Managing flood and coastal erosion risk for the Exe Estuary

Draft Strategy Consultation Document January 2013

Environment Agency

Devon County Council

East Devon

NATURAL ENGLAND

Teignbridge District Council South Devon

Exeter City Council

Network Rail

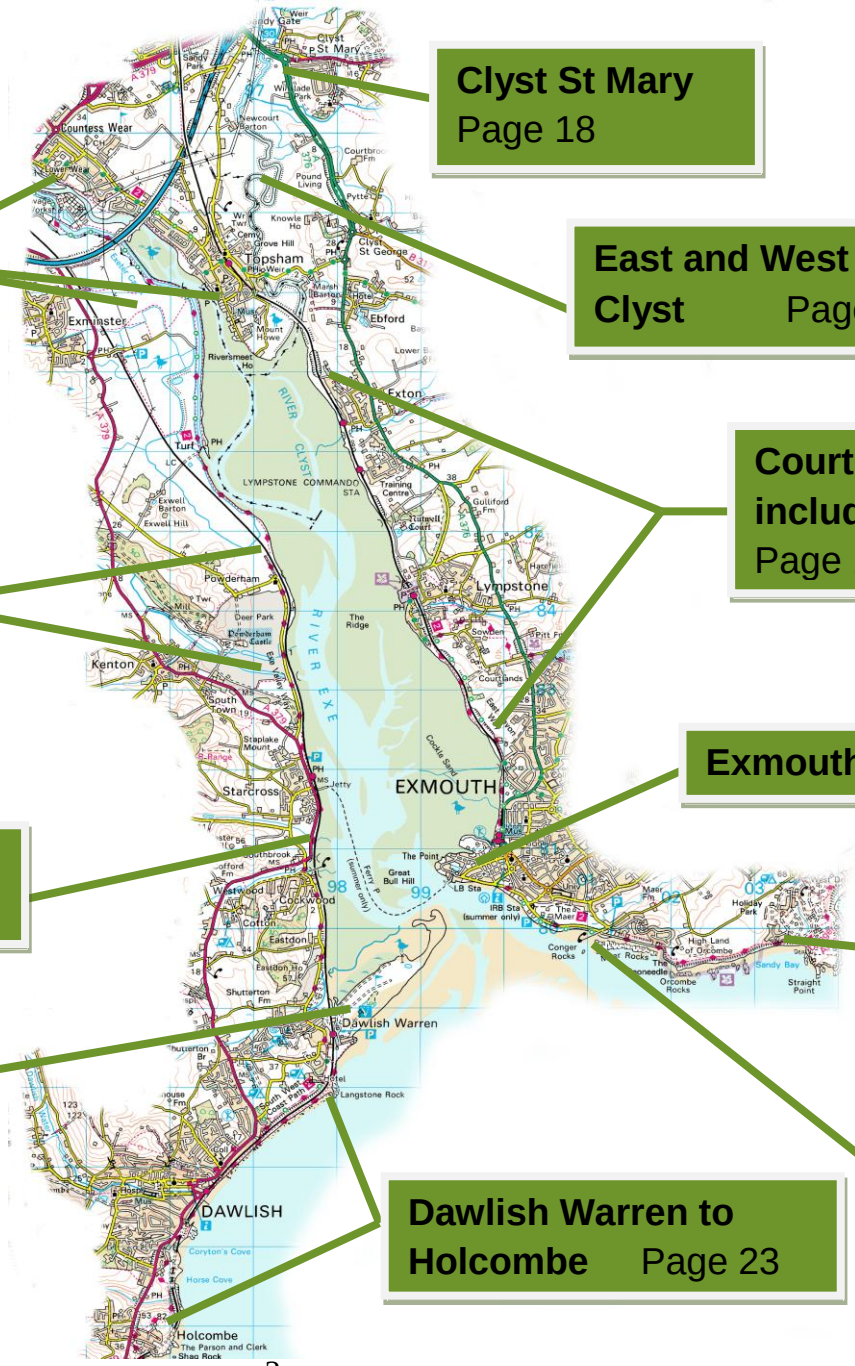
LiCCo Living with a Changing Coast Littoraux et Changements Côtiers

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.

Locations covered by the Strategy Holcombe to Sandy Bay



For Glossary of Terms see pages 25 and 26

Introduction

This consultation document summarises our draft Strategy and recommendations to manage flood and coastal erosion risks for the whole of the Exe Estuary, from Exmouth and Dawlish to Exeter, including adjacent coastline.

We cannot eliminate these risks but we can reduce their impact by working with others and by preparing for them.

Our Strategy needs to be sustainable into the future and so will consider as far as 100 years ahead.

Partners in the Strategy include Devon County Council, East Devon District Council, Teignbridge District Council, Exeter City Council, Natural England and Network Rail.

We are keen to hear your views and in this document we:

- explain how the Strategy builds on existing policies;
- explain the current level of flood risk and coastal erosion and the effects of climate change;
- make recommendations for managing these risks;
- provide links to further information and ways to comment.

Why is the Exe Estuary special?

Over 150,000 people live close to the Exe Estuary. Many more visit, attracted to the traditional seaside resorts and to the significant natural features which provide interest all year round. Much of the estuary has a very high level of environmental protection under European and UK wildlife law because of its international importance.

Communities and businesses have developed along the coastline and many now rely upon defences to reduce the risk of flooding and erosion to property and to agricultural land from the sea.

The estuary is bounded on both sides by railway lines including the mainline connecting London to Exeter and Penzance.

We need to consider all these interests and ensure that we protect what is most valued. The coastline will change, as it has in the past, but we have the opportunity to influence how this happens.

Flood risk and climate change

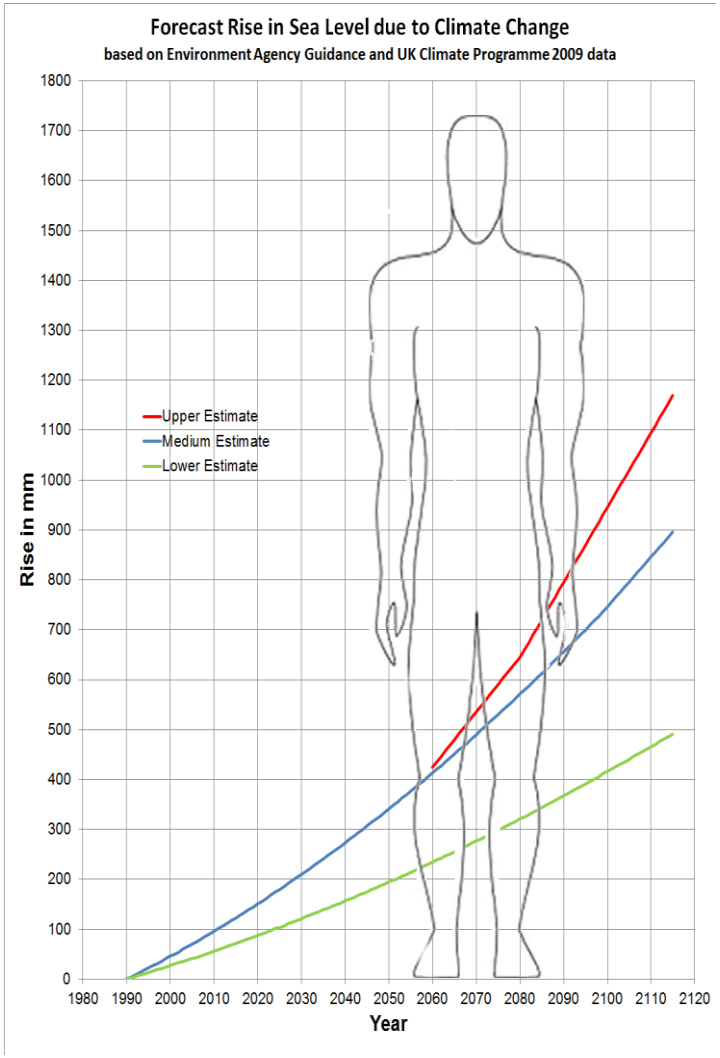
Flood risk

Flood risk combines the chance (or probability) of a particular flood happening and the impact it would have. We assess how important risk is to people, property and the environment. We protect homes and important infrastructure to a higher standard than for agricultural land.

Climate change

The climate is changing and we expect sea level to continue to rise at an increasing rate. Our best estimate is that by the end of this century the sea will be rising by 10mm each year. Such increases may seem small but they will have a significant effect on the risk of flooding and on erosion of the coastline.

By 2060 we expect sea levels to be at least 230mm higher, and probably over 400mm higher, than they were in 1990. Sea levels could be over 700mm higher by 2100 and, although we do not have to protect against this yet, we should prepare for it.



Increasing risks for people

Higher sea levels lead to higher risks of flooding and erosion, particularly if combined with stormier conditions. Coastal flooding that has only a 1 in 100 (1%) annual chance now will have a 1 in 10 (10%) chance by 2050.

Protecting against erosion is very expensive and might not be sustainable in the long term.

Increasing risks for wildlife

Inter-tidal areas such as saltmarsh and sandbanks, which can now be seen at low tide, will be under water for more of the time. This will affect wildlife including birds in the estuary, which are of international importance. We cannot stop sea level rise but we can try and compensate for the loss of habitat caused by our built flood defences, by creating new areas of suitable habitat as part of this Strategy.

How flood and coastal erosion risks can be managed

The aim of this Strategy is to identify how we can best manage flood and coastal erosion risks in the Exe Estuary over the next century. The Government is committed to managing these risks where it is sustainable and cost effective to do so.

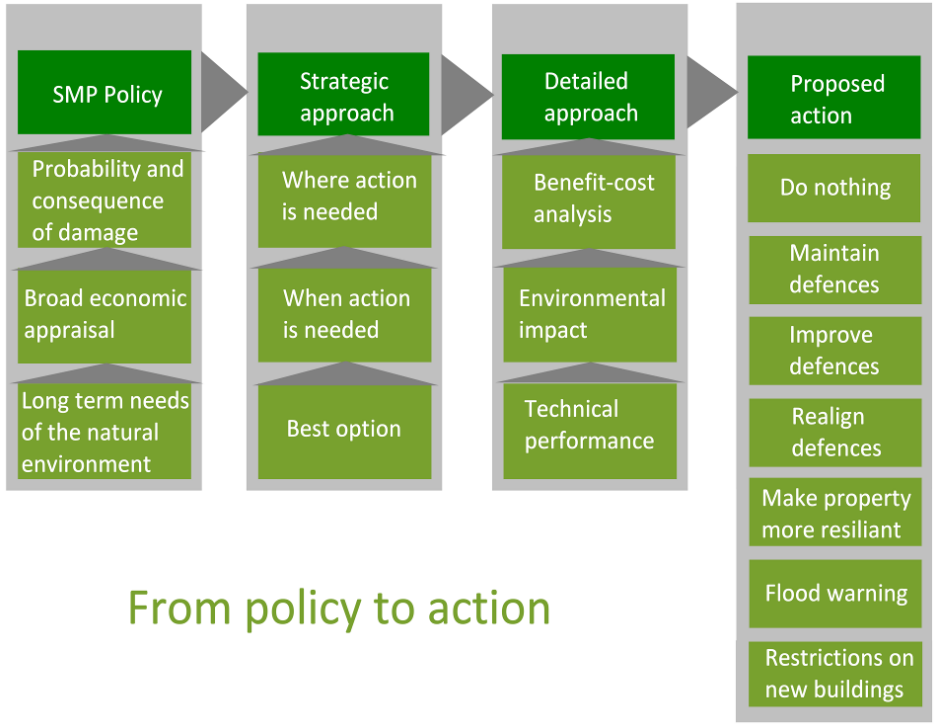
We can reduce the risk of flooding and coastal erosion by:
- maintaining, improving and constructing new coastal defence schemes;
- providing flood warning systems;
- working with local authority planners to restrict development in flood risk areas;
- encouraging the use of flood resilience measures for existing properties in flood risk areas.

As sea levels continue to rise there may come a time when the cost of these measures will outweigh the value of what is at risk. Alternative actions to adapt to the impacts of flood risk will then need to be considered.

In this Strategy we are concentrating on tidal flood risk but properties may also be at risk of flooding from drainage systems, rivers, or a combination of factors.

This Strategy is based on the Shoreline Management Plan (SMP), which sets jointly agreed broad, coastal management policies for the whole South Devon Coast. For each area at risk within the Exe Estuary we have tested the agreed policy. We have looked at the costs and benefits of each option and when we need to take action.

Throughout this process we have worked in partnership with a range of organisations and individuals, to share ideas, test our findings and inform our recommendations.

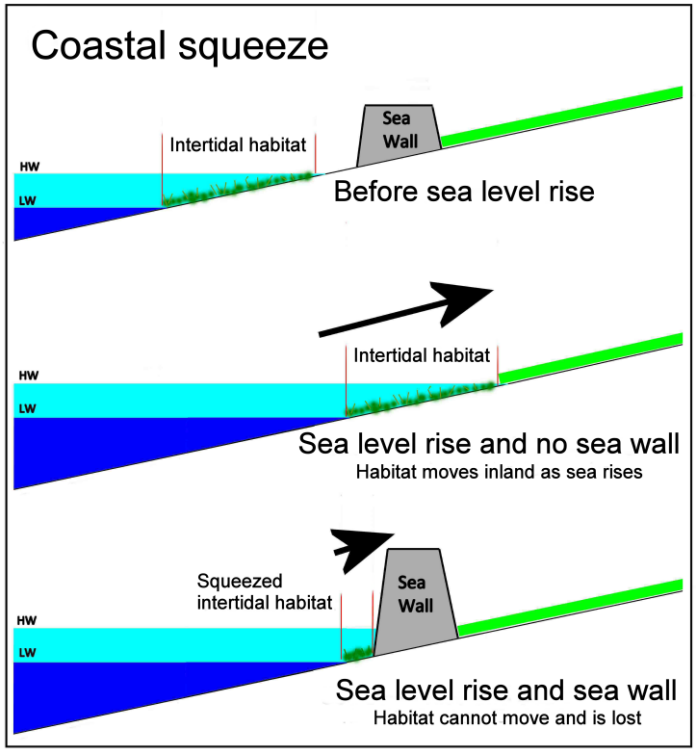


From policy to action

How impacts on the environment can be managed

Special areas

The Exe Estuary is of international importance for nature conservation and is designated as a Special Protection Area. Dawlish Warren sand spit is a Special Area of Conservation. Together these designations form part of what is known as the European Natura 2000 network of sites.



Coastal squeeze

Built defences, such as sea walls, can cause a reduction in the area of saltmarsh and mudflat as the sea level rises. This is because these habitats are prevented from moving further up the shore by the presence of the defence. This process is called 'coastal squeeze'. In the Exe Estuary, this effect will cause loss of internationally important habitat, which is protected by European and UK law. This loss of habitat must be avoided or compensated by the creation of habitat elsewhere.

Future management of the coastline will need to protect the natural environment and be cost-effective. This may mean that certain areas, such as Dawlish Warren sand spit, are allowed to evolve naturally with minimal intervention, rather than constantly trying to battle the powerful forces of nature. These areas will then again be shaped by wind, wave and tide, as they were in the past.

Environmental report

We have considered potential impacts on people, habitats, species, cultural heritage and the landscape. These are described in a separate Environmental Report which supports this Strategy.

How will coastal works be paid for?

Our draft Strategy recommendations will only be implemented if sufficient funding can be found. Our Strategy does not propose detailed schemes nor does it guarantee that funding is available. We have to prioritise where money is spent in order to get the maximum benefit for communities. We recognise that availability of money is likely to limit the ability to deliver works on the ground.

Recent changes to central government funding mean that more schemes will receive some funding, whilst fewer are likely to attract full funding.

Contributions

Where proposed works will not attract full central funding they can only go ahead if costs are reduced (perhaps by accepting a lower standard of protection) or if a local contribution is provided, or a combination of these.

If the local preference is to rely only on central government funding, then it has to be noted that this could involve a long wait.

Funding partnerships can use local contributions to unlock national funding and increase priority, so that projects go ahead sooner. These can come through Local Authorities, developers or from the Regional Flood and Coastal Committee (RFCC) local levy.

Consequences

If funding cannot be found, and projects that have been identified within the Strategy cannot be delivered, the standard of existing defences will worsen over time and the tidal flood risks to that community will increase. If that happens then future generations will have to find even more money to continue their protection or develop new plans to cope with the consequence of living with greater risk.

Let us know your views

The following pages show specific sections of the Estuary, as they are now and how they might look in the future if there were no flood defences in place. For each community around the estuary this document recommends works that are needed by 2030 and also in the longer term, between 2030 and 2110, subject to on-going monitoring and review.

This document can also be viewed online at consult.environment-agency.gov.uk/portal/ together with other supporting information, including the full Environmental Report.

Getting this far has involved face to face meetings with landowners, presentations to parish councils, talks with local businesses and stakeholder events. All comments have been taken into consideration in developing these proposals.

How you can find out more

- See the Exe Estuary Strategy webpages at www.environment-agency.gov.uk/exe/estuary
- The webpages include Fact Sheets and Questions and Answers (Q&A) that may be helpful.
- Come and talk to us at a public meeting or drop-in session. Times and venues will be advertised locally or see the events section of the Living with a Changing Coast website at www.licco.eu/events/category/12/ for more details.
- Contact us using the phone numbers or email addresses provided inside the back cover.
- If you have a specific information request please write to the Environment Agency at the address provided inside the back cover.

How you can comment

Once you have read through our proposals you can send us YOUR views in several different ways:

- Use the automated e-consultation at consult.environment-agency.gov.uk/portal/
- Or complete the questionnaire at www.environment-agency.gov.uk/exe/estuary and email it back to us.
- Post a completed copy of the questionnaire, or write to:

  Exe Strategy,
  Martin Davies,
  Environment Agency,
  Manley House, Kestrel Way,
  Sowton, EXETER, EX2 7LQ

Please ensure that we receive your comments by 5pm on 4 March 2013.

What we will use the responses for

We will use the responses from this consultation to help shape the Exe Estuary Flood and Coastal Erosion Risk Management Strategy. Environment Agency staff dealing with this consultation will see all responses in full.

How we will use your information

Throughout the consultation we will make all comments (apart from personal information) publicly available on the Environment Agency website. This includes comments received online, by email, post and by fax, unless you have specifically requested that your response be kept confidential. Only names of organisations that respond and not individuals will be published.

If you respond online or provide an email address, you will receive an acknowledgement of your response. After the consultation has closed a summary of the responses will be published on the Environment Agency website. We will let you know when this is available.

Under the Freedom of Information Act 2000, we may be required to publish your response to this consultation, but will not include any personal information. If you have requested your response be kept confidential, we may still be required to provide a summary.

'I'm really pleased to have had the opportunity to discuss local issues face to face'

Quote from a Parish Councillor, Stakeholder Event 9 October 2012

1 Sandy Bay

What is at risk?

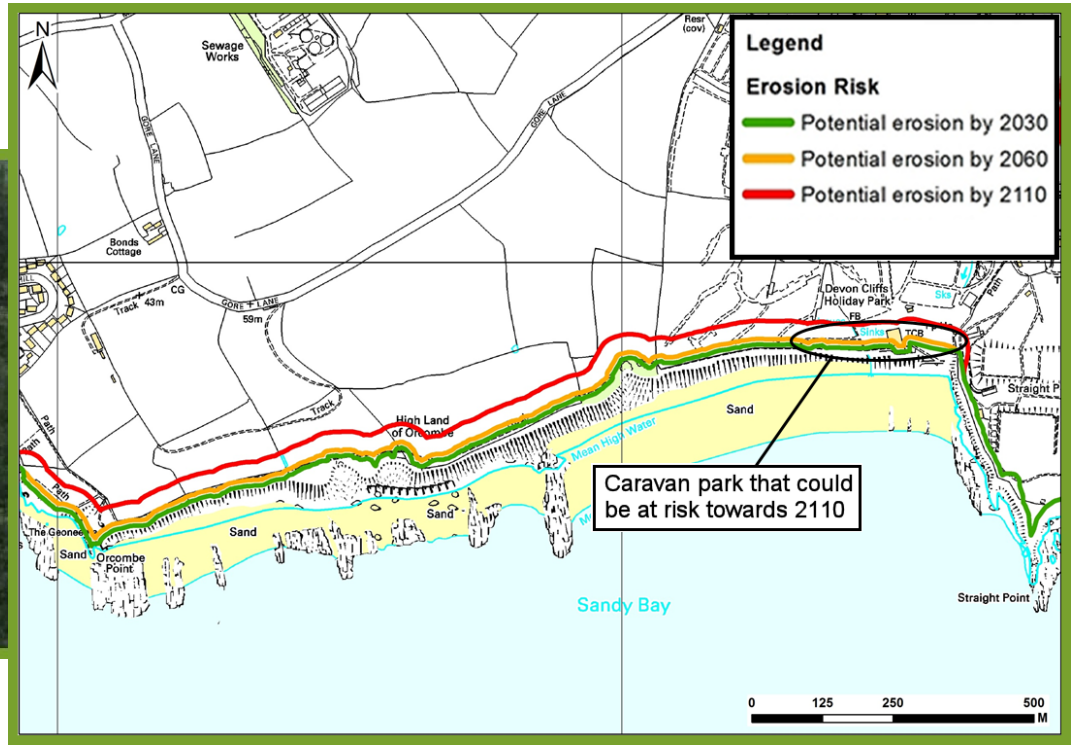
There is no tidal flood risk and erosion risk is very limited until towards 2110, when around 60 caravans could be threatened. The cliff and beach system will evolve naturally to climate change.

Our recommendation

Our recommendation, based on economic, engineering and environmental assessments, is that **No Active Intervention is needed.** This means that no future flood defences are recommended for here. Regular monitoring should be undertaken and the situation reviewed at approximately 10 year intervals.

Other considerations

This section is within the Dorset and East Devon World Heritage Site which has been designated for its special geological features.



2 The Maer, Exmouth

What is at risk?

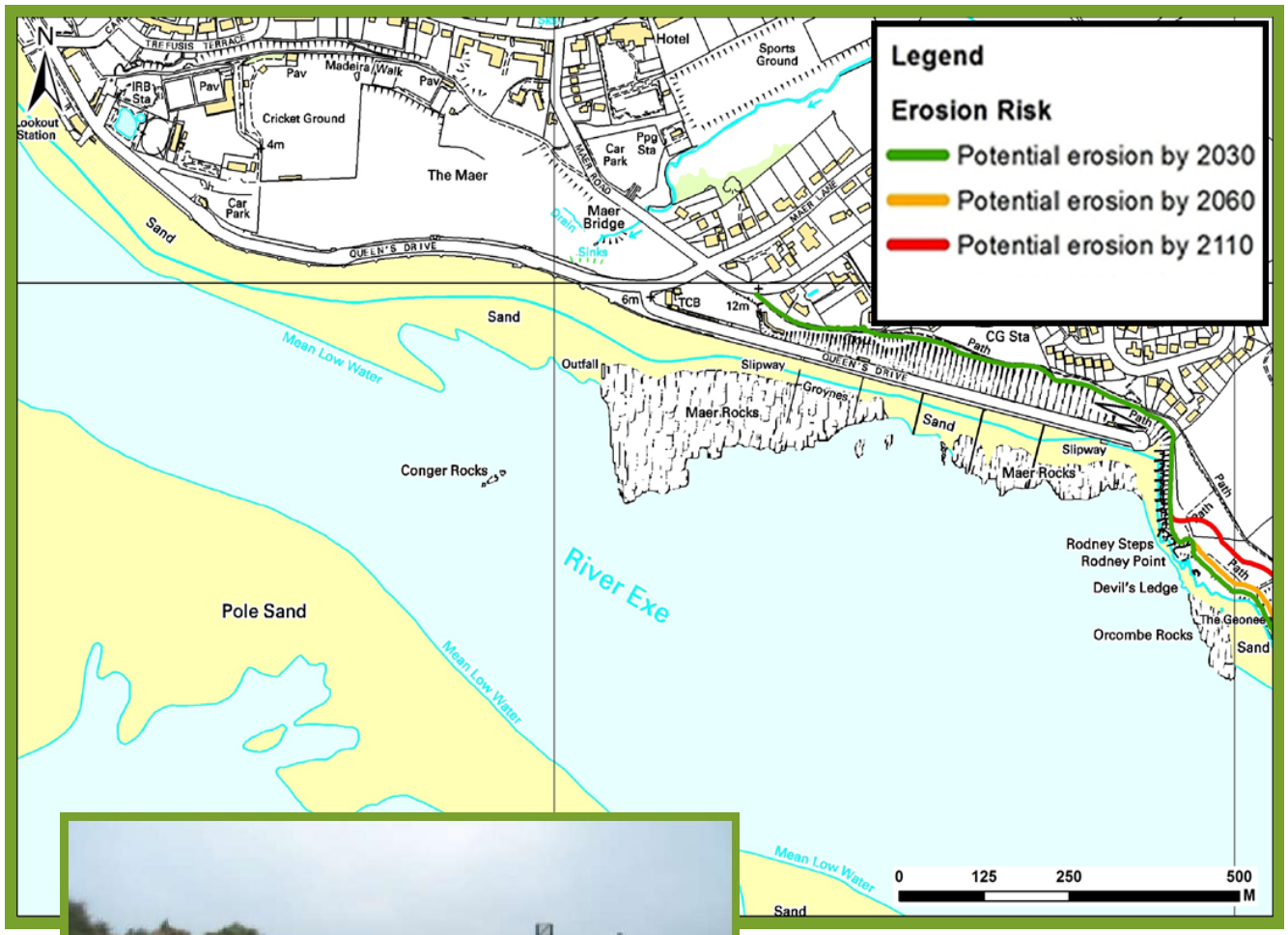
There is no tidal flood risk to the human environment. The existing beach, sand dune and seawall system prevent erosion to the promenade, road and Local Nature Reserve.

Our recommendation

Our recommendation, based on economic, engineering and environmental assessment, is for **beach recharge, recycling of beach material and groyne maintenance to protect the road and amenities from erosion.**

Other considerations

Beach recharge/recycling (i.e. bringing additional sand onto the beach) should be considered in conjunction with works at Dawlish Warren and will be subject to detailed appraisal and licencing.
There is insufficient public benefit to justify central government funding and any work would need local partnership funding.



3 Exmouth

What is at risk?

There is a local 1 in 25 (4%) annual tidal flood risk around Camperdown Terrace and the Imperial Recreation Ground. Existing defences currently limit the annual tidal flood risk to 1 in 1,000 (0.1%) for up to 2,000 residential and commercial properties.

Our recommendation

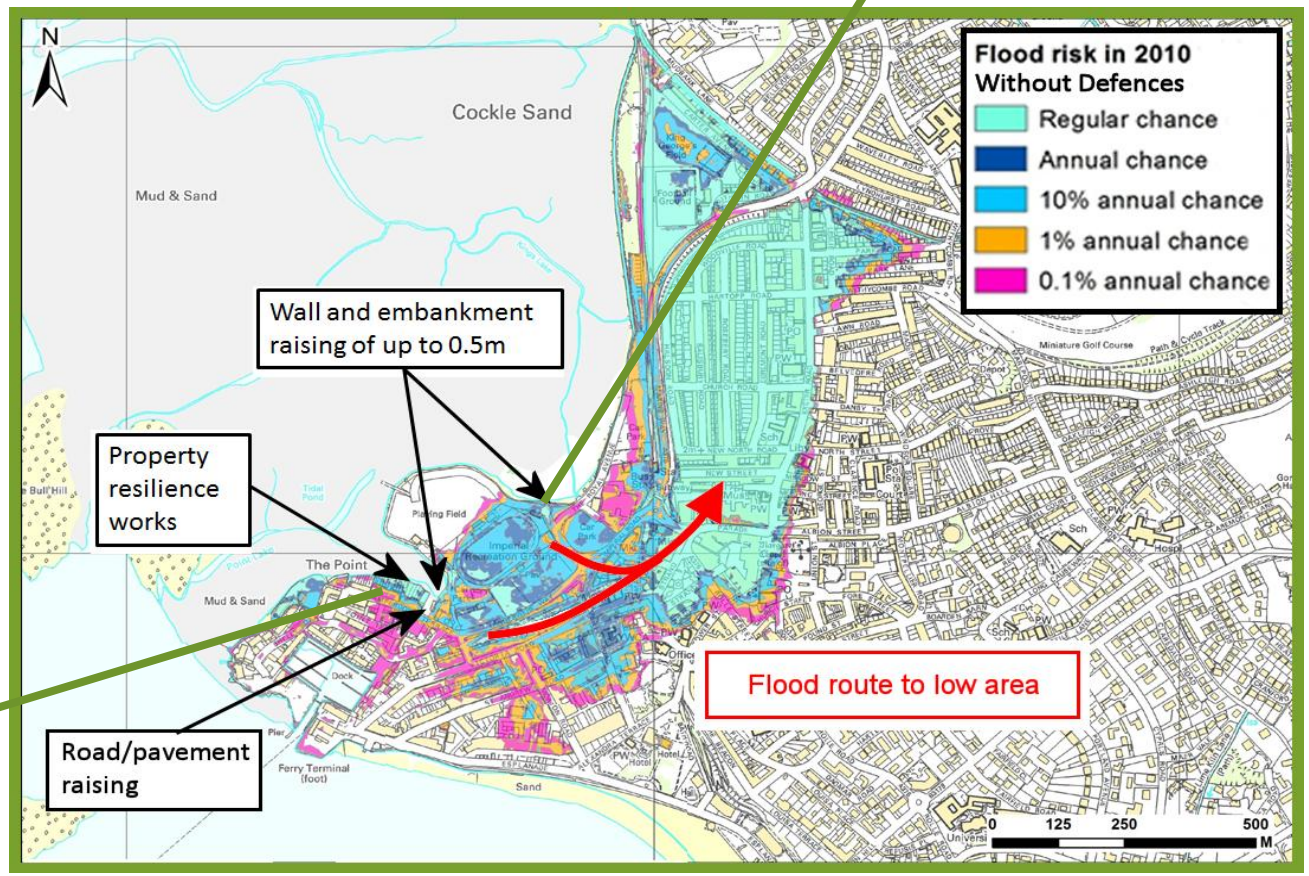
Our recommendation, based on economic, engineering and environmental assessments is for **improvements to revetments and raising walls by up to 0.5m, within the next five years. Local improvements could include road/pavement raising and individual resilience measures for around 20 properties.**

More extensive wall-raising by 0.5-1.2m will be required between 2030 and 2110 to keep pace with climate change.

Other considerations

Improvement works are likely to be supported by government funding, because of the number of properties at risk.

Surface water flood risk to properties in Exmouth is also of concern, and the Strategy recommends further detailed studies.



4 Courtlands to Exton including Lympstone

What is at risk?

Around 200 properties currently have a less than a 1 in 100 (1%) annual risk of tidal flooding.

Our recommendation

Our recommendation, based on economic, engineering and environmental assessments is for **continued maintenance of existing defences. Wall raising of 0.6m - 1.4m will be needed between 2030 and 2110 at Lympstone to keep pace with predicted sea level rise.**

Other considerations

Dawlish Warren provides some shelter to this shoreline.

The majority of this shoreline is protected by the branch line railway and a higher standard of protection may be justified to protect this.

At Lympstone the recent tidal defence scheme protects around 150 properties, with wall improvements and flood gates operated by community wardens.

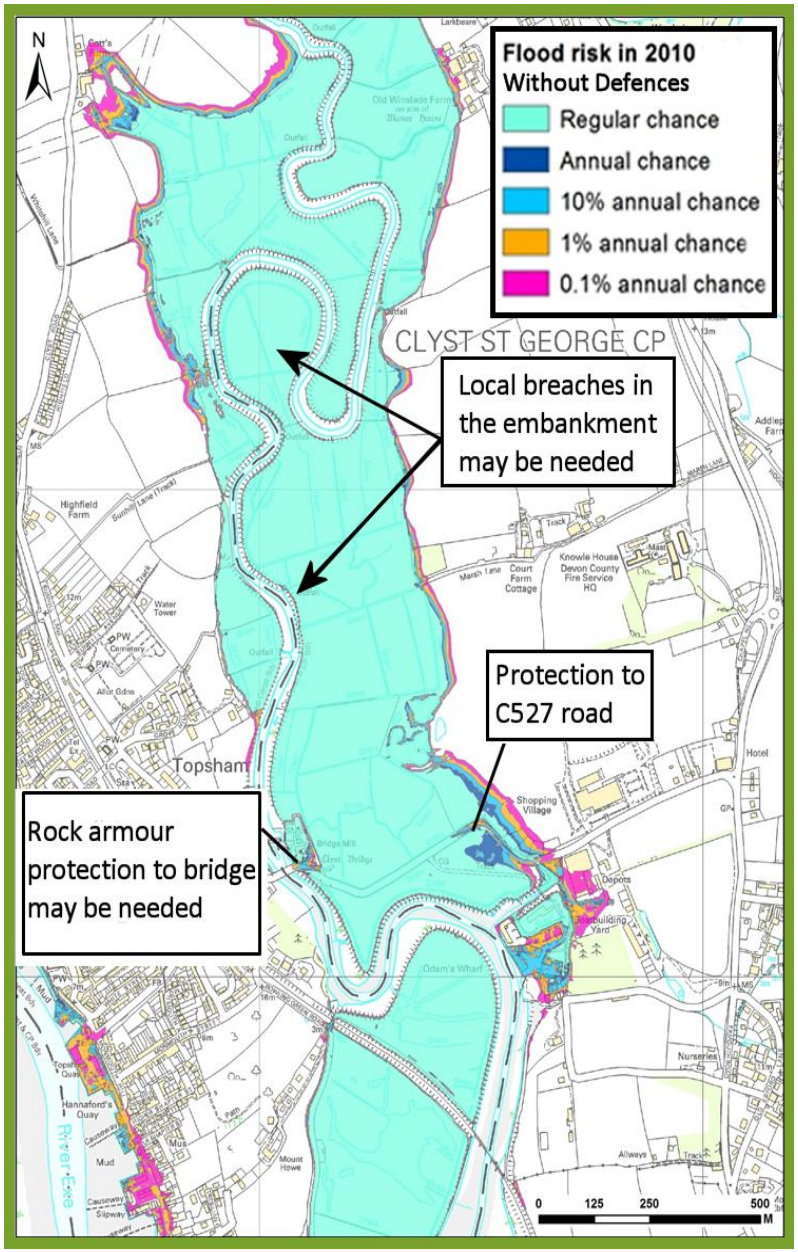
5 East Bank of the River Clyst

What is at risk?

Agricultural land, the C527 road between Clyst St George and Topsham, and fewer than 20 properties currently have a 1 in 5 (20%) annual risk of tidal flooding. The number of properties at risk will rise to over 40 by 2030.

Our recommendation

Our recommendation, based on economic, engineering and environmental assessments, is for the **realignment of some existing embankments before 2030 to create new intertidal habitat. This could be achieved by creating a breach or breaches in some embankments.**



Improved protection from tidal flooding could be achieved to the C527 road by creating new embankments or raising the road, possibly in combination with habitat creation. These measures are subject to the prior agreement of affected landowners. Further improvement to protect the road and properties, with raising of defences by 0.7m, will be required between 2030 and 2110.

Other considerations

Realigning embankments would create 34-38 ha of new inter-tidal habitats to compensate for losses caused by flood and coastal defences that protect communities elsewhere in the estuary.
Funding should be available from central government towards the cost of creating compensation habitat but improved protection to the road will require local partnership funding.

6 West Bank of the River Clyst

What is at risk?

Up to 20 properties are at risk of tidal flooding in the long term, although there is currently only a 1 in 1,000 (0.1%) annual risk.

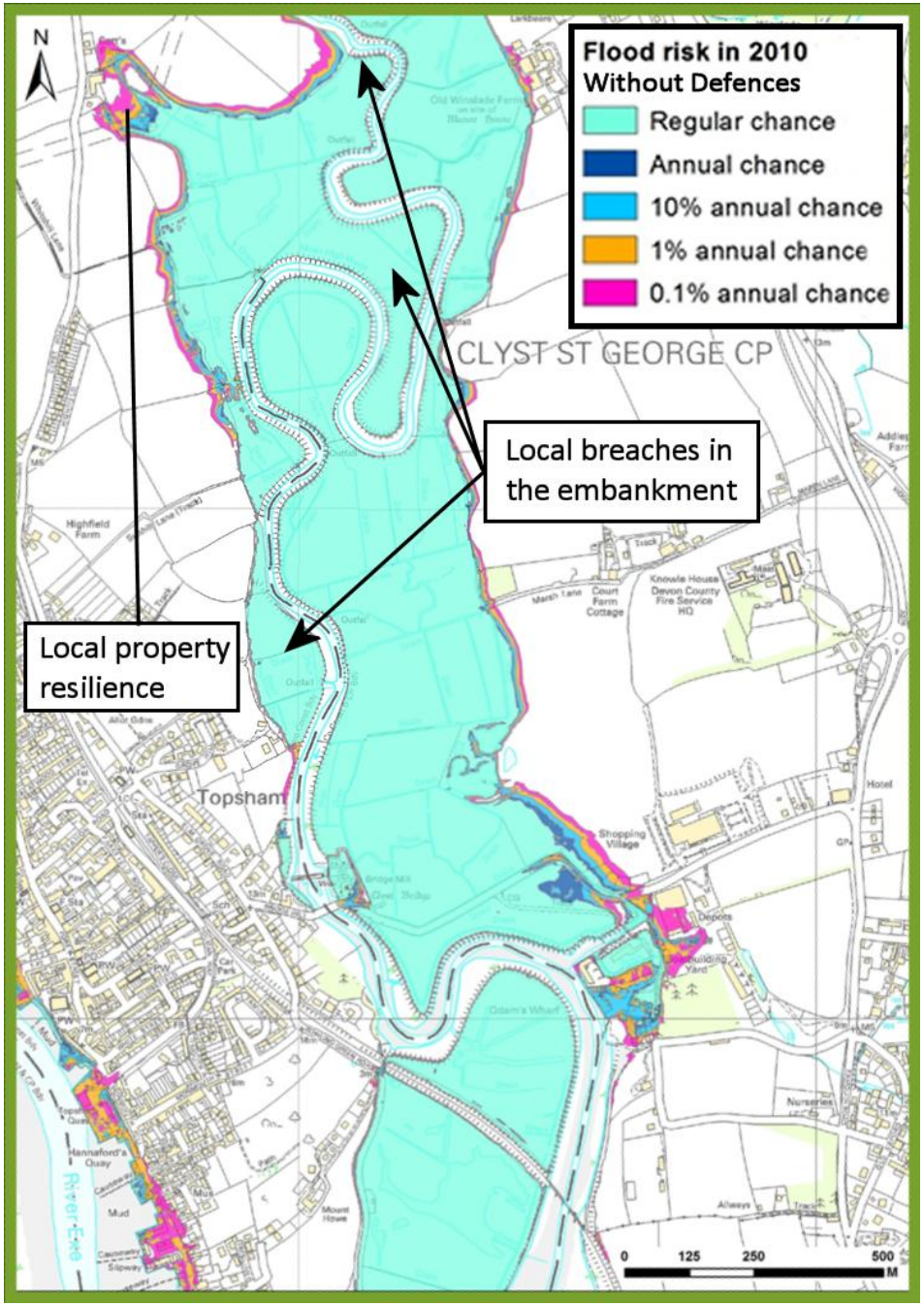
Our recommendation

Our recommendation, based on economic, engineering and environmental assessments, is **to realign some defences on the west bank within the next five years, by locally breaching embankments in agreement with landowners, to create new intertidal habitat. Local resilience measures at one property would ensure no increase in risk to residents.**

Other Considerations

The existing embankments along the west bank of the river Clyst provide a low standard of protection against flooding for the adjacent agricultural land. Realigning some embankments would create 21 ha of new inter-tidal habitat.

There is no economic justification to maintain the existing embankments at public expense but there is a strong case for funding from central government to create habitat. This will compensate for losses caused by flood and coastal defences that protect communities elsewhere in the estuary.



7 Clyst St. Mary

What is at risk?

The embankments around Winslade Barton and Frog Lane currently protect 30-70 local properties and the A376 from tidal flooding, with an annual risk of 1 in 1,000 (0.1%). The risk from fluvial flooding is greater than this.

Our recommendation

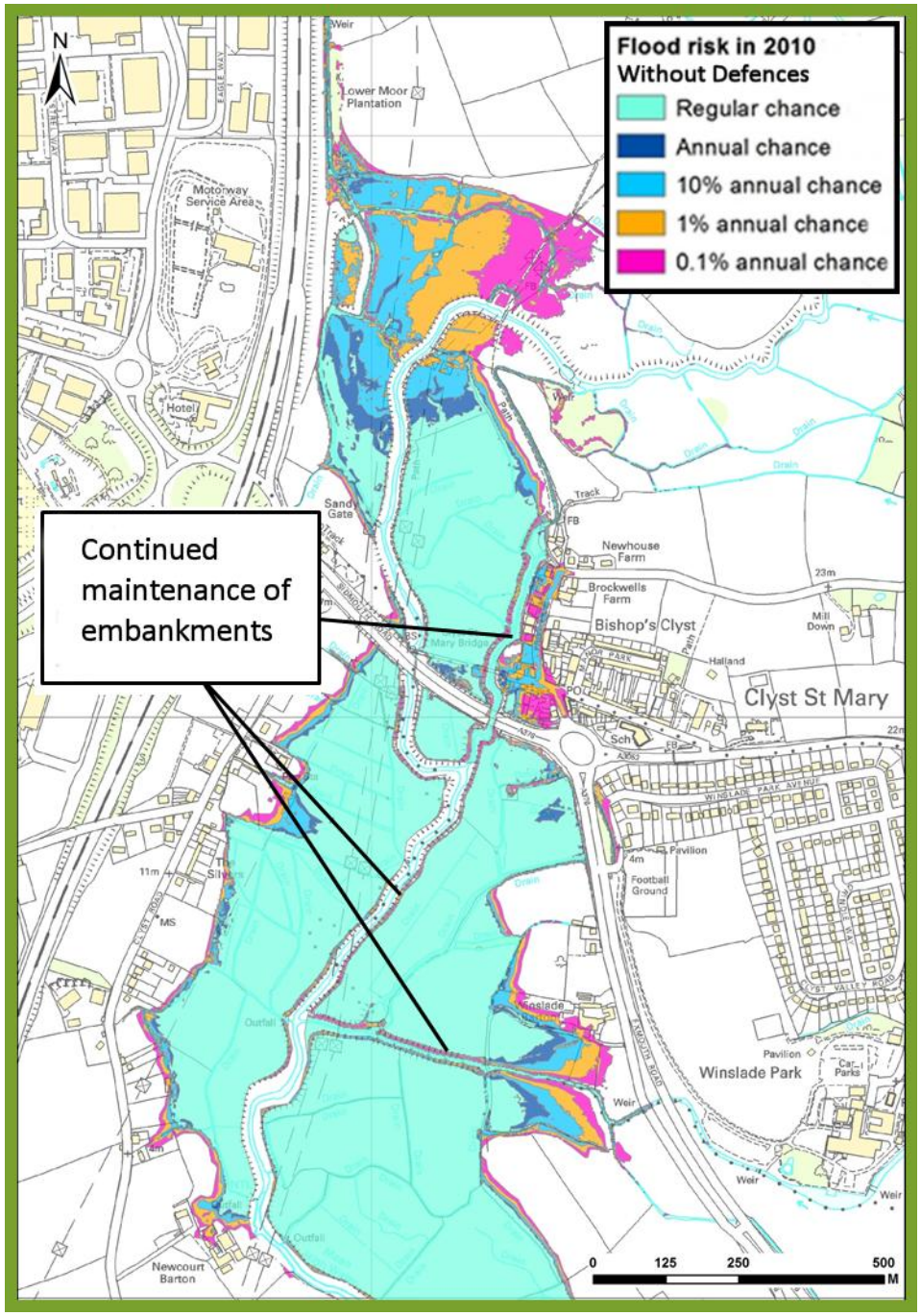
Our recommendation, based on economic, engineering and environmental assessments is for **continued maintenance of the Winslade Barton to Frog Lane embankments. However, the Strategy proposes further studies to reduce the risk of fluvial flooding, which will include a review of this recommendation.**

Other considerations

Economic justification is sufficient to maintain the flood embankments protecting Winslade Barton, the A376 and Frog Lane but not the other embankments in this area that only protect agricultural land to a low standard.

The standard of protection will reduce as sea levels rise but the tidal risk for property will remain below 1 in 50 (2%) up to 2110 and before this time improvements are unlikely to be justified on economic grounds.

However, as the Strategy proposes further studies to review fluvial flood risk here, subsequent recommendations could result in improvements earlier than indicated above.



8 Topsham, Countess Wear and Exminster Marshes

What is at risk?

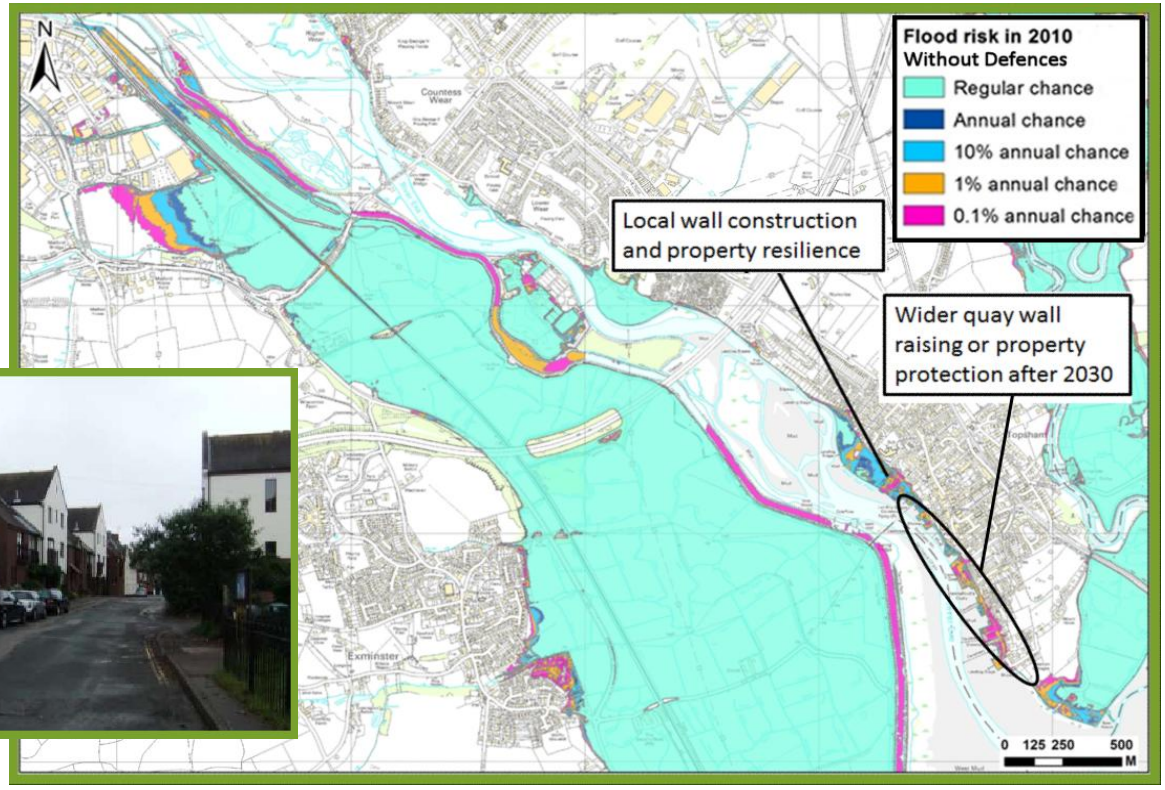
Most properties are high enough to avoid being at risk of flooding. However up to 30 properties, mainly in Topsham adjacent to the recreation ground and along the Strand, have up to 1 in 10 (10%) annual risk of tidal flooding.
On the west bank of the estuary, the Exeter canal banks help to provide protection from tidal flooding for around 200 properties in Exminster, the mainline railway, the M5 motorway and the Exminster Marshes freshwater site.

Our recommendation

Our recommendation, based on economic, engineering and environmental assessments, is for **local ground raising and individual property protection up to 2030 for the Topsham recreation ground area. To keep pace with climate change, wall raising or individual property protection for around 200 properties in Topsham is recommended. Raising of the Exeter canal banks, by around 300mm is also recommended between 2030-2110 to maintain the standard of protection for properties.**

Other considerations

There is economic justification for the recommendation but the cost will need to be supported by local partnership funding.
Surface water flood risk to properties in Countess Wear and Exminster is also of concern, and the Strategy recommends further detailed studies on this.
Some local property resilience has already been undertaken by Exeter City Council at Countess Wear.
Exminster Marshes are part of the Special Protection Area that has been designated for its bird interest.



9 Powderham Banks and the Kenn Valley

What is at risk?

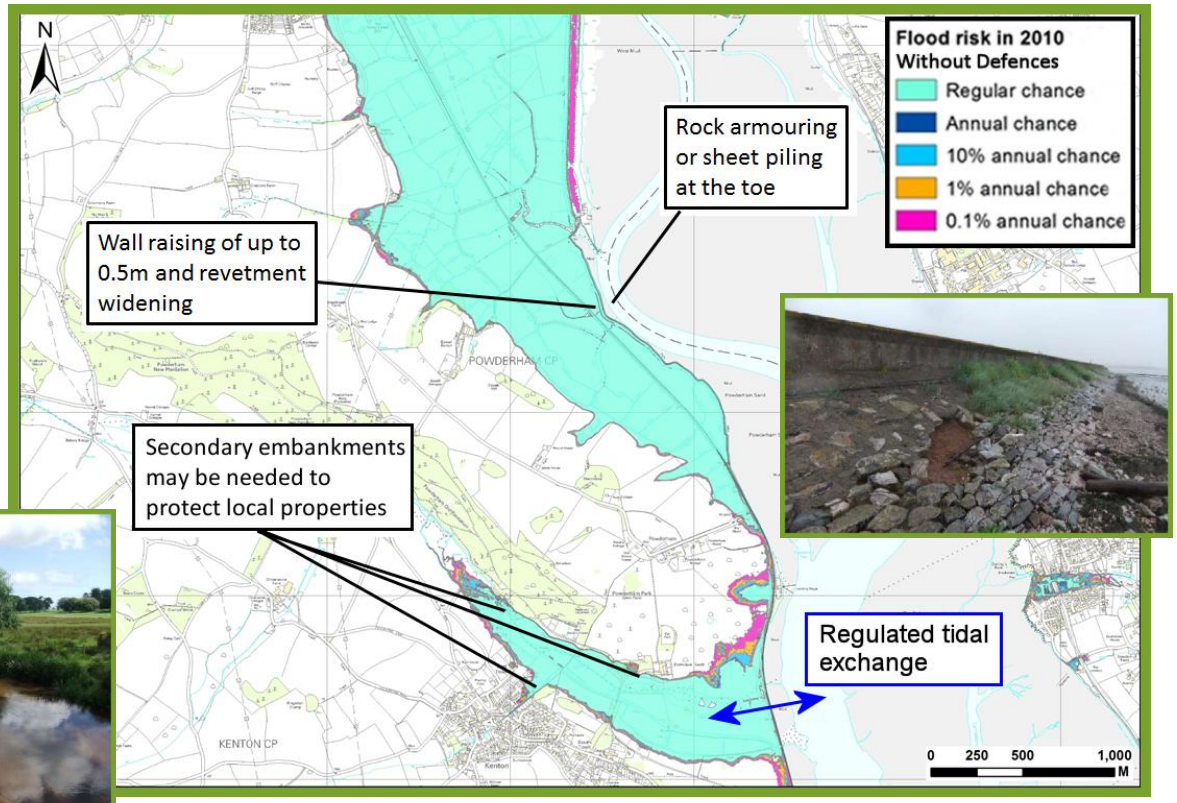
There is a risk to agricultural land and the railway from erosion due to the proximity of the estuary low water channel to the Powderham Banks. There is a 1 in 50 (2%) annual risk of tidal flooding to the mainline railway and Exminster Marshes freshwater site.
30-50 properties will be at regular risk of tidal flooding in the Kenn Valley by 2030.

Our recommendation

Our recommendation, based on economic, engineering and environmental assessments is **for the Powderham Banks, to be raised by 0.5m and strengthened before 2030. Further raising will be needed between 2030-2110, to keep pace with climate change.**
For the Kenn Valley a regulated tidal exchange device to the existing River Kenn culvert is recommended before 2030. Secondary embankments, to improve protection to local properties, are also possible.
Raising of the mainline railway defences of up to 1.1m is likely to be needed between 2030-2110 to keep pace with climate change.

Other considerations

The mainline railway borders the estuary south of Powderham and protects local properties, infrastructure and agricultural land including the Kenn Valley.
The cost of works in the Kenn Valley should receive central funding but other improvement works will need to be supported by local partnership funding.
Controlled tidal flooding of the Kenn Valley will create up to 35 ha of habitat to compensate for losses caused by flood and coastal defences that protect communities elsewhere in the estuary.



10 Starcross and Cockwood

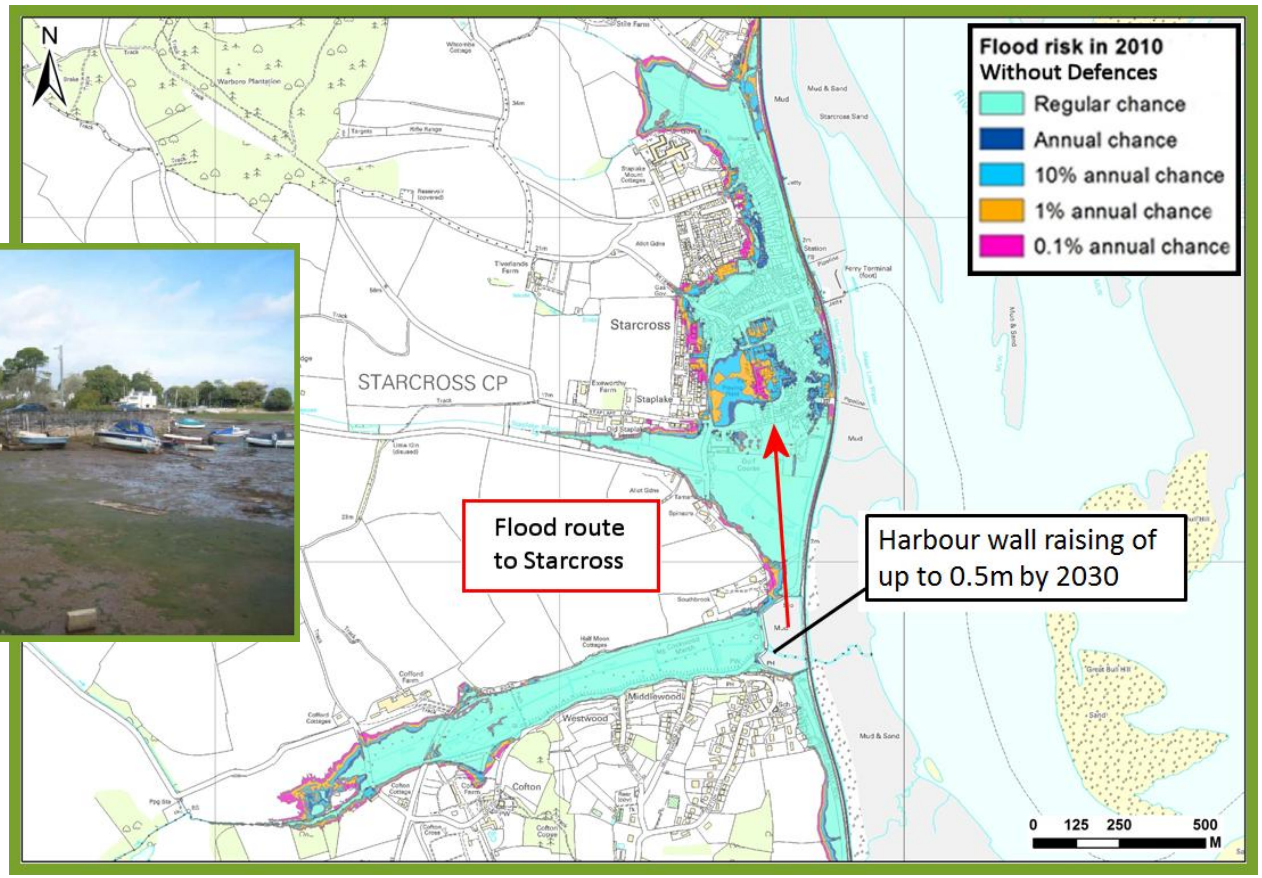
What is at risk?

The mainline railway is at limited tidal flood risk and protects over 600 properties and infrastructure in Starcross. Cockwood harbour walls are lower and allow a 1 in 25 (4%) annual risk of tidal flooding, with a potential flood route to Starcross. There are also local low spots at Generals Lane and near Starcross Fishing & Cruising Club.

The Starcross and Cockwood frontages are sheltered from southerly storms entering the estuary by Dawlish Warren sand spit. Predicted changes to the sand spit will result in reduced shelter and hence greater reliance on local coastal defences, which will then need to be improved. These works have a high level of justification and should therefore be supported by government funding.

Our recommendation

Our recommendation, based on economic, engineering and environmental assessments is for **raising of Cockwood harbour walls or adjacent roads, and other local low spots, by up to 0.5m by 2030. Further raising of the defences and the addition of a 1.2m-1.6m wave recurve wall to the mainline railway embankment will be required between 2030-2110 to keep pace with climate change.**



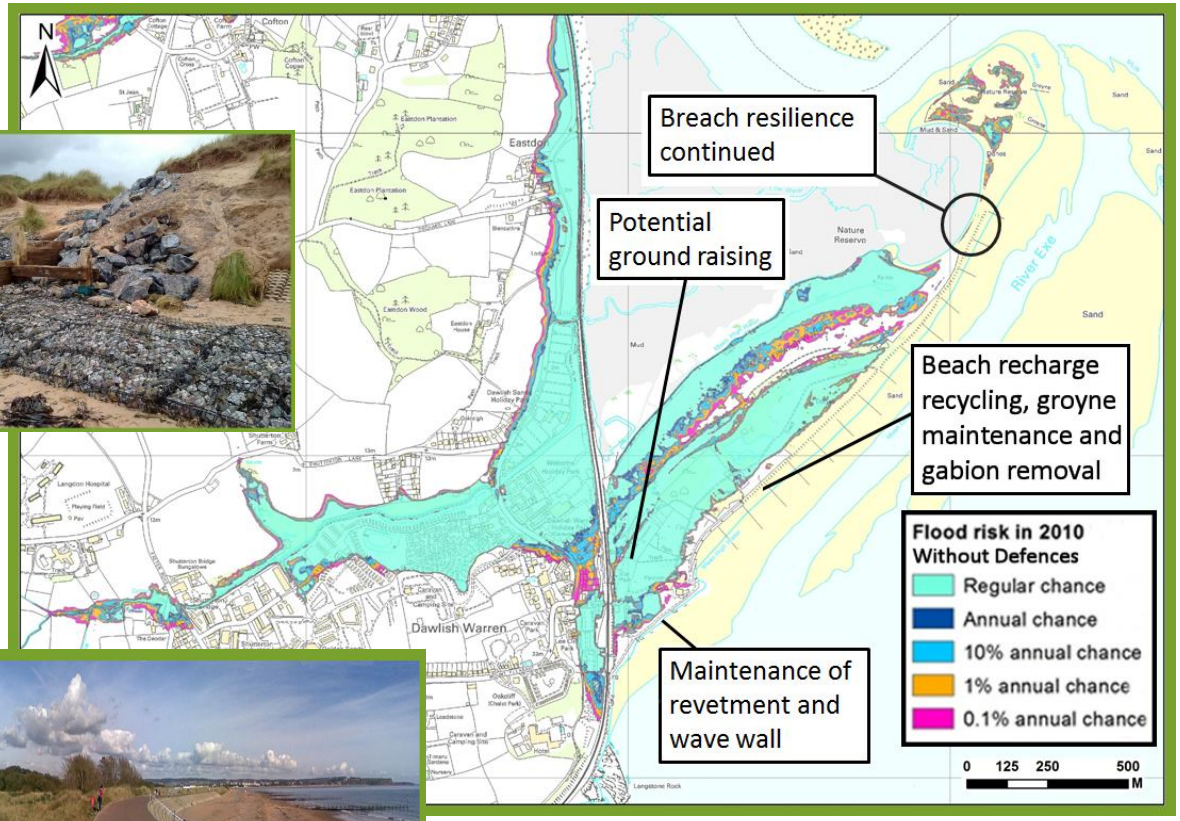
Other considerations

Groundwater flood risk to properties in Starcross is also of concern, and the Strategy recommends further detailed studies on this.

11 Dawlish Warren

What is at risk?

The seaward facing sand dunes and beach are eroding significantly along the majority of the sand spit length. The Special Area of Conservation (SAC) is being damaged by the gabions that were installed in the 1960-70s.



Our recommendation

Our recommendation, based on economic, engineering and environmental assessments, is for **continued maintenance of the coastal revetment and wave wall at the near end. Groyne maintenance, local ground raising and removal of some existing gabions are also recommended in the period up to 2030. This will provide protection for Dawlish Warren village and for the tourist and environmental interests. Beach recharge and recycling will improve the quality of the beach and help it to act as a natural wave barrier into the medium term (towards 2060).**

Between 2030-2110 the coastal revetment will need to be maintained and improved, with the sand spit being allowed to evolve naturally.

Other considerations

It is predicted that towards 2060 continued engineered control of the sand spit will become too difficult and costly. We also then expect that the sand spit will partly lose its sheltering function, requiring further defence improvements within the Estuary.

Some of this work will require local partnership funding.

12 Dawlish Warren to Holcombe

What is at risk?

Around 100 properties in Dawlish Warren village have an annual tidal flood risk of between 1 in 25 (4%) and 1 in 1,000 (0.1%).
South of Langstone Rock, most risk is to the mainline railway and services can be disrupted. The existing risk is 1 in 25 (4%).
There is also the risk of coastal erosion/landslip along this coastline.

Our recommendation

Our recommendation, based on economic, engineering and environmental assessments is for **improvements to the mainline railway revetment in the short term. Network Rail is carrying out its own studies to develop the approach to this, which the Strategy supports. Resilience works for local properties, adjacent to where Dawlish Water discharges to the sea, will be required between 2030-2110 to keep pace with climate change.**
The improvement works would improve protection and reduce operational impacts on the mainline railway, and limit tidal flood risk to property into the future.

Other considerations

The drainage of low-lying areas, particularly during tide-lock, and the flood risk to properties due to groundwater are also of concern, and the Strategy recommends further detailed studies on these.
See also Dawlish Warren sand spit.

Summary of recommendations for works to be undertaken by 2030

	When recommended	Central funding expected	Amendment to the SMP policy
1 Sandy Bay	Not required		No
2 The Maer, Exmouth	5-15years	Little or none	Yes[1]
3 Exmouth	0-5 years	Most or all	No
4 Courtlands to Exton including Lympstone	Not required		No
5 East Bank of the River Clyst	5-15 years	Some	No
6 West Bank of the River Clyst	0-5 years	Most or all	No
7 Clyst St Mary	Not required		No
8 Topsham and Countess Wear	5-15 years	Some	No
9 Powderham Banks[A] and the Kenn Valley[B]	0-15 years	Some[A]/Most or all[B]	Yes[2]
10 Starcross and Cockwood	0-5 years	Most or all	No
11 Dawlish Warren sand spit	0-15 years	Some	No[3]
12 Dawlish to Holcombe	Not required (subject to Network Rail)		No

[1] Managed realignment had been considered but is now not considered necessary

[2] The Kenn Valley is now being considered as a potential site for habitat creation instead of Powderham Banks

[3] Studies have clarified that 'hold the line' of the seaward face of the sand spit is not considered sustainable in the medium to long term

Glossary of Terms

Beach recharge / recycling	Beach recharge, also referred to as beach nourishment or replenishment, describes a process by which sediment (usually sand) lost through longshore drift or erosion is replaced on a beach. It involves the transport of the nourishment material from one area to the affected area. The process is described as recycling when the nourishment material originates from the affected area.
Coastal squeeze	Coastal squeeze is the term used to describe what happens to coastal habitats that are trapped between a fixed landward boundary, such as a sea wall and rising sea levels and/or increased storminess.
Erosion	Coastal erosion is the wearing-away of land and the removal of beach or dune sediments by wave action or currents. It can be gradual or dramatic, such as following a major storm or a cliff fall.
Flood resilience measures	Flood resilience measures do not prevent flooding but reduce the damage caused, by using materials that are less affected by water, such as tiles, and through measures to minimise disruption, such as by raising electrical sockets.
Gabion	Gabions are wire mesh baskets filled with cobbles or crushed rock. As they are flexible and porous they can absorb some wave and wind energy, thereby reducing the scour problems associated with solid sea defences such as concrete seawalls.
Groyne	Groynes are like fences built at right angles to the beach, usually of wood or rock. They are used to slow down longshore drift and build up the beach.
Individual property protection	Individual property protection includes measures such as door barriers, air brick covers, non-return valves, toilet bungs, sealing around service pipes and waterproofing of walls. Grants can be available through local authorities.
Inter-tidal habitat	Inter-tidal habitats are those that occur between low and high water and are therefore alternately exposed to the air and wetting. They include sandbanks and saltmarsh, which can be particularly rich and diverse in species that they support.
Longshore drift	Longshore drift, also known as littoral drift, is the movement of beach material along the shoreline due to the prevailing wind and wave conditions.
Natura 2000 network	Natura 2000 is a European Union wide network of nature protection areas established under the 1992 Habitats Directive. It is comprised of Special Areas of Conservation (SAC) designated by Member States, and also incorporates Special Protection Areas (SPAs) which they designate under the 1979 Birds Directive.
Probability	Probability is the measure of expectation and is also known as the likelihood or chance. Floods are often described in terms of the chance in any one year, such as a 1 in 100 or a 1% annual probability.
Realignment	Realignment involves moving existing coastal defences. Whilst this can be forward to “reclaim” land, with sea levels rising it is more usual to move them to a more sustainable inland position that creates valuable new intertidal habitat. This can also be known as managed retreat or setback.

Regulated tidal exchange	Regulated tidal exchange is the movement of seawater in and out of an area behind fixed sea defences, through engineered structures such as sluices, tide-gates or pipes. These allow the creation of saline or brackish habitats but limit water levels that could cause flooding.
Revetments	Revetments are sloping structures that are constructed along rivers or coastlines to reduce wave action and erosion. They can be impermeable or permeable and constructed from rock, concrete or timber. See wave recurve wall.
Risk	Although the term risk is often used in place of probability, it is used technically in the context of flood and coastal erosion to describe the combination of probability and consequence. The risk for 100 houses, each with a 1 in 50 (2%) annual probability of being flooded, would be the same as for 50 houses, each having a 1 in 25 (4%) annual probability.
Shoreline Management Plan (SMP)	A Shoreline Management Plan sets out the policy for managing our coastline and how we respond to the threat of coastal flooding and the risks of erosion. It is based on large-scale assessment of the risks associated with coastal processes and helps reduce these risks to people and the developed, historic and natural environments. The South Devon and Dorset SMP extends from Rame Head near Plymouth to Durlston Head near Swanage, and was finalised in June 2011.
Special Area of Conservation (SAC)	Special Areas of Conservation (SACs) are strictly protected sites designated under the UK Habitats Regulations for the quality of the habitat and species. Dawlish Warren sand spit has been designated a SAC for its coastal sand dune habitat and the presence of petalwort.
Special Protection Area (SPA)	Special Protection Areas (SPAs) are strictly protected sites classified in accordance with the UK Habitats Regulations. They are classified for rare and vulnerable birds and for regularly occurring migratory species. Particular bird species within the Exe Estuary SPA include the Slavonian grebe, dark-bellied brent goose, pied avocet and black-tailed godwit.
Standard of protection	The standard of protection of a flood defence refers to the probability of the largest flood that it is designed to withstand. Hence we can expect a 1 in 100 (1%) standard of defence to be overtopped, on average, once every 100 years.
Sustainable	There are many definitions of the term ‘sustainable’, which recognise that the economy, environment and society are interconnected and that present needs should not be met at the expense of the future. A decision now that commits future generations to excessive costs, or leads to irrevocable environmental damage, is unsustainable.
Tidal flooding	Tidal flooding occurs when sea level is raised, due to tides and usually other factors, above the level of natural or man-made defences. Other factors include the weather, which produces surge tides and waves, tsunamis and sea level rise. Tidal conditions can also exacerbate freshwater and sewer flooding by affecting free drainage.
Toe defence	Toe defences are often used at the base of revetment or sea walls to prevent scour that could lead to structural damage. They are often constructed from steel sheet piles.
Wave recurve wall	A wave recurve wall is a sea defence designed to reduce wave overtopping by deflecting up-rushing water back seaward. It is sometimes known as a parapet or wave-return wall. Sea defences may combine a wave recurve wall with revetment and toe defence.

To find out more about the Strategy…

You can visit the Environment Agency website which will be updated as new information becomes available. Fact sheets can also be found on this website, which give more detail about different aspects of the Strategy.
Or you can contact the local Environment Agency office:

Martin Davies
Email:
martin.davies1@environment-agency.gov.uk
Tel: 01392 354133

The Environment Agency Strategy website:
www.environment-agency.gov.uk/exe/estuary

To learn more about living with a changing coast…

If you represent an organisation or community group and would like us to come and talk with you about these proposals please contact the Living with a Changing Coast Project Officer:

Jane Lavick
Email: jane.lavick@environment-agency.gov.uk
Tel: 07917 238309

Or visit the Living with a Changing Coast website:
www.licco.eu

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Would you like to find out more about the Environment Agency or about your environment?

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*Calls to 03 numbers cost no more than a national rate call to an 01 or 02 number and must count towards any inclusive minutes in the same way as 01 and 02 calls. These rules apply to calls from any type of line including mobile, BT, other fixed line or payphone.