

Tees Catchment Flood Management Plan

Summary Report December 2009



managing
flood risk

We are the Environment Agency. It's our job to look after your environment and make it **a better place** – for you, and for future generations.

Your environment is the air you breathe, the water you drink and the ground you walk on. Working with business, Government and society as a whole, we are making your environment cleaner and healthier.

The Environment Agency. Out there, making your environment a better place.

Published by:

Environment Agency
Rivers House,
21 Park Square South,
Leeds, LS1 2QG
Tel: 0870 8506506
Email: enquiries@environment-agency.gov.uk
www.environment-agency.gov.uk

© Environment Agency

All rights reserved. This document may be reproduced with prior permission of the Environment Agency.
ISBN: GENE1109BRCK-E-P December 2009

Introduction



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

The Tees CFMP is one of 77 CFMPs for England and Wales. Through the CFMPs, we have assessed inland flood risk across all of England and Wales for the first time. The CFMP considers all types of inland flooding, from rivers, ground water, surface water and tidal flooding, but not flooding directly from the sea (coastal flooding), which is covered by Shoreline Management Plans (SMPs). Our coverage of surface and ground water is however limited due to a lack of available information.

The role of CFMPs is to establish flood risk management policies which will deliver sustainable flood risk management for the long term. This is essential if we are to make the right investment decisions for the future and to help prepare ourselves effectively for the impact of climate change. We will use CFMPs to help us target our limited resources where the risks are greatest.

This CFMP identifies flood risk management policies to assist all key decision makers in the catchment. It was produced through a wide consultation and appraisal process; however it is only the first step towards an integrated approach to flood risk management. As we all work together to achieve our objectives, we must monitor and listen to each others progress, discuss what has been achieved and consider where we may need to review parts of the CFMP.

The Tees catchment has a long history of flooding with reported flooding dating back over 400 years. Over

the years a number of engineering schemes have been implemented to reduce the risk of flooding in the catchment. At present over 9,600 properties including some key infrastructure buildings are at risk of flooding (not taking into account defences) during the one per cent flood event. In the future due to climate change this number is expected to increase to 11,230.

We cannot reduce flood risk on our own, we will therefore work closely with all our partners to improve the co-ordination of flood risk activities and agree the most effective way to manage flood risk in the future. We have worked with and consulted the relevant local authorities in the catchment and with local bodies such as Natural England in developing this plan.

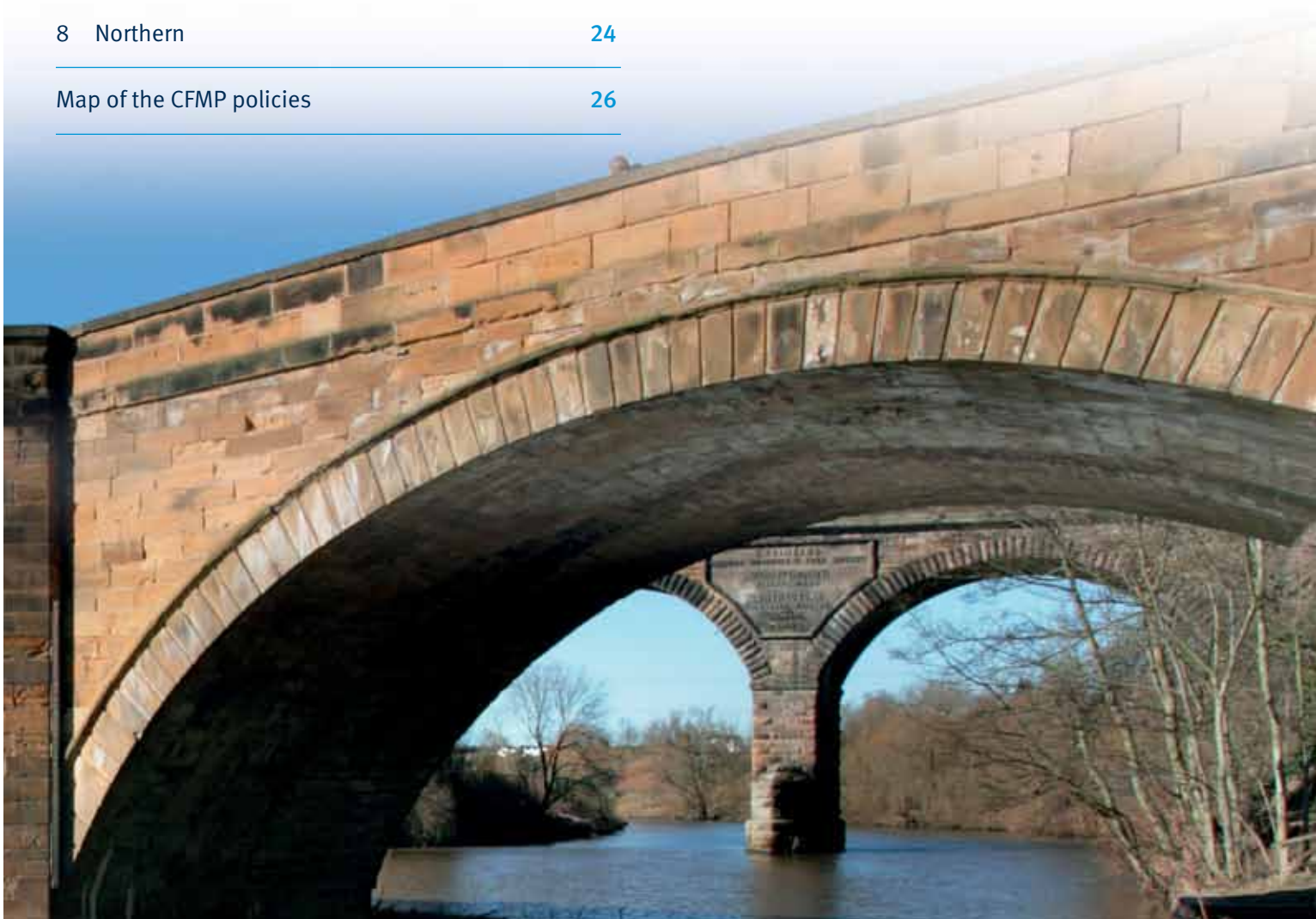
This is a summary of the main CFMP document, if you need to see the full document an electronic version can be obtained by emailing enquiries@environment-agency.gov.uk or alternatively paper copies can be viewed at any of our offices in the North East.

A handwritten signature in black ink, appearing to read 'David Dangerfield', with a long horizontal stroke extending to the right.

**David Dangerfield,
Director – Yorkshire and North East**

Contents

The purpose of a CFMP in managing flood risk	3
Catchment overview	4
Current and future flood risk	6
Future direction for flood risk management	10
Sub-areas	
1 Western	12
2 Middle Tees	14
3 Mid Catchment	16
4 Eastern	18
5 Potto and Swainby	20
6 Halnaby Beck	21
7 Old River Tees	22
8 Northern	24
Map of the CFMP policies	26



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:

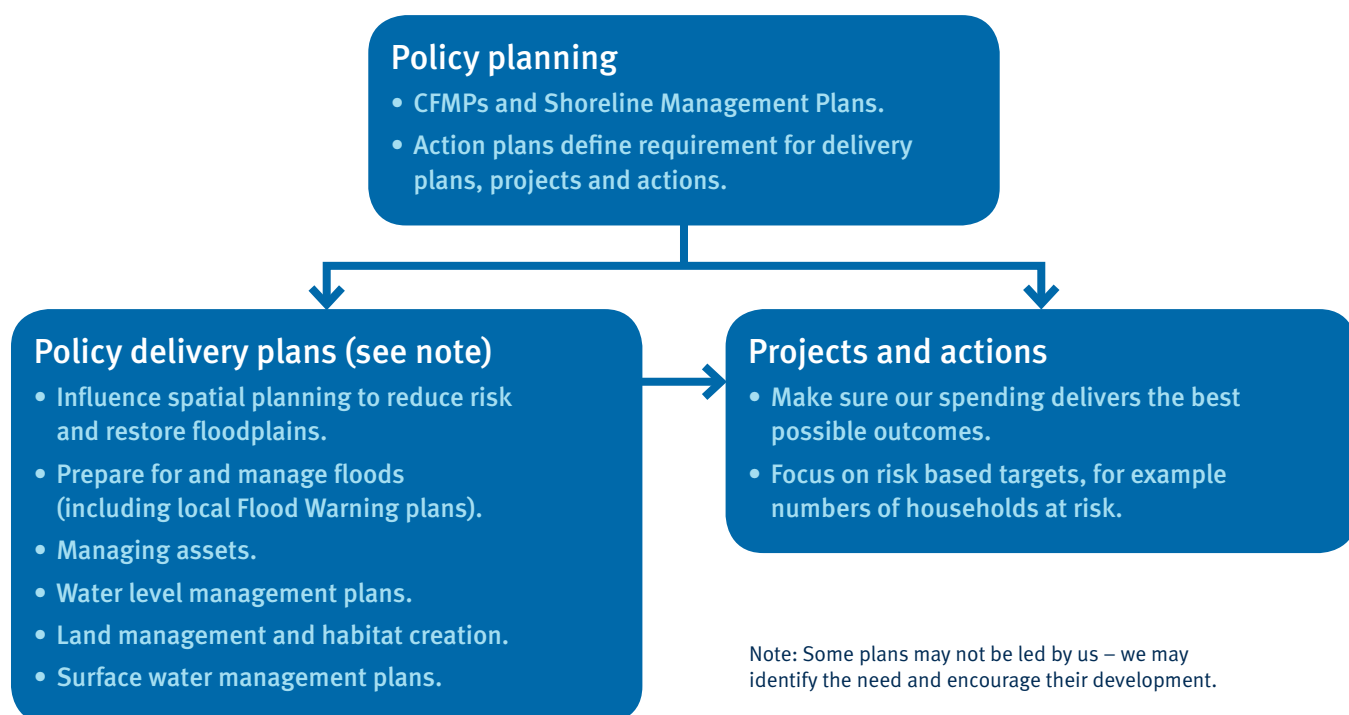
- The Environment Agency, who will use the plan to guide decisions on investment in further plans, projects or actions;
- Regional planning bodies and local authorities who can use the plan to inform spatial planning activities and emergency planning;

- 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 Tees catchment is located in the north east of England. It has three main rivers, the River Tees, the River Skerne and the River Leven.

The River Tees drains the eastern slopes of Cross Fell in the Pennines and flows eastward to the North Sea. The length of the channel from source to sea is approximately 160 kilometres. The catchment has areas with distinctly different characteristics. The rivers in the Upper Tees have steep channel gradients and valley sides. In the mid-catchment, the valley widens out and channel slopes become much gentler. The lower catchment is close to sea level and predominantly tidal in nature. The Tees Barrage forms an artificial barrier between the Tees Estuary

and the upstream catchment. This helps maintain water levels for amenity purposes and eliminates tidal effects further upstream.

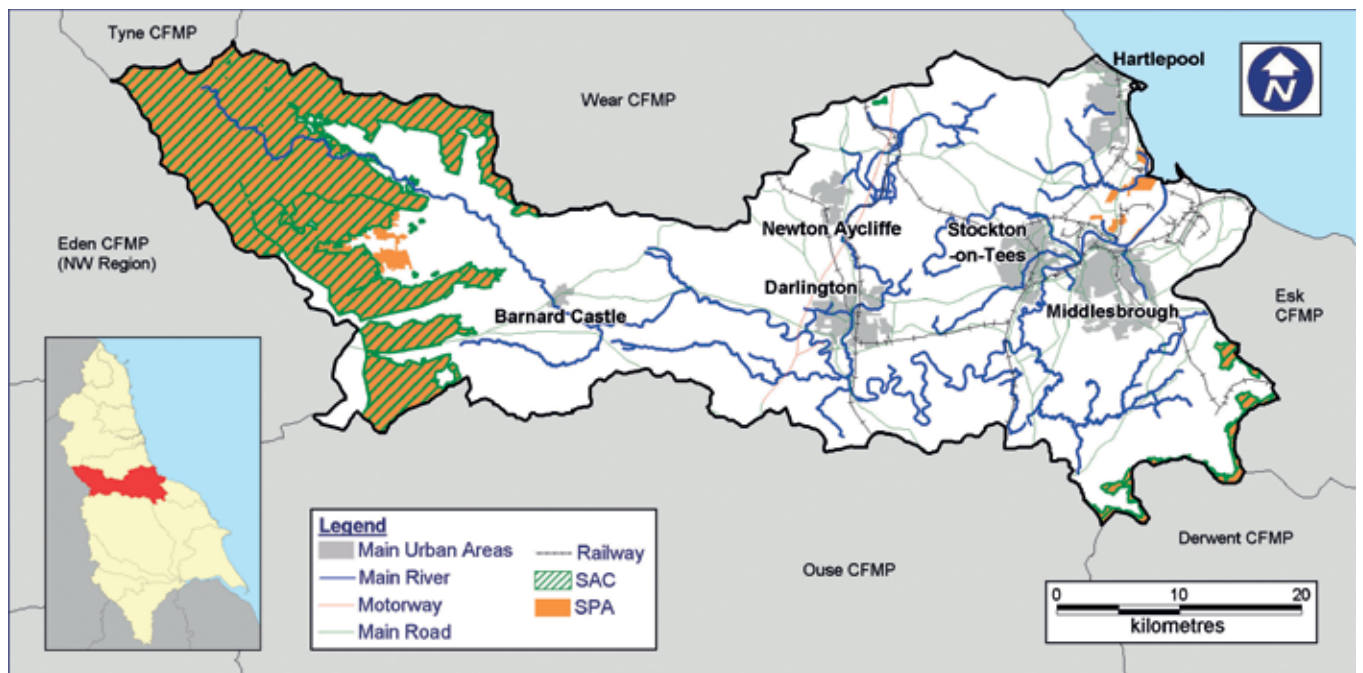
The River Skerne is characterised by wide, flat floodplains and gentle slopes. The River Leven is narrowly confined with limited floodplain development.

Land use in the west of the CFMP area is predominantly moorland and pasture. On the lower slopes and middle catchment the land use changes to a greater amount of pasture and woodland. To the east land use is mainly arable farmland interspersed with large built up areas, including Middlesbrough and Stockton-on-Tees.

The CFMP area contains a large number of designated environmental sites covering a wide range of natural, archaeological and heritage sites. The upper part of the catchment is almost entirely within the North Pennines of Natural Outstanding Beauty (AONB). There are 56 Sites of Special Scientific Interest (SSSI), five Special Area of Conservation (SAC), and three Special Protection Area (SPA) can be found in the headwaters and throughout the catchment.

Approximately 687,000 people live within the CFMP area concentrated in the main towns of Darlington, Hartlepool, Middlesbrough, Redcar and Cleveland, and Stockton-on-Tees.

Map 1 Location and extent of the Tees CFMP area



Current and future flood risk

Overview of the current flood risk

The risk of flooding can be broken down into two parts; The chance (probability) of a particular flood and the impact (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 one per cent flood has a one per cent chance or 0.01 probability of occurring in any one year. Within this document the figures for flood risk are shown as the one per cent flood assuming no formal flood defences and are taken from broadscale mathematical modelling of the catchment. This gives a higher number of properties than will flood during events as the presence of defences will reduce the risk of flooding.

Within the Tees CFMP area flooding is experienced from a number of sources, high rainfall and snowmelt results in high river flows which causes flooding throughout the catchment. In the estuary high tides can result in flooding in the low lying areas around the estuary. In the urban areas intense rainstorms can overwhelm the drainage systems and result in surface water flooding.

There is a long history of flooding within the Tees Catchment on most of the main rivers in the catchment. Flooding in Croft, Neasham and Yarm has been recorded as far back as 1684 following heavy rainfall and large snowmelt events. Flooding in Darlington from the Skerne and Stocksley from the Leven are well documented. Engineering works have been carried out in all of the above areas within the last century to reduce the risk of flooding in all these areas but risk will still remain.

What is at risk?

Within the Tees catchment the main consequences of flooding occur in the urban areas of the catchment.

In total there are almost 8,500 residential properties and over 1,200 commercial properties at risk of flooding. This means almost three per cent of the catchment population is at risk from the one per cent flood event.

Flooding has a neutral impact on 11.21 kilometre squared of SSSI, 8.23 kilometre squared of SAC and 10.1 kilometre squared of SPA and a positive impact on 0.07 kilometre squared SSSI in the CFMP area. Additionally there are 19 Ancient Monuments and 0.78 kilometre squared of registered parks and gardens at risk of flooding in the catchment. The impact of flooding on these assets has not been fully assessed as the modelling used is not the best tool for assessing the impact on specific small structures and sites.

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

Number of properties at risk	Locations
> 1,000	Tees Mouth
500 to 1000	Darlington, Billingham
100 to 500	Croft-on-Tees, Yarm, Stokesley
50 to 100	Neasham, Newton Aycliffe
25 to 50	Teeside Park

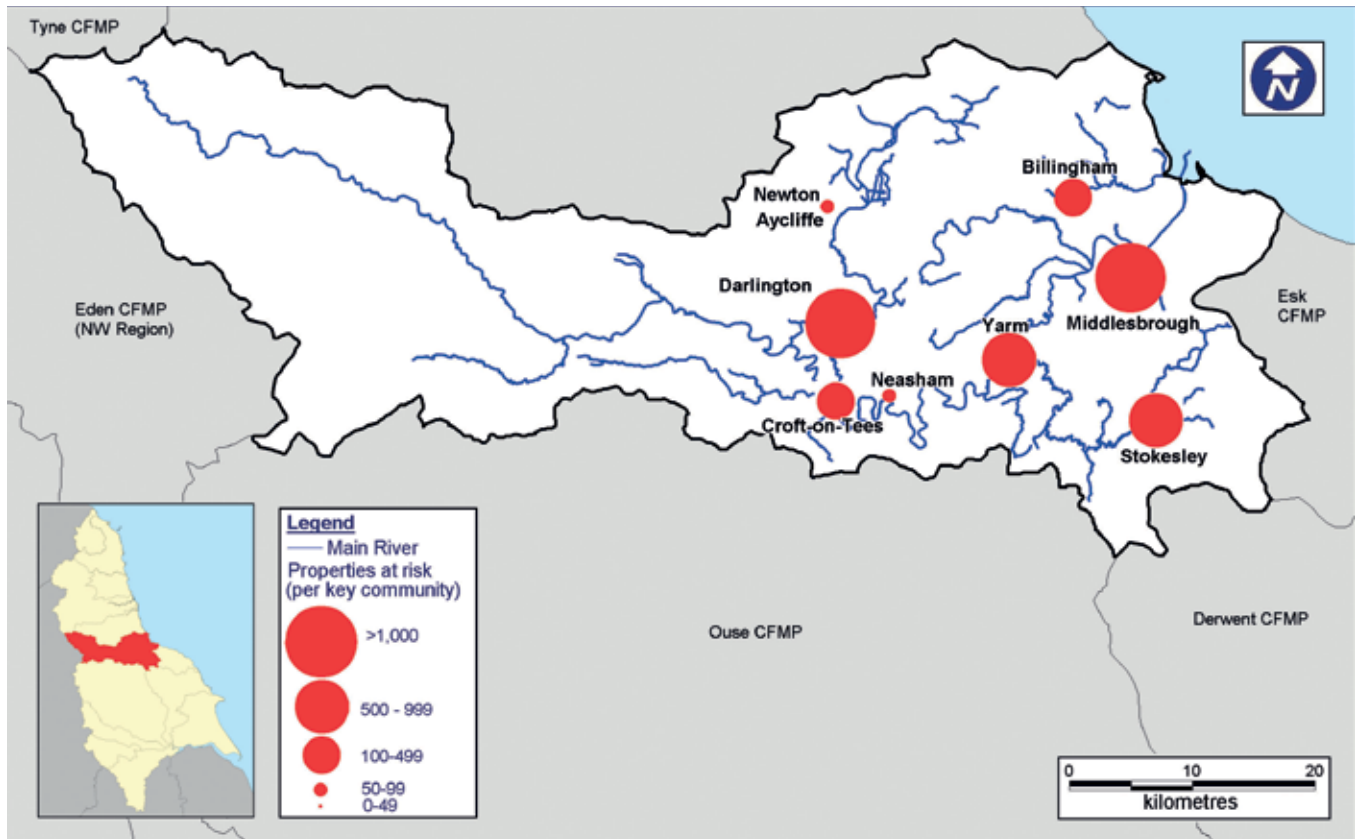
Where is the risk?

The majority of the flood risk within the Tees Catchment is located in the east of the catchment around the areas of Redcar, Hartlepool, Middlesbrough, Darlington, and Stockton-on-Tees. The areas to the west are generally less populated and as a result there are fewer people and properties at risk in these areas, although flooding may still occur regularly the consequences of the flooding is much lower.

Table 2 Critical infrastructure at risk:

82 gas and electricity assets
5 wastewater treatment works
15 healthcare facilities
12 educational facilities
4 emergency service facilities

Map 2 Properties at risk of flooding in the Tees catchment



How we currently manage the risk in the catchment

Our activity is prioritised on a risk basis. Our main activities include:

- **Flood risk mapping** to gain a more detailed understanding of flood risk in localised areas. This includes recording the extents of large floods in the catchment and then mapping these on GIS systems. Where more detail on flood risk is required this team will commission detailed computer modelling of the river systems.
- **Maintenance of existing defences and structures** prioritised on a risk basis to ensure the effectiveness of our assets. Within the Tees catchment there are over 88 kilometres of maintained raised defences and over 750 kilometres of maintained river channel, without which the flood risk would be much greater in the catchment. The Environment Agency carries out regular maintenance such as grass and vermin control, maintenance and inspection of defences and channel clearance in the Tees catchment.
- **Capital schemes** to create new flood defences and replace existing ones where flood risk is identified as being high and where a cost effective solution can be installed.
- **Flood forecasting and warning** to make the emergency responders and the public aware of predicted river and coastal flooding. Within the catchment there are more than 20 specific locations where we offer a focussed flood warning service.
- **Development control** to prevent inappropriate development in flood risk areas and regulate the work of others to ensure that flood risk and environmental issues are not detrimentally effected.
- **Strategic planning** to plan sustainable long term investment on a risk basis including the development of Catchment Flood Management Plans.

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 (e.g. development), and changes in how land is managed. Within the Tees Catchment the major catchment floods are generated by large frontal storm events, while development pressure is significant in the catchment this will likely increase the consequences of flooding and not be a cause of the flooding. For the future flooding scenario within the Tees Catchment we have concluded that climate change will be the main issue to consider. The key trends are:

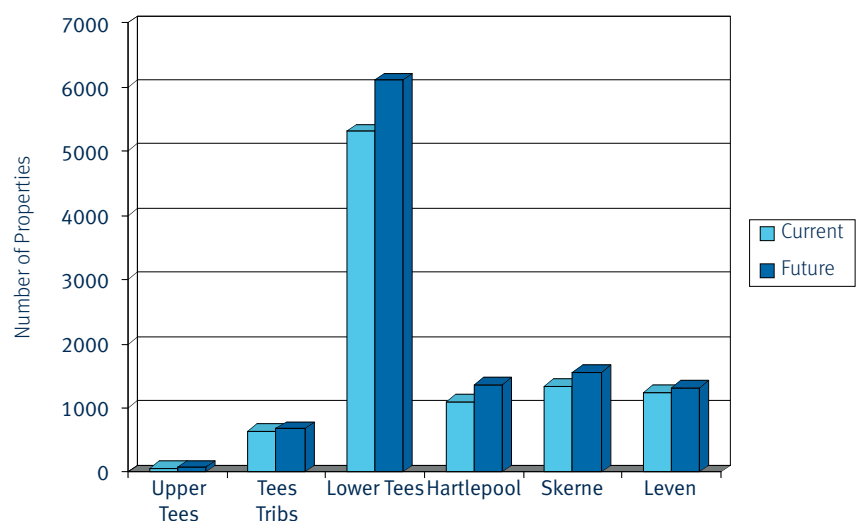
- More frequent and intense storms causing more widespread and regular flooding from drainage systems and some rivers;
- Increased winter rainfall increasing the likelihood of large-scale flood events.

We followed recommended guidance of applying a 20 per cent increase in river flows in estimating the likely impacts of climate change on the catchment. In addition rising sea levels will increase the risk of flooding in and around the Tees Mouth.

The future will not bring the same increase to the risk of flooding to all parts of the Tees CFMP area with the eastern urban areas being most sensitive due to the low lying land, tidal influence, built development and the increased rainfall intensity which will raise the risk of surface water flooding in urban areas. As a result of climate change the numbers of properties are expected to increase to over 11,000 at the one per cent flood. As the frequency of flooding increases there are larger increases in lower flood events as can be seen on the graph below for residential properties throughout the catchment.

The vast majority of this increase will be in the existing urban areas around Darlington, Middlesbrough and Stockton-on-Tees amongst others. Added to this is the development pressure on the existing urban areas in the catchment. The Teesside area is currently identified as a growth point with future development being directed into the area. This may increase further the numbers of properties at risk in the future.

Figure 2 Future increase in properties at risk of flooding in the Tees Catchment by sub-catchment



Future direction for flood risk management

Approaches in each sub-area

Flood risk is not the same in all of the catchment. We have divided the Tees catchment into eight 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.

In the following sections we outline the approach in each sub-area by highlighting:

- Key issues and messages for each sub-area;
- Our policy and vision for future management;
- Key actions to deliver the policy.

Map 3 Catchment policy decisions

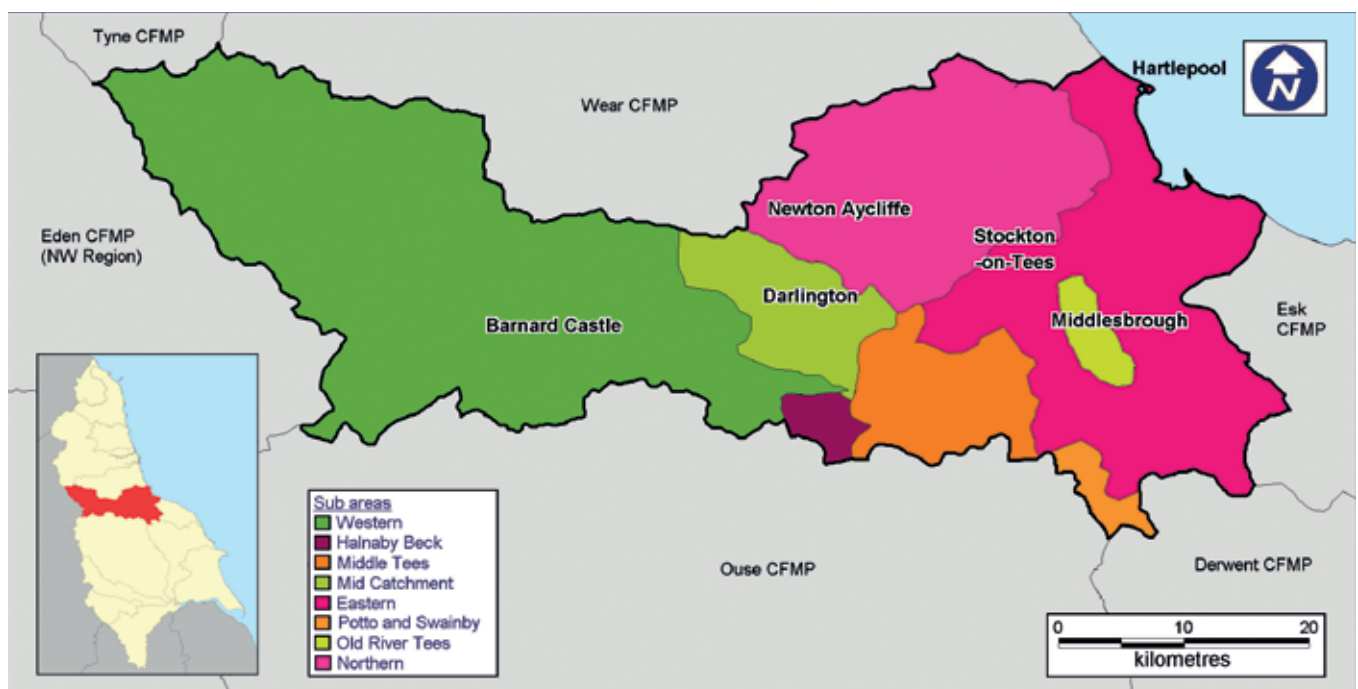


Table 3 Policy options

→ 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.

Western

Our key partners are:

Northumbrian Water

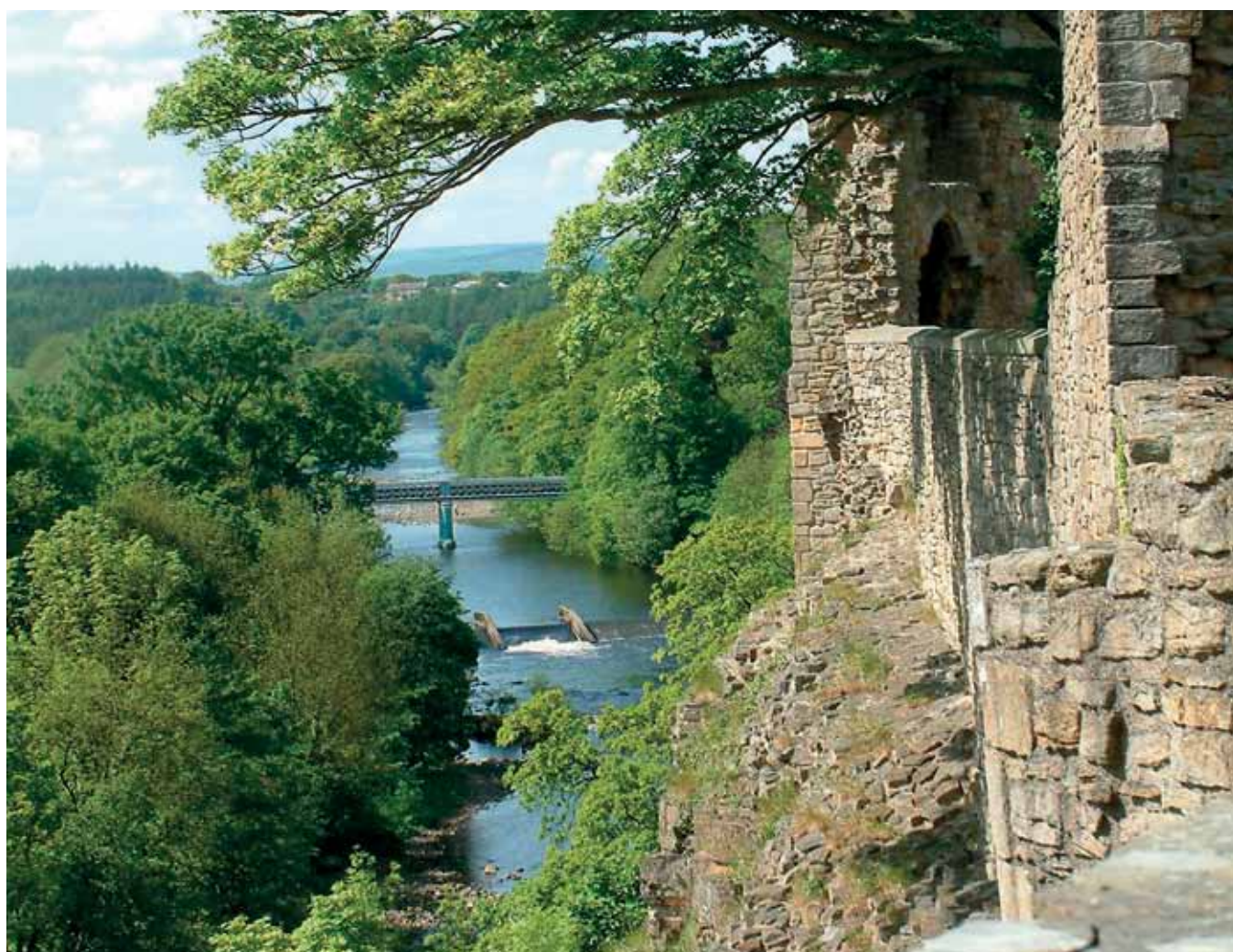
Durham County Council

Highways Agency

The issues in this sub-area

This large sub-area includes the upland River Tees and the upland tributaries of Langley and Clow Beck. While largely rural there are a number of settlements at risk of flooding such as Barnard Castle, Staindrop, Newbiggin and Barton. Based on the 1.3 per cent flood there are a total of 329 properties presently at risk of flooding in the

sub-area. In the future flooding scenarios this rises to 357 for the 1.3 per cent flood. There are a number of key water supply reservoirs in the sub-area. The steep catchment makes the area susceptible to intense rainfall, which can result in the very quick onset of flooding in the sub-area.



The vision and policy

Policy Option 3 has been chosen for the western sub-area. Our broadscale modelling has identified areas where risk may be higher than currently thought, we will need to investigate these areas such as Barton and Barnard Castle further. Once detailed knowledge of flood risk is established we may need to allocate an alternative policy to this sub-area.

There are areas where we pump agricultural drainage, this practice will need reviewing to see if a more natural flow regime is beneficial locally and downstream.

The creation of wet woodlands may slow flows in the sub-area providing local floor risk reduction.

The key messages

- There are a number of watercourses that are at risk of flash flooding which gives very little lead time before a flood.
- The Upper Tees flows are influenced by the presence of water supply reservoirs.
- There is an opportunity to improve the upland environment, which will also reduce runoff.
- The risk of flooding in the future is expected to increase as a result of climate change.
- Careful consideration is needed regarding the impacts of pumping regimes.

Actions to implement the policy

- Seek to carry out land management techniques such as gill planting and moorland grip blocking across the upland area of the sub-area to reduce run-off.
- Ensure all reservoirs have flood plans.
- Investigate the impact of climate change on winter snowfall patterns.
- Carry out a more detailed investigation to validate the level of flood risk in the sub-area, in particular near Staindrop, Barton and on the A1 motorway.
- Investigate redesigning culverts as part of this produce a culvert register to ascertain: ownership, location, capacity, and condition.
- Development of a system asset management plan including a maintenance programme for the rivers and assets in the sub-area.
- Seek to carry out agricultural land management changes to reduce run-off, such as pond creation, buffer strips, or a reduction in drainage.

Middle Tees

Our key partners are:

Local Authorities

Northumbrian Water

Property owners

The issues in this sub-area

Within this sub-area Neasham and Yarm are at risk of flooding from the River Tees and Neasham Stoll. There are in total 815 properties identified as at risk of flooding in the sub-area assuming no defences. However there a number of good flood defence structures in the area which protect to between the two per cent and one per cent flood. There are problems with the sewer system and urban drainage

in Yarm which can lead to flooding in the town during heavy rainfall. We managed risk through raised defences, channel maintenance and a flood warning service. It is thought that the risk of flooding will increase in the future as a result of climate change with an additional 96 residential properties identified as at risk with no defences. Again the current defences reduce this number.



The vision and policy

Under **Policy Option 6** we will use the natural floodplain in the lower rural sections of the sub-area to store water to help manage risks further downstream. The main areas at risk of flooding are Neasham and Yarm, although they both benefit from flood defences, there is a need to use flood management activities to reduce risk. However, new defences are not justified due to cost and environmental impact. We may withdraw from maintenance of rural defences where this may result in benefits in the urban areas. Flood risk management expenditure will be prioritised using a risk based approach.

The key messages

- Yarm and Neasham are the main communities at risk.
- There are a large number of culverts within Yarm, which have the potential to be redesigned. Channel maintenance on the smaller watercourses would reduce the build up of debris that can cause blockages on the culverts.
- Further development in the area would benefit from the assistance of development control.

Actions to implement the policy

- Investigate optimising existing storage areas on the floodplain to reduce risk to Neasham and Yarm. Seek to carry out the preferred option if economically justifiable.
- Raise awareness of the risk of flooding across the sub-area. We will work with partner organisations to advise residents at risk about the possible effects of flooding and how they can prepare. We will encourage residents to sign up to our flood warning service.
- Review sewer and drainage structures in Yarm to ensure adequate capacity is in place and flood risk is not exacerbated.
- Development of a system asset management plan. Withdrawal of agricultural defences that do not protect people and property needs to be reviewed.
- Ensure there is no inappropriate development within the floodplain in line with PPS25. New development and redevelopment plans should incorporate sustainable urban drainage systems.
- Encourage best farming practices and crop management to reduce surface runoff and soil erosion.

Mid Catchment

Our key partners are:

Local Authorities

Highways Agency

Natural England

The issues in this sub-area

Within this sub-area the main risk comes from the River Skerne through Darlington where it meets the River Tees at Croft-on-Tees. Historic flooding has occurred in both Darlington and Croft-on-Tees at regular intervals and while engineering works have been carried out to reduce the risk, the risk of flooding is still high in both locations. For instance in Croft-on-Tees there are presently

143 properties at risk during a 1.3 per cent flood rising to 201 in future flood risk scenarios. While in Darlington work to reduce the risk of flooding from West Beck would be beneficial. As with many urban areas there are surface water flooding issues, especially when the River Skerne is high and prevents the drainage system from discharging effectively.



The vision and policy

Under **Policy Option 5** we will aim to reduce the risk of flooding in the sub-area. In the rural areas, more natural flooding of the floodplain would benefit both the environment and flood risk communities downstream. New or improved flood defences through Darlington and Croft-on-Tees may be needed under this approach.

Any consideration to increase the standard of protection may have an effect downstream by increasing the probability of flooding and could be detrimental in terms of visual amenity. Therefore, further investigation is needed relating to the provision of future flood defences and structures.

Further action to reduce the risk along West Beck would be justified, as this could be achieved through a programme of targeted runoff reduction measures to agricultural land upstream of the risk areas.

The key messages

- Upstream of Croft-on-Tees there is an option to reconnect the floodplain and add artificial storage behind the agricultural defences.
- The actions to manage the risk of flooding in this area will be linked to and may take place in upstream areas.
- Flooding in the central area of Darlington could significantly affect key transport links.

Actions to implement the policy

- A feasibility study of the potential to install flood defences in Darlington and to protect the main roads including the A1.
- Review sewer and drainage capacity in Darlington to relieve pressure on watercourses and drains that are at capacity. Enhance capacity if economically justifiable.
- Investigate redesigning culverts along West Beck.
- Ensure all emergency service facilities, health care facilities and energy utility facilities that are at flood risk have contingency arrangements in place.
- Development of a system asset management plan for the sub-area.
- Maintain and where possible improve take up of our flood warning service in Croft-on-Tees.
- Work with landowners to develop opportunities for improved floodplain storage where possible and appropriate for flood risk management purposes.
- Seek to influence sustainable land management techniques to help to reduce runoff such as buffer strips or a reduction in drainage.

Eastern

Our key partners are:

Northumbrian Water

Local Authorities

The issues in this sub-area

This sub-area contains the majority of the urban development within the Tees CFMP area. It includes the areas in and around Hartlepool, Middlesbrough and Stockton-on-Tees. In total around 4,750 properties lie within the one per cent undefended floodplain within the sub-area. As an area identified as a growth point there is development pressure in the

sub-area which may increase risk of flooding in the future. Under the climate change future flooding scenario risk to properties increases by around 10 per cent in the lower Tees area.

In addition to river flooding the urban areas suffer surface water flooding problems from the drainage systems, these are present in this sub-area.



The vision and policy

By following **Policy Option 5** we will address the high risk of flooding within the sub-area. Risk will increase over time due to climate change and future development, we will seek to reduce risk in this sub-area. We will encourage the development of Surface Water Management Plans and work with the Local Authorities and water companies to reduce surface water flooding. We will implement the findings of the Tees Tidal Strategy and install defences if economically and environmentally sound. Implementation of PPS25 will assist in managing future increases in properties at risk of flooding.

The key messages

- Part of the sub-area is at risk from the North Sea. Future sea-level rise may lead to the need for greater storage in the system.
- Many urban watercourses have been culverted or the channels have been straightened or confined by development leading to high urban flood risk.
- There is development pressure in this sub-area, and rising sea-level and climate change is predicted to increase the risk of flooding.

Actions to implement the policy

- Development of a system asset management plan for flood defences and channel maintenance programme.
- Do a study to ascertain exact level of flood risk to Stokesley and Hartlepool. Carry out any improvements if economically justifiable.
- Ensure all emergency plans are up to date and consider impact of potential risk to communities of a site designated under the Control of Major Accident Hazards Act 1999.
- Carry out investigation of risk in High Tunstall in partnership with water companies.
- A programme investigating the culverts would be beneficial to develop adequate maintenance plan and reduce the risks on Newham Beck and Marton West Beck.
- Deliver actions specified by the Tees Tidal Flood Risk Management Strategy, and the Middlesbrough Beck Project.
- Investigate option of providing flood storage to help reduce the risk of flooding.
- Promote the development of a surface water management plan to identify and manage the risk of flooding.
- Produce a culvert register to ascertain ownership, location, capacity, and condition.

Potto and Swainby

Our key partners are:

Local Authorities

The issues in this sub-area

The main locations at risk are the villages of Potto and Swainby, here risk comes from Potto/Swainby Beck. The level of risk has been questioned by those with local knowledge.

This area responds rapidly to flooding as it is sensitive to intense rainfall. There are no formal flood

defences. There are presently 170 properties identified as at risk during the 1.3 per cent undefended flood this rises to 177 properties in future flooding scenarios. However, this broadscale modelling may not reflect true flood risk and further work is required to identify an accurate risk of flooding.

The vision and policy

Under **Policy Option 3**, we will continue with existing actions such as channel maintenance and providing a flood watch. The risk of flooding needs to be better understood and the work in the short to medium term will focus on gaining a full understanding of the risk associated with the communities of Potto and Swainby.

The key messages

- This catchment in this sub-area has a rapid response to flooding and is prone to intense rainfall.
- The main channel of Potto/Swainby Beck is currently cleared to remove any possible obstructions. However, the watercourse is natural except for some small scale culverting.
- The risk of flooding is only expected to increase slightly in the future.

Actions to implement the policy

- Do a more detailed investigation to determine the level of flood risk in Swainby and Potto.
- Ensure there is no inappropriate development within the floodplain in line with PPS25.
- Development of a system asset management plan for the flood defences and channel maintenance programme.

Halnaby Beck

Our key partners are:

Land owners

The issues in this sub-area

This sub-area is very rural with a small population residing within it. There are currently three properties identified as at risk within the sub-area and there is the potential for one additional property to be at risk

in the future. We currently do not carry out any flood risk management within the sub-area. There is no critical infrastructure at risk now or in the future.

The vision and policy

Under **Policy Option 1**, we will allow natural processes to establish. We will continue to monitor and advise those people at risk. The planning process will ensure that future development and redevelopment takes place out of the floodplain and that the level of risk will not increase in the future as a result of development.

The key messages

- Encouraging residents to be prepared and protected from flooding will be an effective option for reducing flood damage to properties in the area. This is because of the low number of properties at risk.
- The risk of flooding is not expected to increase in the future.
- A number of small areas of woodland are scattered around the area. Any change to this woodland is likely to have little impact on the risk of flooding.

Actions to implement the policy

- Ensure there is no inappropriate development within the floodplain in line with PPS25.
- Provide information on request on improving flood resilience and proofing of individual properties.

Old River Tees

Our key partners are:

Northumbrian Water

Local Authority

Highways Agency

The issues in this sub-area

The area is subject to tidal and river flooding from the Old River Tees. There is some flood risk from the sewer and drainage system. There are notable concentrations of properties at risk in Teesside Retail Park. We currently have flood defences near Teesside Retail Park which reduces the risk of flooding and provides a high standard of protection.

There are 30 properties potentially at risk in the retail park and this doesn't increase with climate change, however this is subject to the defences protecting the areas being maintained.



The vision and policy

Under **Policy Option 3**, we will continue with existing actions to protect people and property. We will work with our partners to understand more fully the risk from flooding from all sources. The flood defences that protect Teesside Retail Park are at an appropriate level given the current and future risk of flooding from rivers. There is a need to investigate the tidal risk of flooding and use the Tees Tidal Strategy once completed to reassess the policy.

Once the risk from other sources has been verified it is likely that action will need to be taken in the future to reduce the level of risk.

The key messages

- Because there is high levels of protection in this sub-area the risk of flooding is low to properties.
- This sub-area forms part of the Tees Tidal Strategy area. of the Tees Tidal Strategy area. There are proposals to build a barrage structure at the mouth of the Old River Tees.
- Local knowledge and the developing Tees Tidal Strategy has outlined that there is risk of tidal flooding in this sub-area, there is a need to investigate the tidal risk.

Actions to implement the policy

- Increase knowledge of the risk of flooding from other sources.
- Raise awareness of the risk of flooding across the sub-area. We will work with partner organisations to advise residents at risk about the possible effects of flooding and how they can prepare.
- Ensure emergency flood plans and business continuity plans are up to date.
- Deliver actions specified by the Tees Tidal Flood Risk Management Strategy when finalised.
- Ensure there is no inappropriate development within the floodplain in line with PPS25, in particular near Teesside Retail Park.
- Any new development and redevelopment, in particular around Teesside Retail Park will require run-off reduction measures.
- We need to work with Northumbrian Water to develop surface water management plans, which cover the risk to the A66.

Northern

Our key partners are:

Land owners

Network Rail

Local Authorities

The issues in this sub-area

This sub-area includes the areas around Stockton -on-Tees and Billingham and some of the smaller tidal watercourses draining into the River Tees.

In the west of the sub-area the rural upper River Skerne has a number of agricultural pumping stations.

There are a number of flood defences which reduce the risk in the sub-area but there are still 458 properties presently at risk of flooding and this rises to 499 in the future. Flooding is experienced from river and tidal sources and in the urban areas there are some reported surface water issues.



The vision and policy

The level of flood risk within the sub-area warrants continued flood risk management actions in accordance with **Policy Option 3**. We will continue to maintain flood defences in the sub-area. We will seek opportunities to reduce pumping in the upper Skerne where justified and will reallocate the savings into alternative management within the sub-area although this action will need to be discussed in detail with National Rail to ensure the East Coast Mainline is not adversely effected. Where possible we will also seek to manage runoff in the rural parts of the catchment to provide some additional benefits to the urban areas.

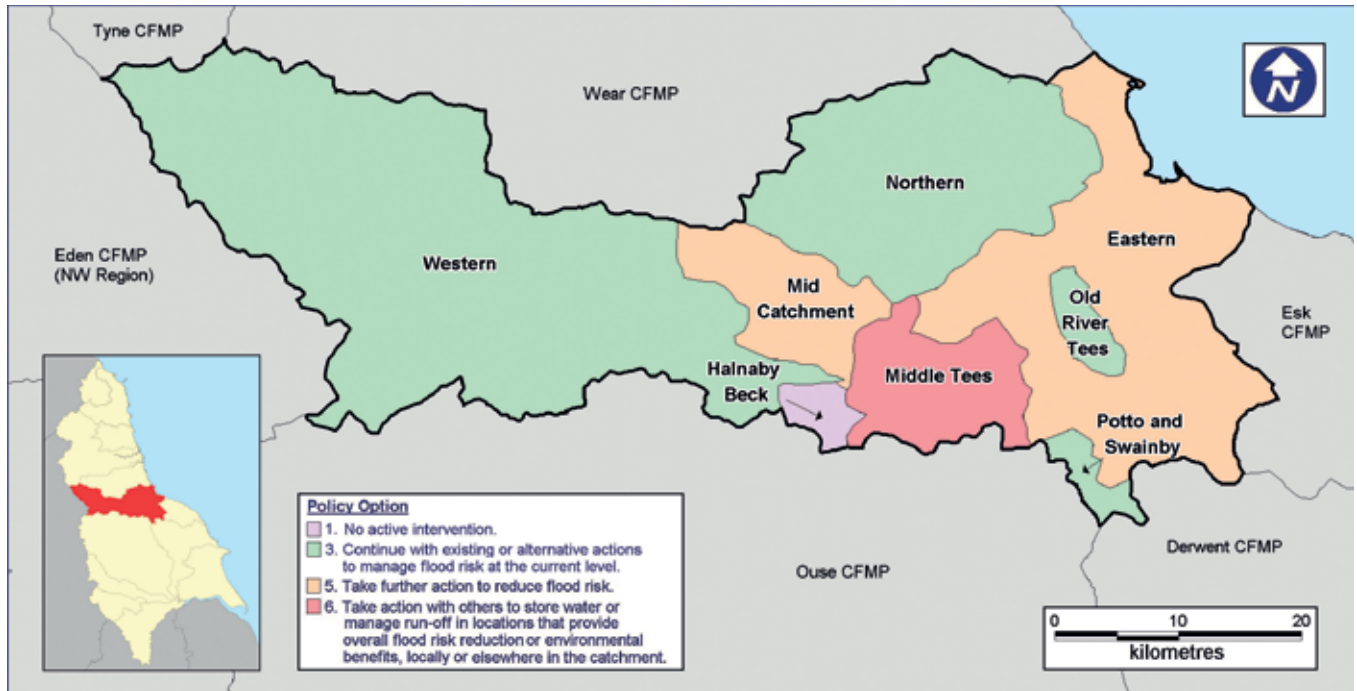
The key messages

- Through reducing or not continuing agricultural pumping this would give benefits to Aycliffe Village, Coatham Mundeville and Barmpton, and to the Lower Skerne.
- There is scope to increase the amount of upstream storage. In doing this, further wetlands and habitats may be created.
- By reducing the speed of flows, the risk to properties downstream could be reduced.
- Crookfoot reservoir is situated on Claxton/North Burn, but it is thought to have little influence on the control of flood generation within the sub-area.

Actions to implement the policy

- Work in partnership with Network Rail to agree the future maintenance programme of Network Rail's mainline railway, which runs through Mordon Stell System.
- Ensure flood risk management assets, including culverts, are managed by all operating authorities in accordance with a coordinated strategic asset management plan.
- Investigate option of utilising flood storage or wetland creation to help reduce the risk of future flooding at Stockton-on-Tees and elsewhere.
- Investigate condition and design of trash screens and culverts. As part of this produce a culvert register to ascertain ownership, location, capacity and condition.
- Development of a system asset management plan for the flood defences and channel maintenance programme.
- Seek to influence sustainable land management techniques through working with farmers and landowners.
- Investigate the potential of using Crookfoot reservoir for additional storage to reduce river flows.

Map of CFMP policies



**Would you like to find out more about us,
or about your environment?**

Then call us on

08708 506 506* (Mon-Fri 8-6)

email

enquiries@environment-agency.gov.uk

or visit our website

www.environment-agency.gov.uk

incident hotline 0800 80 70 60 (24hrs)

floodline 0845 988 1188

*** Approximate call costs: 8p plus 6p per minute (standard landline).
Please note charges will vary across telephone providers.**



Environment first: This publication is printed on paper made from 100 per cent previously used waste. By-products from making the pulp and paper are used for composting and fertiliser, for making cement and for generating energy.