

West Cornwall Catchment Flood Management Plan

Summary Report June 2012



managing
flood risk

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June 2012

Introduction



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

The West Cornwall 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.

Flood risk affects people and property across the West Cornwall catchment, but particularly in the areas of Hayle, Helston, Par and St Blazey, Penzance, Perranporth, St Austell, St Ives and Truro. Various flood events have demonstrated that while the numbers of properties at risk across West Cornwall may be relatively low compared with other areas of the country, the risk to life, and community disruption caused by flooding can be significant.

We cannot reduce flood risk on our own, we will therefore work closely with all our partners to improve the co-ordination of flood risk activities and agree the most effective way to manage flood risk in the future. We have worked with others including: Cornwall Council, Natural England, South West Water and the National Farmers Union to develop this plan.

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

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

Richard Cresswell
South West Regional Director

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The purpose of a CFMP in managing flood risk

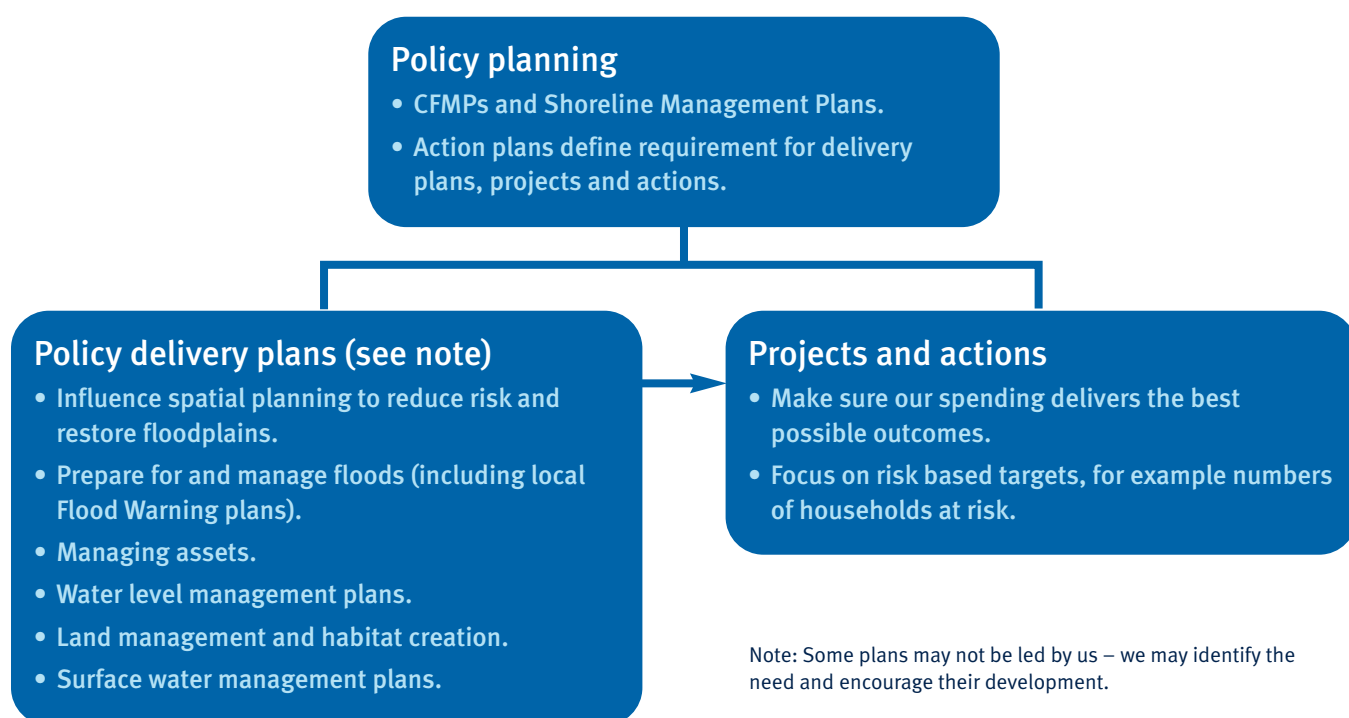
CFMPs help us to understand the scale and extent of flooding now and in the future, and set policies for managing flood risk within the catchment. CFMPs should be used to inform planning and decision making by key stakeholders such as:

- the Environment Agency, who will use the plan to guide decisions on investment in further plans, projects or actions;
- Regional Assemblies and local authorities who can use the plan to inform spatial planning activities and emergency planning;
- Internal Drainage Boards (IDB), water companies and other utilities to help plan their activities in the wider context of the catchment;
- transportation planners;
- land owners, farmers and land managers that manage and operate land for agriculture, conservation and amenity purposes;
- the public and businesses to enhance their understanding of flood risk and how it will be managed.

CFMPs aim to promote more sustainable approaches to managing flood risk. The policies identified in the CFMP will be delivered through a combination of different approaches. Together with our partners, we will implement these approaches through a range of delivery plans, projects and actions.

The relationship between the CFMP, delivery plans, strategies, projects and actions is shown in Figure 1.

Figure 1. The relationship between CFMPs, delivery plans, projects and actions



Catchment overview

The West Cornwall CFMP lies next to the East Cornwall CFMP at the most south-westerly point of mainland Britain. The CFMP area is made up of one relatively large catchment, the River Fal and many other smaller river catchments. The Fal Estuary is the one major estuary in the West Cornwall catchment, with smaller estuaries at Hayle and Helford.

The West Cornwall CFMP covers an area of some 1,500 square kilometres (600 square miles). Annual rainfall ranges from more than 1,400mm (55in) over higher ground to less than 1,000mm (40in) on the coast. The England and Wales average is 920mm (36in).

The topography of West Cornwall is varied. The main upland areas are the Land's End peninsula, the Cammenellis uplands (near

Camborne and Redruth) and the Hensbarrow Downs (to the east of the area), from which a large number of rivers spring. The remainder of the area is made up of rolling farmland, valleys and heaths which form a number of discrete river catchments, many of which are small and steep.

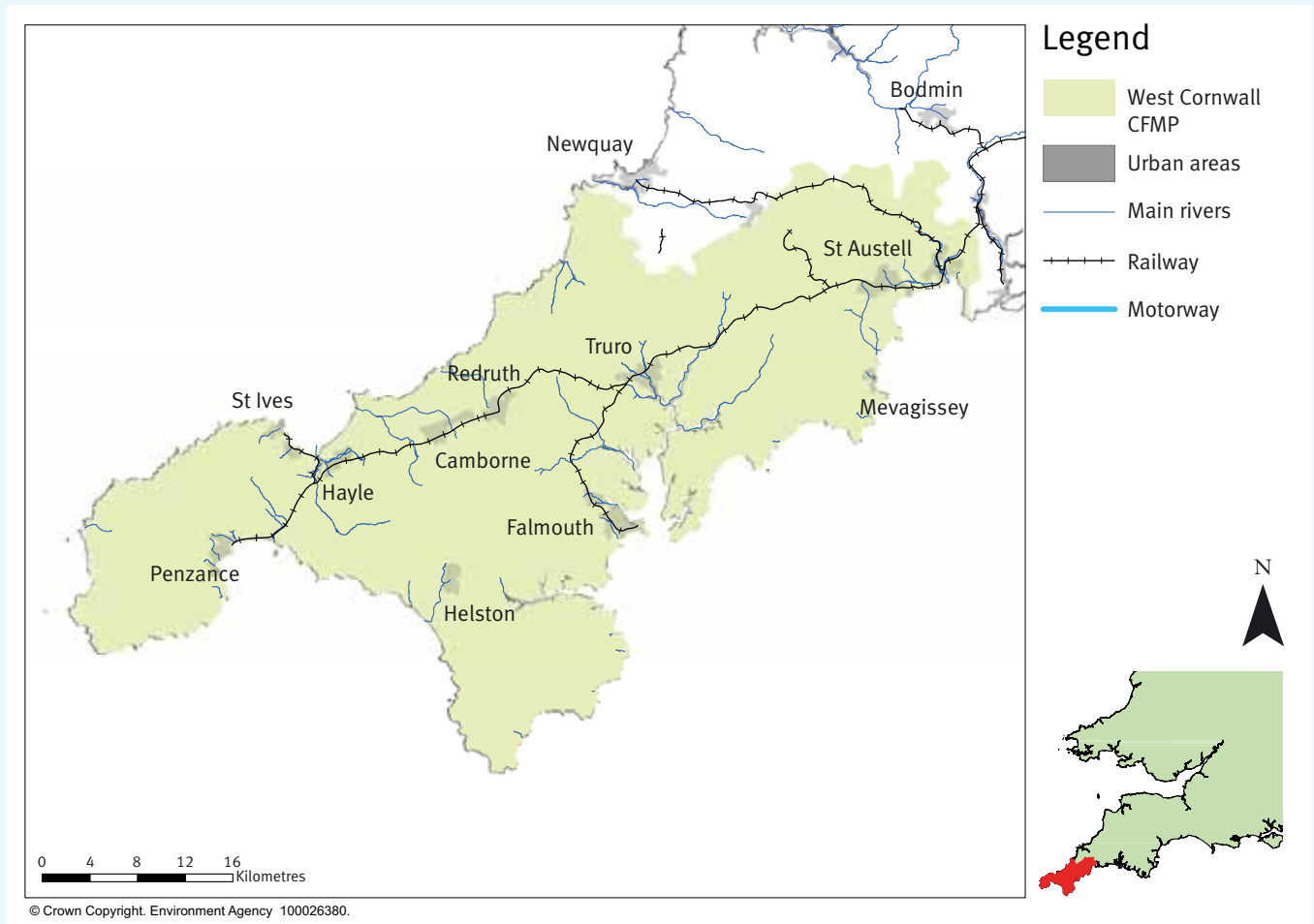
Most of the catchment is rural, with only eight per cent urban. The principal urban centres are Penzance and St Ives in the far west, Camborne, Redruth and Truro in the centre, Falmouth to the south, and Par and St Austell on the south coast, at the eastern extent of the area.

Just over 300,000 people live in the area, with the main employment sectors being the manufacturing and service industries, and tourism. The traditional economic activities of

agriculture, mining, and fishing have been in decline for some years, however they still contribute to the economy today.

The West Cornwall catchment is environmentally rich with many important environmental locations, and some high quality river systems. There are two Areas of Outstanding Natural Beauty, 12 Special Areas of Conservation, one Special Protection Area (SPA), 76 Sites of Special Scientific Interest (SSSIs) and 701 Scheduled Monuments. The area has a rich mining heritage recognised by World Heritage status for mining landscape, with component sites in or adjacent to floodplains at Hayle Harbour and Perranaworthal.

Map 1. Location and extent of the West Cornwall CFMP area



↑ The Square, Pentewan in November 1997

Current and future flood risk

Overview of the current flood risk

There is a recorded history of flooding within West Cornwall that dates back to the 1900s. Previous river flooding incidents include:

- The floods of 1988, in which Truro was flooded twice and over 60 properties were flooded in Perranporth.
- The event of 31 December 2002 and 1 January 2003 saw flooding across the area, including Redruth and Helston, where over 60 properties were affected.
- In addition, St Ives has a long history of flooding, with a severe event in 2002 leading to eight people needing emergency rescue.

High tides contribute to flood risk in West Cornwall. A major tidal surge in 2004 affected many communities on the south coast.

While the numbers of properties at risk across West Cornwall may be relatively low compared with other areas of the country, the risk to life, and community disruption can be just as great.

There are flood alleviation schemes throughout the catchment that reduce flood risk. The main sections of defences are located along:

- the St Austell (White) River through St Austell;
- the Bolingey River through Perranporth;
- the Angarrack and Hayle Rivers at Hayle;
- the River Par and Treffry Canal at Par and St Blazey;
- and around Truro with New Mill and Idless dams and Truro tidal barrage.

What is at risk?

Today, there are over 5,000 properties across the catchment at risk of flooding from rivers and the tide, at a 1% annual probability (rivers) or 0.5% annual probability (tidal) event, not taking into account the effect of flood defences.

Also at risk is the mainline railway (especially at Par and Penzance), the A390 and A39 (at Truro, Par, Perranaworthal and Penzance), two water treatment works, a fire station, police station and a care home.

Also affected by flooding and flood risk management activities are designated environmental sites such as the Hayle Estuary and Carrick Gladden SSSI, Marazion Marsh SPA, and Loe Pool SSSI.

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

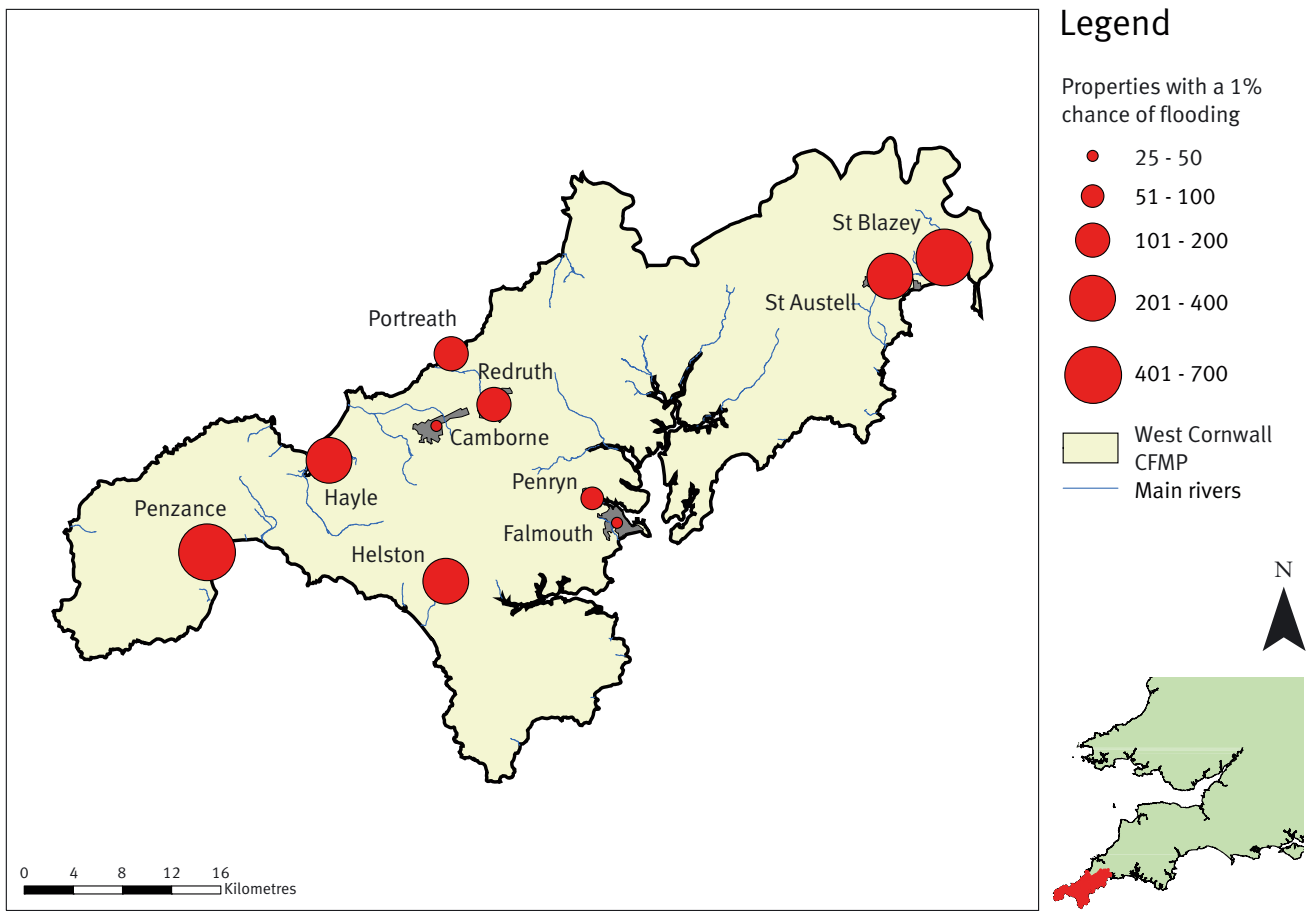


Table 1. Locations of towns and villages with 25 or more properties at risk in a 1% annual probability river flood

Number of properties at risk	Locations
500 to 1,000	Par/St Blazey, Penzance
100 to 500	St Ives, Perranporth, St Austell, Hayle, Truro, Helston, Redruth, Portreath
50 to 100	Penryn, Crowlas, Falmouth
25 to 50	Camborne

Table 2. Critical infrastructure at risk:

7 electricity substations, 8 railway lines, 11 A roads, 2 water treatment works

Where is the risk?

The distribution of potential flood risk from rivers and tides is illustrated in Map 2 for a flood with a 1% annual probability (0.5% for tides) of occurring or being exceeded.

The greatest concentration of properties at risk of flooding is at Par and St Blazey. Here some 690 properties are at risk from river, tidal and surface water flooding. This is set to increase due to rising sea levels.

Penzance has the next highest concentrations in property at risk with some 505 properties at risk respectively.

In addition to these locations, there are risks of surface water flooding, which can be deep and fast flowing, across much of the catchment. However, further studies following on from the CFMP are needed by us and our partners to quantify this potential risk.

How we currently manage the risk

- Flood risk mapping – A major part of the programme is Flood Zone Improvements and Hazard Mapping. This is focused on improving the mapping at high-risk locations.
 - Managing development – Our development control team supports the planning process by ensuring that new developments have the appropriate flood risk assessments and follow PPS25 (Government Planning Policy Statement on Development and Flood Risk).
 - Flood warning – Where flood forecasting exists, we aim to provide at least two hours advance warning of imminent flooding to people in designated risk areas. This however is not realistic on many of the rivers in West Cornwall due to their flashy nature. The service involves using a multi-media communication service called Floodline Warnings
- Direct. This provides a system that can target warnings to people via different media methods, including telephone, email and SMS text messaging. We also provide a public access telephone service called Floodline that people can ring to check if there is a flood warning for their area. Flood warnings in force are also listed on our website. Major Incident Plans have been developed for Perranporth, Helston, Truro, Penryn and Par / St Blazey.
- Flood defence schemes – We have flood defence schemes at St Austell (on the Sandy River and St Austell River), Truro, Hayle, St Ives, Helston, Perranporth, Angarrack, Penzance, Par, Penryn and Falmouth.
 - Maintenance – We maintain channels and defences.



← Tregenna Place, St Ives, 14/11/2002

The impact of climate change and future flood risk

We have considered a range of factors that could influence flood risk over the next 100 years to find out how flood risks could change in West Cornwall. The factors we have looked at are climate change, land management and urban development. We have used government guidance and other calculations to test the influence of each factor.

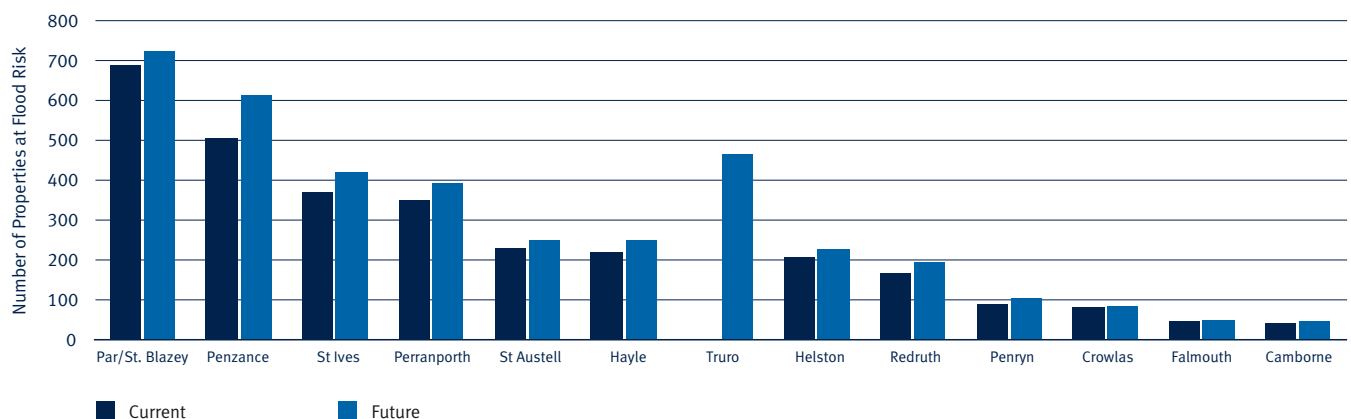
We have used the following future scenario in the West Cornwall CFMP,

- 20% increase in peak flow in all watercourses due to climate change.
- 11% increase in river flows due to land use change.
- 5% increase in river flows in certain locations due to urban development.

We have found that climate change has the greatest influence on future flood risk, increasing flood risk from both rivers and the tide. Land management also contributes, because of the rural nature of the catchment. Urban development could affect flood risk significantly in St Austell, Falmouth and Redruth.

In the future we expect flood depths to increase but for flood extents to increase or remain the same. This means that more people and property will be affected by flooding in the future. The areas where we expect flood risk to increase the most are Penzance and Truro (see Figure 2).

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



Future direction for flood risk management

Approaches in each sub-area

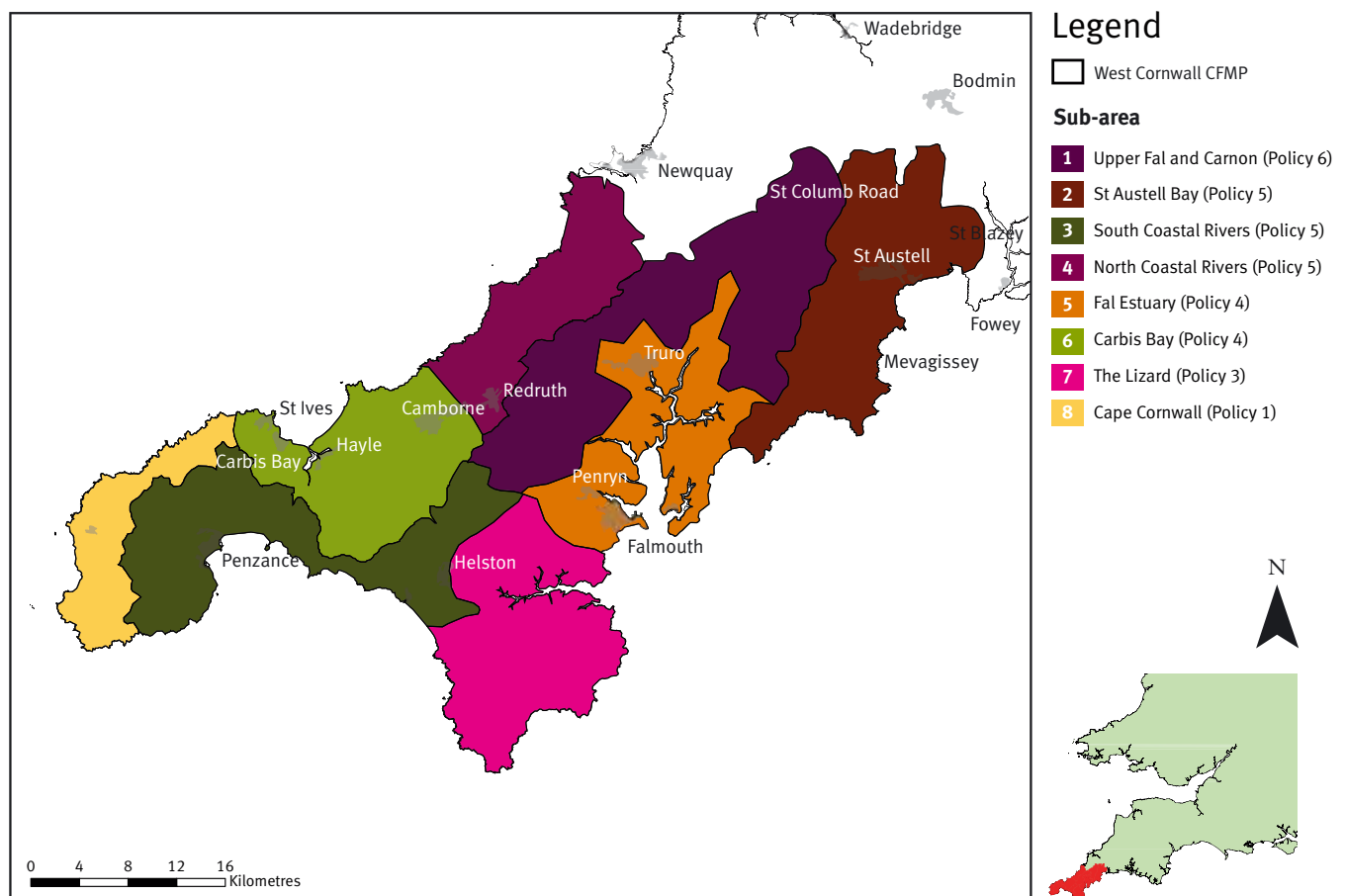
We have divided the West Cornwall catchment into eight distinct sub-areas which have similar physical characteristics, sources of flooding and level of risk. We have identified the most appropriate approach to managing flood risk for each of the sub-areas and allocated one of six generic flood risk management 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.



↑ Floods in St John's Road at Helston, January 2003

Map 3. West Cornwall sub-areas



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Table 3. Policy options

Policy 1

Areas of little or no flood risk where we will continue to monitor and advise

This policy will tend to be applied in those areas where there are very few properties at risk of flooding. It reflects a commitment to work with the natural flood processes as far as possible.

Policy 2

Areas of low to moderate flood risk where we can generally reduce existing flood risk management actions

This policy will tend to be applied where the overall level of risk to people and property is low to moderate. It may no longer be value for money to focus on continuing current levels of maintenance of existing defences if we can use resources to reduce risk where there are more people at higher risk. We would therefore review the flood risk management actions being taken so that they are proportionate to the level of risk.

Policy 3

Areas of low to moderate flood risk where we are generally managing existing flood risk effectively

This policy will tend to be applied where the risks are currently appropriately managed and where the risk of flooding is not expected to increase significantly in the future. However, we keep our approach under review, looking for improvements and responding to new challenges or information as they emerge. We may review our approach to managing flood defences and other flood risk management actions, to ensure that we are managing efficiently and taking the best approach to managing flood risk in the longer term.

Policy 4

Areas of low, moderate or high flood risk where we are already managing the flood risk effectively but where we may need to take further actions to keep pace with climate change

This policy will tend to be applied where the risks are currently deemed to be appropriately-managed, but where the risk of flooding is expected to significantly rise in the future. In this case we would need to do more in the future to contain what would otherwise be increasing risk. Taking further action to reduce risk will require further appraisal to assess whether there are socially and environmentally sustainable, technically viable and economically justified options.

Policy 5

Areas of moderate to high flood risk where we can generally take further action to reduce flood risk

This policy will tend to be applied to those areas where the case for further action to reduce flood risk is most compelling, for example where there are many people at high risk, or where changes in the environment have already increased risk. Taking further action to reduce risk will require additional appraisal to assess whether there are socially and environmentally sustainable, technically viable and economically justified options.

Policy 6

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

This policy will tend to be applied where there may be opportunities in some locations to reduce flood risk locally or more widely in a catchment by storing water or managing run-off. The policy has been applied to an area (where the potential to apply the policy exists), but would only be implemented in specific locations within the area, after more detailed appraisal and consultation.

Upper Fal and Carnon

Our key partners are:

Cornwall Council

Natural England

National Farmers Union

Imerys Ltd

The issues in this sub-area

The Upper Fal and Carnon covers the river catchments of the Fal, Tresillian, Allen and Carnon. All the rivers drain into the Fal Estuary area. The watercourses have a slow response to rainfall. The upper reaches of the rivers will, however, react rapidly for example with water draining from the moors. Flood risks are made more complex due to the legacy of mine and mineral workings, which can impact on water drainage, discharge, storage and transfer between catchments.

Villages at risk of flooding include Chacewater, St Dennis, Grampound, Ponsanooth and Tregony. In total there are 191 properties at risk of

flooding in a 1% annual probability flood, with 38 of these located in Chacewater. However, schemes protect properties in Tregony and Grampound schemes up to and including the 20% annual probability flood event. The schemes from Chacewater to Devoran and at Ponsanooth protect properties for up to the 2% annual probability flood event.

Specific flood warnings are available on the River Fal from Trenowth to Tregony, with general coverage flood warnings elsewhere.

Critical infrastructure at a high risk of flooding includes an electricity substation, a water treatment works and several roads. The railway between Truro and Plymouth may be at risk.

The nature of the catchments also makes them prone to field run-off, which can be exacerbated through inappropriate land management. This has caused flooding due to run-off from agricultural land, particularly in the St Stephen area.

The vision and preferred policy

Policy Option 6 - we will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits.

Significant numbers of properties, residents, and community asset, would benefit from flood risk management actions and relatively significant habitat creation opportunities would be provided. Habitat creation opportunities include wetland creation. In addition, reducing flood risk in this area would reduce flood risk downstream and therefore have cumulative social, economic and environmental benefits in the Fal Estuary area.

Proposed actions to implement the preferred policy

- Investigate the scope for wetland creation on the Tresillian River upstream of Ladock and Tresillian, and on the River Allen upstream of Truro, which could attenuate flows and reduce flood risk downstream.
- Examine the potential for alterations to the wetlands of Goss Moor and Tregoss Moor to create additional storage resulting in flow attenuation in this area and in the Fal Estuary area.
- Support local authorities in the preparation of their Strategic Flood Risk Assessments and associated Local Development Framework Plans. Master planning of Sustainable Drainage Systems for any urban extension of Truro also forms an essential part in delivering this policy.
- Consider the use of disused china clay pits in the Fal catchment to contribute to a reduction in flood risk downstream in this area.
- Further investigate the links between land management practices, run-off and flood risk. Research impact of mine and mineral workings on flood risk. In particular the impact on water, drainage, discharge, storage and transfer between catchments. This may require a water cycle study for China Clay areas to be included in the Minerals Development Plan Document Strategic Flood Risk Assessment.
- Use programmes to raise and maintain awareness of flood risk and self-help measures.

St Austell Bay

Our key partners are:

Cornwall Council

Woodland Trust

Land owners

Natural England

Imerys, Goonvean

Mid Cornwall Moors Life Project

Blazey where 650 properties are at risk and in St. Austell where 230 properties could be affected. The number of properties at risk in the sub-area could increase by around 75 by 2100.

Critical infrastructure at a high risk of flooding includes three electricity substations, a fire station, St Blazey police station, a Care Home in Par and two telephone exchanges in Mevagissey. The mainline railway, the Newquay branch line, as well as numerous roads (including the A390) are at risk of flooding.

Flood alleviation schemes reduce flood risk at Par and St Blazey, St Austell and Pentewan.

Whilst the area is served by flood warning systems, St Austell is not. Furthermore, the flood warning service on the River Par provides less than two hours notice of flooding. However, there is a Major Incident Plan in place for Par and St Blazey where over 1,000 people are at risk.

The coastline is mainly made up of cliffs with limited risks of tidal flooding. However, a number of populated areas have developed along the coast in lower areas where tidal flood risk is an issue. Tide-locking of watercourses where they drain into the sea is also a problem.

The nature of the catchments also make them prone to field run-off, which can be exacerbated through inappropriate land management. This has caused flooding due to run-off from agricultural land in the Sticker, Gorran Haven and Tywardreath areas.

The vision and preferred policy

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

The chosen policy provides the highest level of reduction to flood risk, resulting in significant reductions in economic damages, number of properties, community assets, residents, vulnerable communities, and roads and critical infrastructure that are at risk of flooding. This reflects the fact that the current level of flood risk in the area is high and not adequately dealt with.

The issues in this sub-area

St Austell Bay is subject to flood risks from river, tides and surface water. The area covers the catchments of the River Par, the St Blazey Stream, the St Austell (White) River and Pentewan Stream as well as the coastline around the Bay with small streams in incised valleys.

Areas at risk of flooding from rivers include Par and St Blazey, St Austell, London Apprentice, Luxulyan, Pentewan, Mevagissey, Bugle, Tywardreath Highway and Gorran Haven. Surface water is a source of flood risk in many locations.

There are around 1,380 properties at risk of flooding from the 1% annual probability flood (0.5% tidal), particularly in Par and St.

Proposed actions to implement the preferred policy

- Create specific flood warning service on the St Austell River for St Austell, London Apprentice and Pentewan. Review flood warning criteria on the River Par.
- Flood Hazard Mapping of Par, St Blazey and at St Austell to improve emergency response information.
- Undertake a flood risk management strategy at St Austell, Par and St Blazey to investigate opportunities to improve existing flood alleviation schemes. Surface Water Management Plans (SWMP) produced for St Austell, Mevagissey, Par and St Blazey. Include proposals for implementation.
- Examine scope for reconnection of channel and floodplain along the St Austell (White) River.
- Support Cornwall Unitary Authority in the preparation of its Strategic Flood Risk Assessments and associated Local Development Framework documents.
- Examine the scope for wetland creation upstream of Luxulyan. Any eco town located in the River Par headwaters should incorporate measures to reduce flood flows at Luxulyan and St Blazey.
- Further investigate the links between land management practices, run-off and flood risk.
- Research impact of mine and mineral workings on flood risk.
- Investigate the benefits of using disused china clay pits upstream of St Austell to attenuate flows.
- Create a Major Incident plan for St Austell.
- Use programmes to raise and maintain awareness of flood risk and self-help measures.

South Coastal Rivers

Our key partners are:

Cornwall Council

South West Water

Natural England

National Farmers Union

The issues in this sub-area

South Coastal Rivers covers the catchments of the Rivers Cober, Red River and Trevaylor Stream, as well as the coastline of Mounts Bay. It includes the major settlements of Penzance and Helston and other towns such as Mousehole, Crowlas and Porthleven.

There are numerous small catchments draining directly to the coast, particularly in the Mounts Bay area, while the River Cober springs on high ground to the north-east and drains a greater area.

A number of areas are at risk of flooding from rivers, particularly Helston, Gulval (Trevarrack) Penzance, Nancledra, Lamorna, Chyandour, Ludgvan and Burras. The nature of the catchments also makes them prone to field run-off, which can be exacerbated through inappropriate land management.

A number of populated areas have developed along the coast in low areas, particularly Penzance, Newlyn, Porthleven and Mousehole. In these areas tidal flood risk is more significant.

There are approximately 1,000 properties at risk of flooding under the 1% (or 0.5% tidal) annual probability flood, particularly in Penzance where 480 properties could be affected and in Helston where 200 properties are at risk. Critical infrastructure at a high risk of flooding includes a water treatment works, an electricity substation, the mainline railway and various roads.

By 2100, the number of properties at risk of flooding could increase by over 150, mainly in Penzance.

Flood alleviation schemes serve to reduce flood risk at Penzance, Helston, Porthleven and Mousehole.

Specific flood warnings are available on the River Cober between Wendron and the coast through to Loe Pool with less than two hours notice of flooding. Tidal flood warnings are issued for the South Cornish coast. There is a Major Incident Plan in place at Helston, with less than six hours notice of major flooding available.

The vision and preferred policy

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

The Chosen Policy provides significant reductions in economic damages and the number of properties, community assets, residents, vulnerable communities, roads and critical infrastructure that are at risk of flooding. Furthermore, additional benefits arise from the protection from flooding of heritage, landscape and pollution risk sites. It allows the existing high levels of flood risk to be addressed, particularly at Helston where the existing flood risk management actions do not adequately deal with river or surface water flood risks.

Proposed actions to implement the preferred policy

- Review the quality of flood warning criteria on the River Cober and implement recommendations. Use programmes to raise and maintain awareness of flood risk and self-help measures.
- Undertake Surface Water Management Plans for Penzance, Porthleven, Newlyn, Mousehole, Crowlas and Helston. Include proposals for implementation.
- Review channel maintenance procedures to ensure that targeted maintenance is undertaken to reduce flood risks, particularly upstream of structures.
- Investigate the potential to increase storage capacity at Drift reservoir and investigate the creation of upstream storage on the Trevaylor Stream and on the River Cober. Implement recommendations.
- Investigate the creation of wetland areas at Marazion Marsh to enhance this SSSI/SPA site and reduce flood risk in the Green Lane area.
- Support local authorities in the preparation of their Strategic Flood Risk Assessments and associated Local Development Framework Plans.
- Investigate feasibility of improvements to the flood alleviation scheme in Helston.
- Further investigate the links between land management practices, run-off and flood risk.
- Progress with the outcomes of the Rapid Response Catchment Study.

North Coastal Rivers

Our key partners are:

Cornwall Council

Camborne, Pool and Redruth (CPR) Regeneration

South West Regional Development Agency

English Partnerships

South West Water

Natural England

National Farmers Union

The issues in this sub-area

The North Coastal Rivers area is at risk from both river and tidal flooding. Rivers generally drain medium sized catchments through narrow valleys with limited floodplains. Communities at flood risk from rivers include Perranporth, Portreath, Bridge and Gilberts Coombe.

Surface water is a source of flood risk in areas such as Redruth, Scorrier, Mount Hawke and Carn Brea Village. Flood risk is also increased in rural areas where land is not managed appropriately.

The coastline is predominately made up of high cliffs and tidal flood risk is limited to low-lying areas on the coast, such as Porthtowan, Perranporth and Portreath.

There are approximately 850 properties at risk of flooding under the 1% annual probability or 0.5% annual probability flood event, particularly in Perranporth where 350 properties are at risk, and in Portreath where 150 properties could be affected. Infrastructure such as various roads are at risk of flooding. There are flood alleviation schemes at Perranporth, Redruth and Portreath. The number of properties at risk of flooding could increase by around 90.

A flood warning service is available for communities on Perrancoombe Stream, the river between Silverwell and Perranporth. There is a Major Incident Plan for Perranporth but with less than two hours notice of severe flooding. Tidal flood warnings are issued on the north coast.

The vision and preferred policy

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

The chosen policy could provide significant reductions in economic damages and the number of properties community assets, residents, vulnerable communities, roads and critical infrastructure that are at risk of flooding. Furthermore, additional benefits arise from the protection from flooding of heritage, landscape and pollution risk site.

Proposed actions to implement the preferred policy

- Undertake feasibility studies at Gilberts Coombe, Bridge and Portreath for options to reduce flood risk. Implement recommendations.
- Create specific flood warning service on the Redruth Stream/Portreath Stream for Bridge and Portreath. Create a Major Incident Plan (MIP) for Portreath. Use programmes to raise and maintain awareness of flood risk and self-help measures. Review flood warning criteria for MIP at Perranporth.
- Review channel maintenance procedures to ensure that targeted maintenance is undertaken to reduce flood risks, particularly upstream of structures.
- Progress the outcomes of the Rapid Response Catchment Study.
- Support the planning authority in the preparation of its Strategic Flood Risk Assessments and associated Local Development Framework Documents.
- Implement the Surface Water Management Plan for Redruth.
- Investigate the links between land management practices, run-off and flood risk.
- Undertake research to improve understanding about the impact of mine workings on flood risk on a catchment level.



↑ Flooding in Perranporth 9 February 1974

Fal Estuary

Our key partners are:

Cornwall Council

South West Water

Natural England

National Farmers Union

The issues in this sub-area

The Fal Estuary covers the catchments of the Carnon, Tresillian, Fal, Allen and Kenwyn Rivers. It includes the major settlements of Truro, Falmouth and Penryn.

The area is subject to both flood risk from river and tidal water and in places these combine to exacerbate flood risk further. There are numerous small catchments draining directly to the estuary, with other larger catchments springing on high ground upstream in the Upper Fal and Carnon area.

Urban areas particularly at risk of flooding include Flushing, Penryn, St Mawes, Truro and Tresillian. In all of these places flood risk from tidal water is the major concern, however Truro is also at risk from the rivers Allen and Kenwyn. Surface water is a source of flood risk in Falmouth, Penryn and Truro.

There are approximately 440 properties at risk of flooding under the 1% annual probability (and 0.5% tidal) floodplain, with 220 properties at risk in Truro and 90 in Penryn. A number of roads are at risk of flooding.

Flood alleviation schemes reduce flood risk at Truro, Penryn, Falmouth and Flushing.

A flood warning service is offered to communities along the Rivers Kenwyn, Allen and Tinney, but with less than two hours notice of flooding provided on the Kenwyn and Allen. Tidal flood warnings are also issued for the South Cornish Coast, including the Fal estuary. Emergency plans are in place for Truro and Penryn.

Risk will increase as a result of the impact of climate change, urban development and inappropriate land use management. This will reduce the standard of protection offered by existing flood alleviation schemes, particularly at Truro. The number of properties at risk of flooding could increase by over 250, with the majority of this increase expected in Truro.

The vision and preferred policy

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

The chosen policy will prevent significant future impacts from flooding, and manages the current risks in a sustainable manner, working mainly with existing flood risk assets. It allows a range of flood risk management actions to be considered, such as sustaining the current flood alleviation scheme at Truro, whilst also considering areas for potential managed retreat in the Fal estuary.

Proposed actions to implement the preferred policy

- Review Truro flood alleviation scheme and implement measures required to sustain the current scale of flood risk into the future.
- Review channel maintenance procedures to ensure that targeted maintenance is undertaken to reduce flood risks, particularly upstream of structures.
- Use programmes to raise and maintain awareness of flood risk and self-help measures. Review flood warning criteria on the Rivers Allen and Kenwyn. Create community-based warnings for areas at risk of tidal flooding.
- Support local authorities in the preparation of their Strategic Flood Risk Assessments and associated Local Development Framework Plans.
- Undertake Surface Water Management Plans for Truro, Falmouth and Penryn. Include proposals for implementation.
- Undertake a flood risk management strategy to investigate key opportunities for managed realignment in the Fal estuary and potential impacts on flood risk and habitat creation.
- Further investigate the links between land management practices, run-off and flood risk.

Carbis Bay

Our key partners are:

Cornwall Council

Camborne, Pool and Redruth (CPR) Regeneration

South West Regional Development Agency (SWRDA)

English Partnerships

South West Water

Hayle Harbour Company

Hayle Town Council

Natural England

National Farmers Union

Infrastructure such as the mainline railway and various roads are at risk of flooding. The number of properties at risk could increase by around 100.

There are flood alleviation schemes in the main risk locations, including St Ives, Hayle and Angarrack.

Defences at Hayle provide protection for a severe tidal event (0.5 per cent annual probability flood event) and from the two rivers for the 1.3 per cent and 2.5 per cent annual probability floods. Flood risk in St Ives has been addressed with the recent completion of a flood alleviation scheme to provide protection from the Stennack Stream for up to a 0.6 per cent annual probability flood.

A flood warning service on the River Hayle is provided for communities at risk of flooding from Relubbus downstream and at Hayle. Flood warnings are offered to properties at risk from tidal flooding.

The vision and preferred policy

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

The chosen policy was selected as it prevents significant future impacts of flooding and manages the current risks in a sustainable manner, working mainly with existing flood risk management measures. The provision of flood risk management measures is adequate for the current flood risk situation and the proposed actions will maintain this into the future.

The issues in this sub-area

Carbis Bay area covers the catchments of the Red River, Hayle River and Stennack Stream. It includes the major settlements of Camborne, Pool, Hayle and St Ives.

There are around 870 properties at risk of flooding under the 1% annual probability (or 0.5% tidal) flood, particularly in Hayle where 220 properties are at risk.

Proposed actions to implement the preferred policy

- Review River Hayle flood alleviation scheme to sustain current standard of service.
- Undertake a flood risk management strategy for the Hayle River to consider how provision of upstream storage, wetland creation and setting back of defences could sustain flood risk.
- Investigate the use of existing water bodies and Higher Trevaskis reservoirs upstream of Angarrack to attenuate flows downstream.
- Further investigate the links between land management practices, run-off and flood risk.
- Progress with the outcomes of the Rapid Response Catchment Study.
- Use programmes to raise and maintain awareness of flood risk and self-help measures.
- Support the planning authority in the preparation of its Strategic Flood Risk Assessments and associated Local Development Framework Documents.
- Undertake Surface Water Management Plans for Camborne, Pool, St Ives and Hayle. Within this investigate retrofitting Sustainable Drainage Systems and using pumping stations to deal with tide-locking issues. Include proposals for implementation at St Ives and Hayle. Implement the Surface Water Management Plan for Camborne and Pool.



↑ Flooding on the A30 at Hayle in February 1974

The Lizard

Our key partners are:

Cornwall Council

South West Regional Development Agency (SWRDA)

English Partnerships

South West Water

Natural England

National Farmers Union

The issues in this sub-area

The Lizard covers the Helford River catchment and coastal catchments to the south.

There are just over 100 properties at risk of flooding in the 1% annual probability (and 0.5% tidal) flood, particularly in Coverack where 15 properties are at risk and Gweek where 12 properties could be affected. Various roads are also at risk of flooding.

Flood alleviation schemes are located at Gweek, Porthallow, Porthoustock, Coverack and Cadgwith.

Flood risk is increased in developed areas where structures such as culverts and bridges are subject to blockage and areas of impermeable ground such as roads and car parks increase surface run-off problems and increase the volume of water entering the drainage network. Such flooding has been recorded at Cadgwith, Porth Navas, Coverack and Constantine.

As a result of the impacts of climate change and inappropriate land use management flood extents and depths are expected to increase, with flood extents up to 5m greater in some locations and depths increasing by over 0.7m. The number of properties at risk of flooding could increase by around 10.

The vision and preferred policy

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

The chosen policy will allow improved control over future geomorphology and will maintain existing schemes that protect properties from frequent flooding into the future.

Proposed actions to implement the preferred policy

- Review channel maintenance procedures to ensure that maintenance is only undertaken where it is essential to control flood risks, particularly upstream of structures.
- Support local authorities in the preparation of their Strategic Flood Risk Assessments and associated Local Development Framework Plans.
- Investigate the links between land management practices, run-off and flood risk. Consider options for influencing land management practice to reduce flood risk, including encouraging landowners to join Environmental Stewardship programmes.
- Progress with the outcomes of the Rapid Response Catchment Study.

Cape Cornwall

Our key partners are:

Cornwall Council

The issues in this sub-area

Cape Cornwall covers the north and west coastal strip of the Penwith peninsula from Penberth River catchment in the south to just west of St Ives on the north. The area includes the communities of St Just, Porthcurno, Sennen and Zennor.

A number of locations are vulnerable to flooding caused by short, intense rainfall events. Flooding from rivers overtopping their banks and from surface water run-off are the biggest risk. Areas such as Tregeseal have suffered fluvial flooding in the past while St Just has experienced surface water flooding when the volume of water in the built up area has exceeded the capacity of the existing urban drainage system.

There are currently no flood alleviation schemes and, due to the nature of the rapid response to rainfall, it is not possible to offer specific flood warnings to communities using the current hydrometric infrastructure. Flood warnings are issued for the North Cornwall and South Cornwall coasts. Tidal flooding is considered to be of minimal risk.

There are 66 properties at risk of flooding under the 1% annual probability river or 0.5% tidal flood. Some minor roads are also at risk.

As a result of the impacts of climate change and land use management, the number of properties at risk will increase by around 5 properties.

The vision and preferred policy

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

The current flood risks are very low compared to other areas in the CFMP. Increased flooding brings only limited social and economic impacts, and risk to life does not increase. Further there are no potential adverse impacts on environmental assets as a result of increasing flood risk.

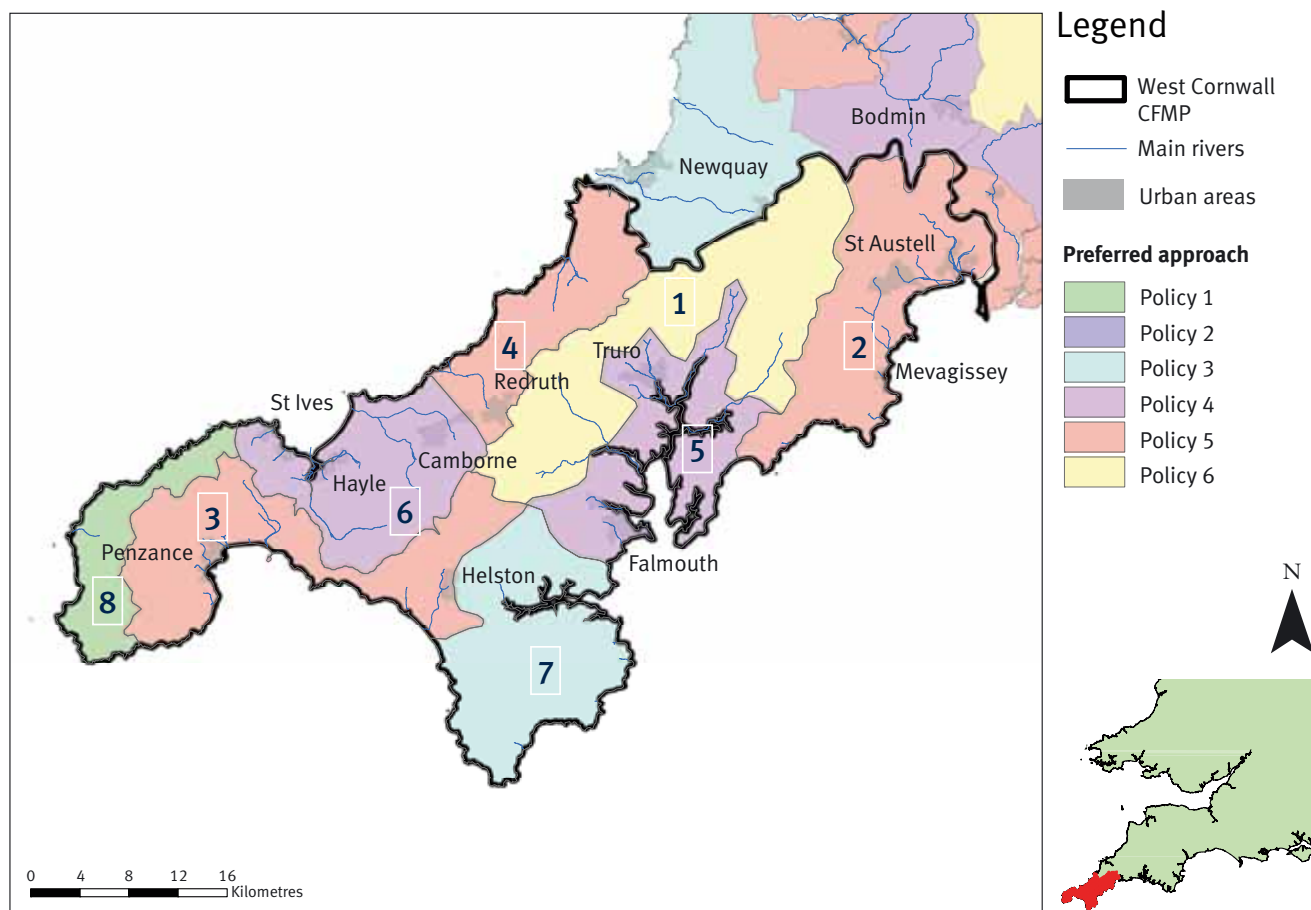
This policy does, however, allow the situation to continue to be monitored to allow a change of policy if conditions change from those expected.

Proposed actions to implement the preferred policy

- Any development should be carefully designed not to exacerbate flood risks. Land use planners should consider designating all floodplains as functional in order to ensure they are not constricted, or that the limited floodplain storage is not reduced. Where development or redevelopment is permitted in flood risk areas it is essential that robust warning and evacuation procedures are secured and maintained.
- No further action is proposed. We will continue to monitor and advise, particularly with regard to the Tregeseal Stream and St Just.

Map of CFMP policies

Map of the policies in the West Cornwall catchment



The sub-areas

- 1 Upper Fal and Carnon
- 2 St Austell Bay
- 3 South Coastal Rivers
- 4 North Coastal Rivers
- 5 Fal Estuary
- 6 Carbis Bay
- 7 The Lizard
- 8 Cape Cornwall

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