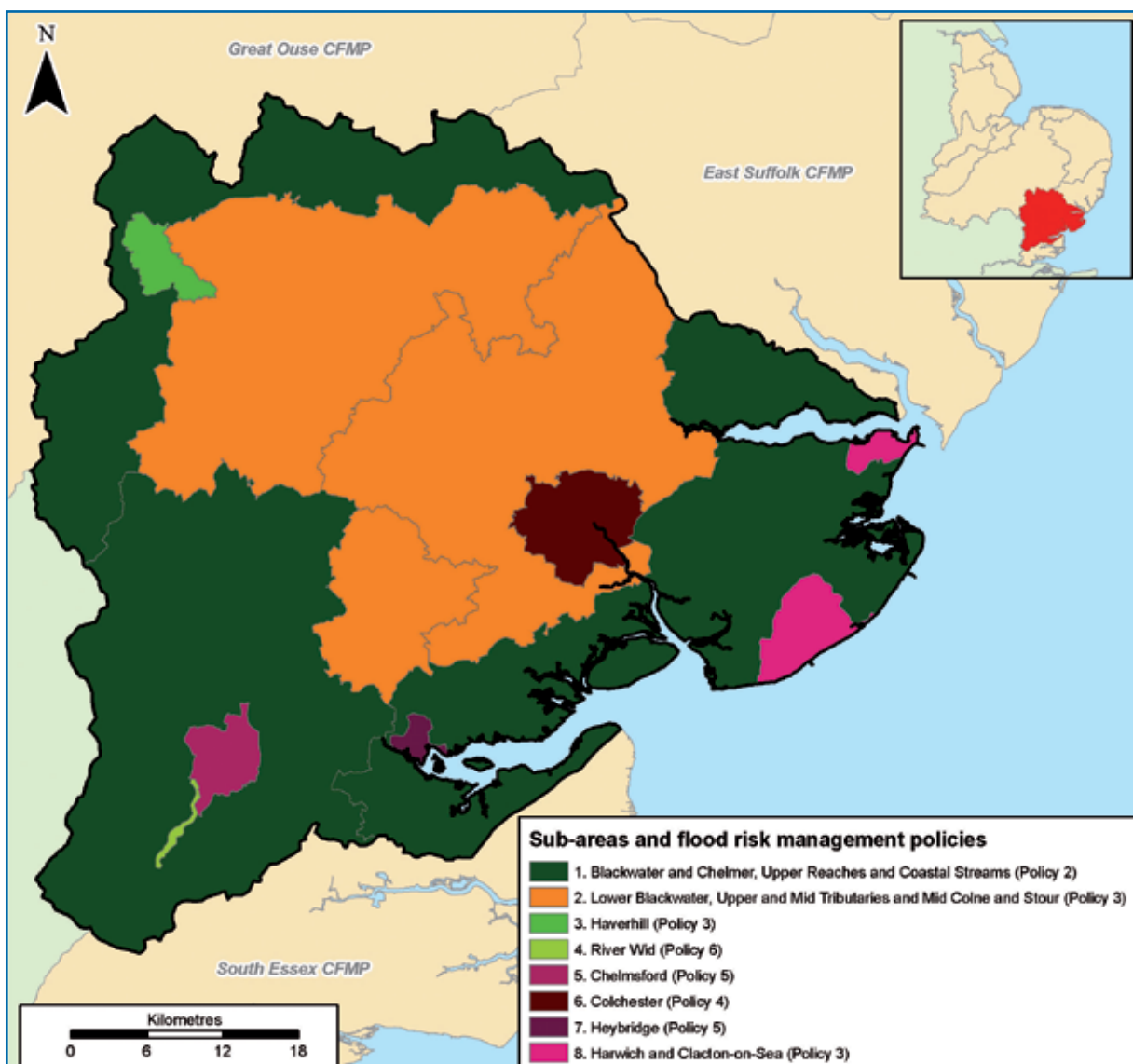


Table 3 Flood risk management policy options

→ 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.

Blackwater and Chelmer, Upper Reaches and Coastal Streams

Our key partners are:

Babergh District Council

Basildon District Council

Billericay Town Council

Braintree District Council

Brentwood Borough Council

Chelmsford Borough Council

East Cambridgeshire District Council

Epping Forest District Council

Maldon District Council

Mid Suffolk District Council

South Cambridgeshire District Council

St Edmundsbury Borough Council

Tendring District Council

Uttlesford District Council

The issues in this sub-area

There are few people and properties at risk in this large rural sub-area. People and properties at risk are located in isolated towns and villages scattered throughout the rural region. River flooding is infrequent and the consequences of flooding are low. There are no formal flood defences in this sub-area.

Currently 328 properties within this sub-area are at risk from the 1% annual probability river flood. The properties at risk are concentrated within Blackwater and Chelmer in villages such as Braintree, Bocking and Great Dunmow. Mainly grade three agricultural land

is also at risk from river flooding within this sub-area. Some parts of the A414, A120, A1060 and A12, three electricity sub-stations and three Sewage Treatment Works (STW) are at risk from a 1% annual probability river flood. Tables 4, 5 and 6 detail flood risk to people and property in this sub-area.

Table 4 Risk to people and property within the Coastal Streams during a 1% annual probability river flood, taking into account current flood defences

	Current	Future (2100)
Number of people at risk	48	48
Number of properties at risk	25	25

Table 5 Risk to people and property within Blackwater and Chelmer during a 1% annual probability river flood, taking into account current flood defences

	Current	Future (2100)
Number of people at risk	476	598
Number of properties at risk	220	277

Table 6 Risk to people and property within the Upper Reaches during a 1% annual probability river flood, taking into account current flood defences

	Current	Future (2100)
Number of people at risk	177	216
Number of properties at risk	83	105

The vision and preferred policy

Policy option 2: Areas of low to moderate flood risk where we can generally reduce existing flood risk management actions.

In these rural reaches the current activity to manage flooding is out of proportion with the level of flood risk, or is not effective. In general, overall flood risk management activities will be reduced within the sub-areas, however where flood risk is more concentrated (for example in towns and villages) existing actions to manage flooding may be continued.

The preferred approach is to reduce bank and channel maintenance in some locations. This will enable limited resources to be targeted to other areas of the catchment where the risks are greater, to ensure value for money. The preferred approach will also help improve the flow between the river and its floodplain and so improve wetland and aquatic habitats.

Flood warning is an important way of managing the consequences of flooding throughout the catchment. Therefore, the local flood warning infrastructure (such as river flow gauging stations) needs to be maintained.

The key messages

- Where feasible, flood risk management activities will be reduced as the current activity to manage flooding is out of proportion with the level of flood risk.
- Reducing bank and channel maintenance will help naturalise rivers and improve the flow between the river and its floodplain.
- Maintain flood warning infrastructure (such as river flow gauging stations) to ensure that an effective flood warning service can be provided throughout the catchment.

Proposed actions to implement the preferred policy

General actions across the sub-area:

- Investigate options to cease or reduce current bank and channel maintenance and flood defence maintenance. In addition, changes in land use, development of sustainable farming practices and environmental enhancement should be investigated to mitigate an increase in flooding in the future.
- Encourage planners to develop policies to prevent inappropriate development in the floodplain using measures set out in Planning Policy Statement 25 (PPS25). Any new development should be resilient to flooding and provide opportunities to improve river environments.

Actions specific to Coastal Streams:

- Work with partners to develop emergency response plans for critical infrastructure and transport links at risk from flooding.

Actions specific to Blackwater and Chelmer:

- Continue with the flood warning service including the maintenance of flood warning infrastructure (for example, river flow gauging stations) and public awareness plans.
- Work with partners to develop emergency response plans for critical infrastructure and transport links at risk from flooding.
- Continue maintenance of Hanningfield Reservoir. Essex and Suffolk Water must carry out their duties under the Reservoirs Act.

Actions specific to Upper Reaches:

- Continue with the flood warning service including the maintenance of flood warning infrastructure (i.e. river flow gauging stations) and public awareness plans;
- Work with partners to develop emergency response plans for critical infrastructure and transport links at risk from flooding.

Lower Blackwater and Upper and Mid Tributaries, Mid Colne and Stour

Our key partners are:

Essex County Council

Maldon District Council

Braintree District Council

Witham Town Council

Sudbury Town Council

Colchester Borough Council

Halstead Town Council

Hadleigh Town Council

Wivenhoe Town Council

The issues in this sub-area

This is a large sub-area where there are a number of settlements at risk. Currently 1,183 properties are at risk from the 1% annual probability river flood. The majority of the properties at risk (492) are located within Mid Colne and Stour in villages such as Stratford St Mary, Bures, Bures St Mary, Hadleigh, Nayland, White Colne and Chappel. There is a significant amount of mainly grade three agricultural land at risk in this sub-area. There are sections of A-road, a railway station, four electricity sub-stations and one STW also at risk in a 1% annual probability river flood. The probability of river flooding on the Mid Colne and Stour has been reduced through flood banks at White Colne, the Nayland bypass channel on the River Stour, a flood

storage area upstream of Halstead and flood defences at Stratford St. Mary. The probability of river flooding in the Upper and Mid Tributaries has been reduced through the construction of two brick wall defences at Sudbury, a retaining wall at Finchingfield, and flood storage lagoons at Sible Hedingham. There are no flood defences in the Lower Blackwater part of this sub-area. Tables 7, 8 and 9 detail flood risk to people and property in this sub-area.

Table 7 Risk to people and property within the Lower Blackwater during a 1% annual probability river flood. There are no formal flood defences in this sub-area

	Current	Future (2100)
Number of people at risk	444	527
Number of properties at risk	219	258

Table 8 Risk to people and property within the Upper and Mid Tributaries during a 1% annual probability river flood, taking into account current flood defences

	Current	Future (2100)
Number of people at risk	1,033	1,300
Number of properties at risk	472	602

Table 9 Risk to people and property within the Mid Colne and Stour during a 1% annual probability river flood, taking into account current flood defences

	Current	Future (2100)
Number of people at risk	971	1,122
Number of properties at risk	492	601

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 settlements in this sub-area have been built in the floodplain and as a result have a history of flooding. In the past flood defences have been constructed and maintenance work carried out on the rivers to reduce flood risk. Although flood risk is not expected to increase significantly in the future, as there is a concentration of people and property within the floodplain, it is still feasible and effective to continue with the current level of flood risk management. For the majority of this sub-area this will be achieved by continuing existing flood risk management activities. However, there may be alternative, more appropriate ways to manage flood risk at the current level.

Alternative measures may include reducing flood risk maintenance in parts of the sub-area where there is a low flood risk. Reducing the need for continued maintenance could bring opportunities to improve the environmental quality of local watercourses.

The key messages

- The current level of flood risk management should be continued in this sub-area.
- In some areas there may be alternative, more appropriate ways to manage flood risk at the current level.
- Any new development or re-development should be resilient to all sources of flooding.

Proposed actions to implement the preferred policy

General actions across the area:

- Continue with the flood warning service including the maintenance of flood warning infrastructure (i.e. river flow gauging stations) and public awareness plans.
- Work with planners to influence the location, layout and design of new and redeveloped property. Ensure that only appropriate development is allowed on the floodplain through the application of Planning Policy Statement 25 (PPS25).

Actions specific to Lower Blackwater:

- Continue with the current level of flood risk management to maintain the flow of water through Coggeshall, Kelvedon, Feering and Witham.
- Investigate options to reduce flood risk maintenance activities beyond the settlement boundaries of Coggeshall, Kelvedon, Feering and Witham.
- Reduce the consequences of flooding by improving public awareness of flooding.

Actions specific to Upper and Mid Tributaries:

- Continue with the current level of flood risk management throughout the Upper and Mid Tributaries.
- Work with partners to develop emergency response plans for critical infrastructure and transport links at risk from flooding.

Actions specific to Mid Colne and Stour:

- Continue with the current flood risk management activities.
- Work with partners to develop emergency response plans for critical infrastructure and transport links at risk from flooding.
- Continue maintenance of Abberton Reservoir. Essex and Suffolk Water must carry out their duties under the Reservoirs Act.

Haverhill

Our key partners are:

St Edmundsbury Borough Council

Haverhill Town Council

The issues in this sub-area

This sub-area includes the town of Haverhill and the village of Sturmer. Currently six properties within this sub-area are at risk from the 1% annual probability river flood. The Meldham Washlands Flood Alleviation Scheme (FAS) on the River Stour has reduced the probability of river flooding in Haverhill and Sturmer. There is a small amount of mainly grade one and two agricultural land at risk in this sub-area. There is no critical infrastructure at risk in a 1% annual probability river flood, Table 10 details flood risk to people and property in this sub-area.

Table 10 Risk to people and property within the Haverhill sub-area during a 1% annual probability river flood, taking into account current flood defences

	Current	Future (2100)
Number of people at risk	12	16
Number of properties at risk	6	8

Flood risk in Haverhill is currently very low, because the town is defended to a high standard of protection by Meldham Washland FAS.

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 settlements in this sub-area have been built in the floodplain and as a result have a history of flooding. In the past flood defences have been constructed and maintenance work carried out to reduce flood risk. Although flood risk is not expected to increase significantly in the future, as there is a concentration of people and property within the floodplain, it is still feasible and effective to continue with the current level of flood risk management. This will be achieved by continuing with existing flood risk management activities.

The key messages

- The current level of flood risk management should be continued.
- Continue current flood risk management activities.

Proposed actions to implement the preferred policy

- Continue with the flood warning service including the maintenance of flood warning infrastructure (i.e. river flow gauging stations) and public awareness plans.
- Work with planners to influence the location, layout and design of new and redeveloped property. Ensure that only appropriate development is allowed on the floodplain through the application of Planning Policy Statement 25 (PPS25).
- Continue with the current flood risk management activities.



↑ Haverhill Washlands

River Wid

Our key partners are:

Chelmsford Borough Council

The issues in this sub-area

There are few properties located in this predominantly rural area, therefore the risk to people and property is low. There are only 3 properties at risk from the 1% annual probability river flood. There is a small amount of mainly grade three agricultural land and one STW also at risk from river flooding in this sub-area. Table 11 details flood risk to people and property in this sub-area.

Table 11 Risk to people and property within the River Wid sub-area during a 1% annual probability river flood, taking into account current flood defences

	Current	Future (2100)
Number of people at risk	7	7
Number of properties at risk	3	3

The floodplain in this sub-area can provide an area to store water during flood events. The storage of floodwaters can reduce the impact of flooding to people and properties in urbanised areas downstream. For example, storage of water in the River Wid sub-area may reduce the risk to people and property in Chelmsford. Currently there is low risk to people and property in this sub-area and the storage of floodwaters will not increase this risk.

The vision and preferred policy

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

In this largely rural area the aim is to manage flood risk by maximising the potential of the floodplain to retain water to benefit locations elsewhere in the catchment. Storing water on these floodplains can reduce flood risk to settlements downstream. This approach may involve:

- restoring river channels, water meadows and the natural floodplain;
- reducing runoff from agricultural land;
- structural measures to control water levels and retain more water on the floodplains;
- engineered schemes to store floodwater.

Locally, the floodplain storage areas may provide long-term benefits for the river environment and wetland habitats.

Within this sub-area reducing bank and channel maintenance will increase the ability of the floodplain to store water by improving the flow between the river and its floodplain. However, where flood risk may be more concentrated, such as in towns and villages, existing actions to manage flooding may be continued.

To be able to use the floodplain for flood risk management, planners must prevent development that affects the ability of the floodplain to retain water.

The key messages

- Storing water on the floodplain in this area can reduce flood risk to settlements downstream and provide benefits for the environment and habitats.
- Prevent development that affects the ability of the floodplain to retain water.
- Maintenance work on rivers should aim to increase the capacity of the floodplain to retain water.

Proposed actions to implement the preferred policy

- Implement the recommendations from the Chelmer flood risk study and Chelmsford Flood Alleviation Scheme Viability Study. These studies have investigated creating/developing storage within the River Wid sub-area.
- Identify opportunities where bank and channel maintenance can be reduced to improve the flow between the river and its floodplain to increase water storage on the natural floodplain.

- Continue with the flood warning service including maintenance of flood warning infrastructure (such as river flow gauging stations) and flood awareness plans.
- Encourage planners to develop policies to prevent inappropriate development in the floodplain using measures set out in Planning Policy Statement 25 (PPS25). Any new development should be resilient to flooding and provide opportunities to improve river environments.
- Work with partners to develop emergency response plans for critical infrastructure and transport links at risk from flooding.



↑ River Wid

Chelmsford

Our key partners are:

Chelmsford Borough Council

The issues in this sub-area

This sub-area consists of Chelmsford, a large urban area situated at the confluence of the Rivers Can, Chelmer and Wid. The town centre and residential areas are at risk from flooding from the three watercourses. Currently there are 366 properties at risk from the 1% annual probability river flood. Chelmsford is currently offered some protection from river flood events by a flood alleviation scheme built in 1964. There is some agricultural land at risk and some parts of the A1016, 1099 and A138 at risk in the 1% annual probability river flood. There is a significant amount of mainly grade three agricultural land at risk in the 1% annual probability river flood. Table 12 details flood risk to people and property in this sub-area.

Table 12 Risk to people and property within the Chelmsford sub-area during a 1% annual probability river flood, taking into account current flood defences

	Current	Future (2100)
Number of people at risk	692	1,187
Number of properties at risk	366	649

The vision and preferred policy

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

The risk to this large urban area is high and climate change and further urbanisation, are thought to increase this risk into the future. Historically, defences have been constructed to reduce the probability of flooding. However, flood defences can fail or be overwhelmed and may become less effective in the future. Our focus is to carry out the recommendations of the River Chelmer flood risk study and build a Flood Storage Area (FSA) on the River Wid, upstream of Chelmsford. Alongside the flood storage scheme we would continue to maintain the current defences in Chelmsford. We will also increase awareness and uptake of our flood warning service and continue to work with the local authorities to ensure that new development is appropriate to the flood risk. This policy will help us to reduce the current and future flood risk in Chelmsford.

The key messages

- Where possible, flood risk should be managed by storing water on the floodplain upstream of Chelmsford.
- Redevelopment of floodplain areas is an opportunity to increase their flood resilience.
- Flood awareness plans will be used to manage the consequences of flooding.

Proposed actions to implement the preferred policy

- Encourage planners to develop policies for regeneration to follow the principals of PPS25, incorporate resilience measures so that the location, layout and design of development can help to mitigate residual flood risk and provide opportunities to improve the environment and make space for water.
- Reduce the consequences of flooding by: improving public awareness of flooding; encouraging people to sign up to, and respond to, flood warnings; and by improving local emergency planning for critical infrastructure at risk.
- Implement recommendations from the Chelmer flood risk study and Chelmsford flood alleviation scheme viability study to develop flood storage upstream of the town to manage current and future flood risk.
- Continue current maintenance activities through the town.



↑ River Can, Chelmsford

Colchester

Our key partners are:

Colchester Borough Council

The issues in this sub-area

This sub-area includes the urban area of Colchester. The River Colne has defences through Colchester. Colchester is also protected against tidal surge and flooding by the Colne Barrier which was constructed in 1994. Currently there are 171 properties at risk from the 1% annual probability river flood. There is no agricultural land at risk of flooding, but some parts of the A133 are at risk of flooding in the 1% annual probability river flood. Table 13 details flood risk to people and property in this sub-area.

Table 13 Risk to people and property within the Colchester sub-area during a 1% annual probability river flood, taking into account current flood defences

	Current	Future (2100)
Number of people at risk	338	890
Number of properties at risk	171	453

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.

Historically, flood defences have been constructed to reduce the probability of flooding. In the future the protection given by these defences may decline as future flooding is forecast to become more intense. Flood risk is expected to increase in the future to people and property. It is therefore important to maintain the current level of flood risk into the future. For Colchester the preferred approach is to take further action to sustain the current level of flood risk by upgrading the existing flood defences through the town. This will reduce the risk from overtopping of the defences in the future.

The risk of flooding cannot be completely removed. Other measures need to be taken to manage the consequences of flooding. Flood awareness plans should be produced to encourage people to sign up to and respond to flood warnings. In the long term, flood risk management planning needs to be linked closely with regeneration and redevelopment, so that policies can be put in place to create green corridors, and to incorporate flood resilience measures into the location, layout and design of development.

The key messages

- Maintain the current flood risk by maintaining the defences into the future.
- Any redevelopment of floodplain areas is an opportunity to increase their flood resilience.
- Flood awareness plans will be used to manage the consequences of flooding.

Proposed actions to implement the preferred policy

- Investigate the feasibility of improving the existing defences to manage future flood risk in the town.
- Continue with the flood warning service including the maintenance of flood warning infrastructure for example, river flow gauging stations.
- Develop a flood awareness plan to encourage people to sign up to, and respond to flood warnings. The flood awareness plan will inform people about the risk of defences breaching and the actions they can take to protect themselves and their property.
- Work with partners to develop an emergency response plan for critical infrastructure and transport links at risk of flooding.
- Encourage planners to develop policies for new development and regeneration (including commercial sites) to incorporate resilience measures so that the location, layout and design of development can help to reduce flood risk. Planners should prevent inappropriate development in the floodplain using measures set out in Planning Policy Statement 25 (PPS25), and ensure that any new development does not increase the risk to existing development. Any new development or regeneration should provide opportunities to improve the river environment and make space for water.



↑ River Colne, Colchester

Heybridge

Our key partners are:

Maldon District Council

The issues in this sub-area

Heybridge is a low lying sub-area which is defended from coastal flooding to a high standard but is at flood risk from a number of rivers. Currently, there are 609 properties within this sub-area at risk from the 1% annual probability river flood. There is a small amount of mainly grade three agricultural land at risk in the 1% annual probability river flood, but no critical infrastructure is at risk. Table 14 details flood risk to people and property in this sub-area.

Table 14 Risk to people and property within the Heybridge sub-area during a 1% annual probability river flood, taking into account current flood defences

	Current	Future (2100)
Number of people at risk	322	1,426
Number of properties at risk	609	655

We currently manage the risk of river flooding by the storage of flood waters upstream of Heybridge and the pumping of flood waters. The River Can is pumped into the North Sea when the tide level is high and the river cannot flow freely into the sea through gravity. The benefits of these approaches will reduce in the future as storms are expected to become more frequent and intense.

The vision and preferred policy

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

In this densely populated urban sub-area the preferred approach to manage flood risk in Heybridge, is to do a Flood risk study. This study should look at how we can reduce the flood risk and investigate the possibility of building new flood defences and carrying out channel improvements.

The risk of flooding cannot be completely removed and other measures need to be taken to reduce the flood risk. A flood warning service for river flooding should be developed for Heybridge and flood awareness plans produced to encourage people to sign up to and respond to the flood warnings. In the long term, flood risk management planning needs to be linked closely with regeneration and redevelopment, so that policies can be put in place to create green corridors, and to incorporate flood resilience measures into the location, layout and design of development.

The key messages

- Develop a study for Heybridge to investigate how flood risk in the town should be managed.
- Flood risk management planning needs to be linked closely with regeneration and redevelopment so that the location and layout of development can help to reduce flood risk.
- Flood awareness plans will be used to manage the consequences of flooding.

Proposed actions to implement the preferred policy

- In the short term, continue with the current flood risk management activities.
- Develop a flood risk study for Heybridge. The study should investigate building an earth embankment along Spicketts Brook and channel improvements in Heybridge and Heybridge Basin.
- Flood forecasting and warning study to improve the current flood warning service.
- Develop a flood awareness plan to encourage people to sign up to, and respond to flood warnings. The flood awareness plan will inform people about the risk of defences breaching and the actions they can take to protect themselves and their property.
- Encourage planners to develop policies for new development and regeneration (including commercial sites) to incorporate resilience measures so that the location, layout and design of development can help to reduce flood risk. Planners should prevent inappropriate development in the floodplain using measures set out in Planning Policy Statement 25 (PPS25), and ensure that any new development does not increase the risk to existing development. Any new development or regeneration should provide opportunities to improve the river environment and make space for water.



↑ River Chelmer at Heybridge

Harwich and Clacton-on-Sea

Our key partners are:

Essex County Council

Tendring District Council

Harwich Town Council

Anglian Water

Essex and Suffolk Water

The issues in this sub-area

Currently there are 95 properties within this sub-area at risk from the 1% annual probability river flood. There is a small amount of mainly grade three agricultural land and one railway station at risk in a 1% annual probability river flood. The probability of river flooding in Harwich has been reduced through upstream flood storage and through the Harwich pump station, which pumps the Ramsey River into the North Sea when tide levels are high and the river cannot flow freely to the sea under gravity. There are no flood defences in Clacton-on-Sea. Tables 15 and 16 detail flood risk to people and property in this sub-area.

Table 15 Risk to people and property within Harwich during a 1% annual probability river flood, taking into account current flood defences

	Current	Future (2100)
Number of people at risk	5	7
Number of properties at risk	3	4

Table 16 Risk to people and property within Clacton-on-Sea during a 1% annual probability river flood. There are no formal river flood defences in this sub-area

	Current	Future (2100)
Number of people at risk	205	265
Number of properties at risk	92	120

The vision and preferred policy

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

These settlements have been built in the floodplain and as a result have a history of flooding. In the past flood defences have been constructed and maintenance work carried out on the rivers to reduce flood risk. Although flood risk is not expected to increase significantly in the future, as there is a concentration of people and property within the floodplain, it is still feasible and effective to continue with the current level of flood risk management. This will be achieved by continuing with existing flood risk management activities.

The key messages

- The current level of flood risk management should be continued.
- Continue current flood risk management activities.

Proposed actions to implement the preferred policy

General actions across the sub-area:

- Continue with the current flood risk management activities.
- Continue with the flood warning service including the maintenance of flood warning infrastructure (i.e. river flow gauging stations) and public awareness plans.
- Work with planners to influence the location, layout and design of new and redeveloped property. Ensure that only appropriate development is allowed on the floodplain through the application of Planning Policy Statement 25 (PPS25).

Actions specific to Harwich:

- Work with our partners to put in place the recommendations from the Haven Gateway Water Cycle Study to ensure that water resources and flood risk management issues can be addressed in a sustainable way to accommodate future planned growth.

Actions specific to Clacton-on-Sea:

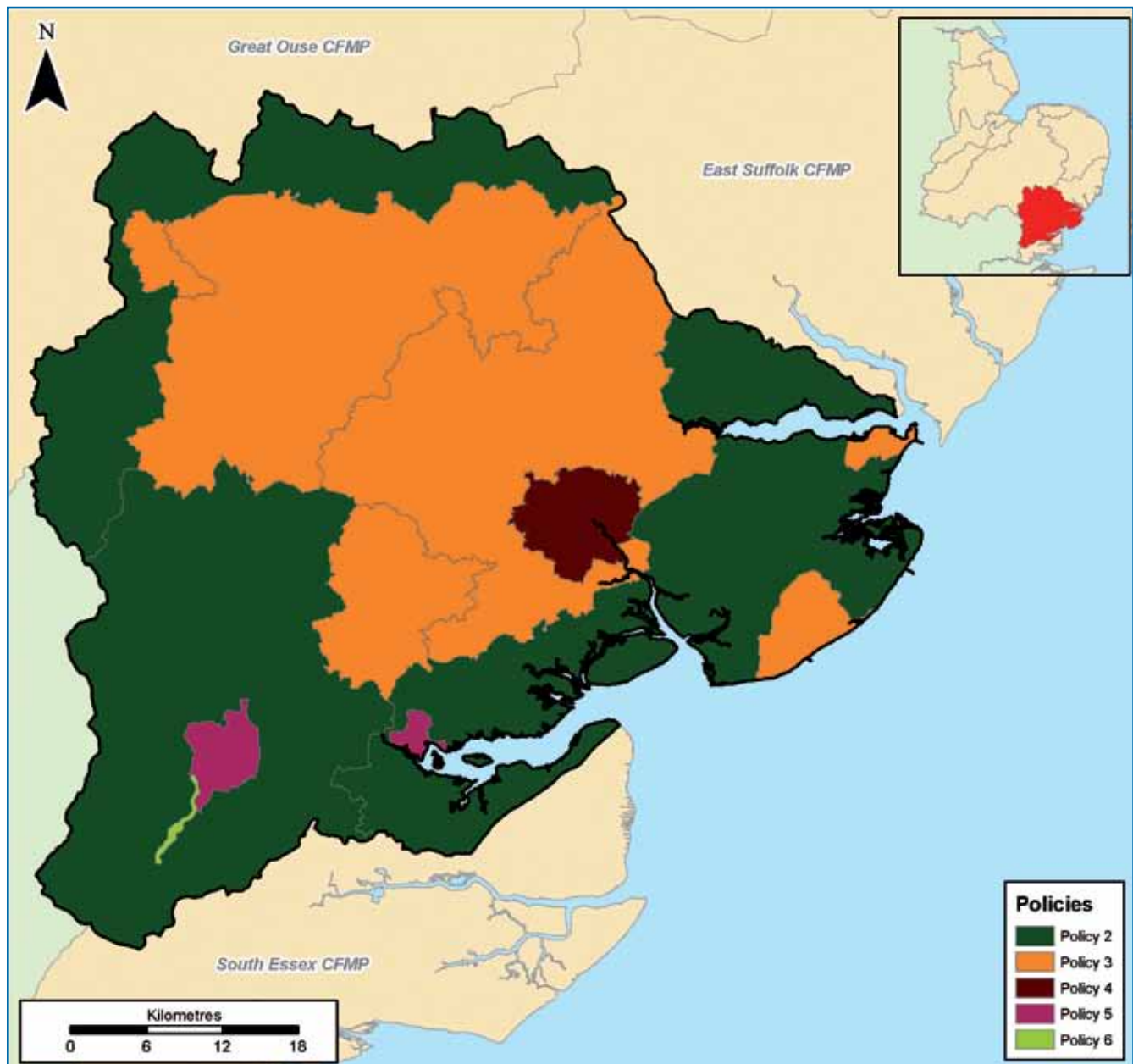
- Work with partners to develop an emergency response plan for critical infrastructure and transport links at risk of flooding.



↑ Picker's Ditch, Clacton-on-sea

Map of CFMP policies

Map 4 The flood risk management policies for the North Essex CFMP area



Notes

Notes

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