



Llywodraeth Cymru
Welsh Government

The National Strategy for **Flood and Coastal Erosion Risk Management in Wales**

October 2020



Contents

Ministerial Foreword	3		
1 Introduction	4		
<ul style="list-style-type: none"> Purpose of the National Strategy Strategic and Legislative Context Progress since the publication of the first National Strategy Looking ahead – what next for flood risk management in Wales 			
2 National Strategy Objectives and Measures	11		
3 Flood and Coastal Erosion Risk	12		
<ul style="list-style-type: none"> Types of flooding and coastal erosion Risk and Likelihood Climate Change Adaptation Impacts 			
4 Roles and Responsibilities	17		
<ul style="list-style-type: none"> Welsh Risk Management Authorities Organisations Groups and Committees 			
5 Flood and Coastal Erosion Risk Management	25		
<ul style="list-style-type: none"> Objective A: Improving our understanding and communication of risk Flood and coastal risk information and mapping Flood Risk Management Plans Shoreline Management Plans Coastal monitoring 	25		
<ul style="list-style-type: none"> Objective B: Preparedness and Building Resilience Community resilience and behaviours Awareness Raising 	30		
<ul style="list-style-type: none"> Objective C: Prioritising investment to the most at risk communities Natural Flood Management Green-grey infrastructure 	33		
<ul style="list-style-type: none"> Objective D: Preventing more people becoming exposed to risk Managing development risk Coastal adaptation Asset maintenance 	39		
<ul style="list-style-type: none"> Objective E: Providing an effective and sustained response Emergency Response Review of flood events 	44		
		6 Funding Flood and Coastal Erosion Risk Management	46
		<ul style="list-style-type: none"> Funding and budgets for FCERM Future funding and longer-term programme pipelines Prioritisation Wider benefits and partnership funding contributions Monitoring and Reporting of this National Strategy 	
		Summary of Measures	52
		Glossary/Definitions	55

Ministerial Foreword



Flood and Coastal Erosion Risk Management (FCERM) in Wales amounts to far more than the building of defences. Our risk management approach encourages wider resilience, prevention and awareness, so better decisions can be made, by the public and those who have an influence on development and the environment.

The storm events of 2020 have emphasised the need to reinforce our strategic

priorities for flood prevention, resilience and climate adaptation. I witnessed first-hand the devastation flooding can bring to communities and the impact it has had on our infrastructure and economy. However, I also saw how resilient and generous people can be, and the way in which neighbours, businesses, Local Authorities and responders worked together during the response and recovery. Our network of flood assets again showed their worth by protecting tens of thousands of homes from flooding.

We are learning lessons from those floods. They have helped strengthen this new Strategy and the Welsh Government's resolve to do more.

This Government wants to leave a legacy for future generations in Wales, placing management of water at the heart of decision making whilst planning effectively for the rising challenge of climate change, and reducing the risk to life.

Wales is encouraging better provision of information, more natural flood management schemes and greater collaboration in this new Strategy to further reduce risk and create better, more sustainable schemes which deliver wider wellbeing benefits. Improving access to clear, accurate flood and coastal information will help us all to make better, more informed decisions and maximise the impact of our investment.

We are promoting wider catchment approaches to managing risk, cross-border and multi-agency working, and the sharing of ideas. To help do this, we need clarity on roles and responsibilities. This not only helps our Risk Management Authorities but also the public in understanding who does what and their own role in staying safe and building resilience. Of course, it is not possible to remove all risk; however, we can agree ways to manage it and help reduce its impact.

Climate change will bring rising sea levels and more intense storms. Wales faces tough decisions on how to defend low-lying coastal areas and fluvial floodplains, in particular along estuaries and in our steep-sided valleys. We can reduce risk to existing homes but we need to ensure poor development decisions are not made now which put more people at risk in the future.

This Strategy strengthens our stance on prevention and links with new Welsh legislation and other policy areas to ensure we do not store up problems for future generations. Our new direction on sustainable drainage and revised planning policy help to complement this Strategy and ensure a consistent national approach to the management of land and water. As such, the Strategy has been prepared alongside new flood risk data and updated planning policy in Technical Advice Note (TAN) 15. This will ensure our flood, coastal and planning policies align, taking into account better information to avoid inappropriate development and provide clear advice in the new Wales Flood Map.

This Government has boosted investment through the introduction of the Coastal Risk Management Programme and more flexible funding to support delivery. This makes it all the more important to work with our communities to tailor alleviation projects to each location, then monitor their effectiveness and communicate how risk is being managed, so the public can remain involved and benefit from safer places. This transparency not only builds trust and maximises benefits from investment, it will also foster a collective responsibility to ensure we all play our part in helping reduce risk.

Lesley Griffiths MS

Minister for Environment, Energy and Rural Affairs

Introduction

1. Across Wales over 245,000 properties are at risk of flooding from rivers, the sea and surface water¹ with almost 400 properties also at risk from coastal erosion². As the climate changes we can expect those risks to increase, with more frequent and severe floods, rising sea levels and faster rates of erosion of the coast. This is likely to mean more communities will be affected by flooding and coastal erosion, including some that are not currently considered to be at risk.
2. Managing the risk from flooding and coastal erosion is a priority for the Welsh Government. Our Programme for Government: Taking Wales Forward commits to continuing investment in flood defence work, with over 45,000 properties benefitting between 2016 and 2021.
3. However, Flood and Coastal Erosion Risk Management (FCERM) in Wales amounts to far more than the building of defences. Our risk management approach encourages wider resilience, prevention and awareness of risk so that better decisions can be made, both by the public and those with an influence on how land and water is managed.
4. This new Strategy further strengthens our policies on communication, catchment approaches, collaborative working and forward planning. It complements new legislation to not only reduce present risk but also prevent issues for future generations through informed, place-based decisions. Recent improvements to asset data and mapping, alongside new guidance on natural flood management and investment are helping to make this possible and more widely understood by the public and those responsible for delivery.
5. Climate change will bring significant challenges. Difficult decisions will need to be made as to where investment is directed and how we adapt. We are committed to finding better ways of managing water across catchments, working with communities and maintaining our existing infrastructure so it remains resilient.
6. Since the last National Strategy in 2011, £600 million³ has been invested across Wales, reducing risk to communities. In that time we have also seen major flooding events including widespread coastal flooding in 2013/14 and river flooding in 2020. We know through investigation reports that the assets in place protected many more homes from flooding in each of these events demonstrating the importance of continued investment. The Wales Coastal Review (2014) estimated that our network of assets and defences prevented £3 billion of damages in the coastal storms of December 2013 and January 2014⁴.

7. The Strategy is being launched in uncertain times as we respond to major flooding events as well as COVID-19. There are likely to be increasing pressure on budgets as we help our nation to recover. As such, we need to maximise and communicate the benefits of our investment, ensure value for money and have others take responsibility and play their part in helping reduce risk.

Purpose of the National Strategy

8. This is the second National Strategy on **Flood and Coastal Erosion Risk Management (FCERM)** for Wales, replacing the 2011 Strategy. It is prepared under the terms of the Flood and Water Management Act 2010.
9. This Strategy sets out how we intend to manage the risks from flooding and coastal erosion across Wales. It sets objectives and measures for all partners to work towards over the life of this document, which will be 10 years unless significant policy updates are required prior to that time.
10. Whilst measures are designed to be clear and deliverable over the next decade, the Strategy has been drafted with a longer-term, strategic view, recognising the nature of flood and coastal erosion risk with respect to the challenges of climate change. In this way, it will work alongside other strategic plans for shoreline management, infrastructure and planning to set out the direction we want to take.
11. Since the first National Strategy was published, legislation has been passed which affects the way we work. The Well-being of Future Generations (Wales) Act 2015 and Planning (Wales) Act 2015 encourage partnership working, collaboration and a long term approach. The Environment (Wales) Act 2016⁵ introduced the sustainable management of natural resources approach and duties to enhance biodiversity, and reduce carbon emissions. It also provided powers to establish a new Flood and Coastal Erosion Committee, which was set up in 2019.
12. In addition, we have taken into account recommendations made by the Wales Audit Office (WAO) in its 2016 report on Coastal Flood and Erosion Risk Management in Wales⁶, the Public Accounts Committee's 2017 report on Coastal flood and erosion risk management in Wales⁷, as well as the 2014 Wales Coastal Flooding Review⁸. These reports provided positive recommendations for the development of coastal risk management in Wales.

1 Flood Risk Assessment Wales, NRW (2019).

2 National Coastal Erosion Risk Map (2012); most likely scenario under SMP policies over next 100 years.

3 Welsh Government Capital and Revenue investment, including ERDF and CRMP, 2012/13 to 2020/21

4 Wales Coastal Flooding Review Phase 1 Report – naturalresourceswales.gov.uk/media/1936/wales-coastal-flooding-review-phase-1.pdf

5 www.legislation.gov.uk/anaw/2016/3/contents/enacted

6 www.audit.wales/node/3952

7 www.assembly.wales/laid%20documents/cr-ld11073/cr-ld11073-e.pdf

8 naturalresources.wales/evidence-and-data/research-and-reports/reports-evidence-and-data-on-flooding/wales-coastal-flooding-review-delivery-plan-phase-2-recommendations/

13. Key changes to this National Strategy include the clarification of roles and responsibilities around flood and coastal erosion, the promotion of natural measures and catchment approaches, new objectives on improving our understanding and preventing exposure to risk, highlighting the importance of good information and effective planning, and direction on how our investment is prioritised, supported by new FCERM Business Case Guidance.
14. The Strategy has been developed in light of the Welsh Government’s Natural Resources Policy⁹ and gives support to **Natural Flood Management (NFM)**, where appropriate. NFM is also sometimes referred to as **nature based solutions**; however the NFM term is more widely used in flood risk management.
15. Local Flood Risk Management Strategies are a requirement of the Flood and Water Management Act¹⁰ and must be consistent with this National Strategy. Local Flood Risk Management Strategies in Wales should be reviewed to align with this document’s objectives, measures and related policies and legislation.

Strategic and Legislative Context

16. The Flood and Water Management Act 2010 sets out how Welsh Ministers must develop, maintain and apply a National FCERM Strategy. Further to this, the EU Floods Directive (2007) and Flood Risk Regulations (2009) set out how Member States must report on certain aspects of flood risk management, in particular identifying and addressing areas of high risk.
17. **‘Taking Wales Forward’** sets out the programme for Government i.e. what the Welsh Government will deliver during this term of Government¹¹. In that document there is a commitment to ‘continue to invest in flood defence work’.
18. **‘Prosperity for All: the national strategy’** sets out how the Welsh Government, will deliver for Wales, setting long term commitments in terms of four themes: Prosperous and Secure, Healthy and Active, Ambitious and Learning, and United and Connected. It has a strong focus on building economic resilience and taking actions to address the effects of climate change. The strategy states the Welsh Government will: actively manage the risks that climate change presents to health, well-being and to communities’.
19. **Flood and Coastal Erosion Risk Management (FCERM)** helps deliver against the national strategy’s priority themes and underlying priority areas as follows:

Figure 1: FCERM links to priority themes in ‘Prosperity for all: the national strategy’

Prosperous and Secure	FCERM supports the economy by improving resilience of people, businesses and transport by reducing the likelihood and consequences of flooding and coastal erosion.
Healthy and Active	The reduction of flood risk through alleviation schemes can promote more healthy and active communities. Raising awareness and community engagement can improve the mental health of those at risk and ultimately aims to prevent loss of life. The development of a flood risk management scheme can also provide wider benefits such as footpaths and cycle lanes.
United and Connected	FCERM schemes are designed to reduce the consequences from flooding and coastal erosion resulting in more resilient, well connected communities.

Figure 2: Links to priority areas in ‘Prosperity for all: the national strategy’

Housing	Good quality, affordable housing is acknowledged as the bedrock of living well; FCERM activity supports this by prioritising funding to communities most at risk. The Welsh Government has also worked with the insurance industry on affordable insurance for high risk households and is contributing to a project to improve standards for Property Flood Resilience, making homes more resilient to flooding. New homes should be planned consistent with Planning Policy Wales and TAN 15, utilising the latest flood and coastal information to avoid inappropriate development or increasing the flood risk elsewhere.
Mental Health	The link between flood risk and mental health is well established. Providing services that raise awareness of flood risk, providing flood warnings, and information on what to do before, during and after a flood are key to the delivery of the FCERM objective of ‘preparedness and building resilience’ and helps reduce anxiety associated with flooding.

20. FCERM is well placed to provide effective infrastructure and land management which brings wider wellbeing benefits. This will help make communities a safer, more resilient environment whilst reducing mental health issues. We are also investing in longer term coastal adaptation and wider catchment schemes to lessen the impact of climate change on communities

9 gov.wales/docs/desh/publications/170821-natural-resources-policy-en.PDF

10 Flood and Water Management Act 2010, Section 10, Local flood risk management strategies: Wales

11 Current Government term is 2016-21

21. The Well-being of Future Generations Act defines the well-being goals, which set a shared vision for public bodies in Wales to work towards. By working with natural processes and identifying opportunities for Natural Flood Management (NFM) to reduce flood risk, public bodies are: contributing to the well-being goals through the Sustainable Management of Natural Resources¹², maintaining and enhancing biodiversity¹³, and delivering our Natural Resources Policy¹⁴ priorities.
22. We encourage RMAs to embrace the 5 ways of working in the management of flood and coastal erosion risk which consider the **long term** climate change predictions to **prevent** risk getting worse, taking a **collaborative** approach which **involves** others in the delivery and success of interventions. Given the need to make best use of resource, we acknowledge the importance of **integration** and regional working which can aid delivery of core functions, and further encourage catchment approaches bringing benefits now and for future generations Figure 3 provides further examples of how FCERM contributes to the Wellbeing of Future Generations Act (2015).
23. Many powers and duties regarding the management of floods and erosion are captured in legislation such as the Land Drainage Act, Water Resources Act and Coastal Protection Act. The Flood and Water Management Act 2010 clarified some powers and responsibilities but there may still be a need to do more to help the public to understand who does what, as well as their own responsibilities.

Figure 3: FCERM links to Wellbeing of Future Generation Goals



A Prosperous Wales	Building resilience and reducing risk to people and places, help the economy and sustain long term employment. Construction of flood schemes creates jobs and safer places to work and invest.
A Resilient Wales	A key objective of this Strategy is to build resilience in our communities and deliver sustainable, safer places, helping mitigate the impacts from climate change. Schemes also provide an opportunity for wider benefits such as biodiversity enhancements improving ecosystem resilience.
A Healthier Wales	Sharing information on risk and what to do before, during and after a flood, together with the real reduction in risk to homes, helps to improve mental well-being. Schemes can help create more attractive and safe communities to live and work in and provide wider health benefits such as recreation and amenity improvements.
A More Equal Wales	Funding is prioritised based on level of risk on an all Wales basis thereby removing regional inequality. We also support initiatives to give those at highest flood risk access to affordable insurance.
A Wales of Cohesive Communities	Reducing flood and coastal erosion risk helps to create attractive and safe communities to live, work and travel through. Closer working with communities to discuss risk and collaborate on alleviation schemes also helps bring people together and take greater collective responsibility.
A Wales of vibrant culture and thriving Welsh language	A society that promotes and protects culture, heritage and the Welsh language, and which encourages people to participate in the arts, and sports and recreation.
A Globally Responsible Wales	Supporting sustainable approaches such as Natural Flood Management and hybrid schemes to help reduce flood and coastal erosion risk.

¹² Part 1 of Environment (Wales) Act

¹³ Section 6 Environment (Wales) Act

¹⁴ The NRP sets three national priorities for the management of our natural resources:

- Delivering nature-based solutions;
- Increasing renewable energy and resource efficiency; and,
- Taking a place-based approach.

Progress since the publication of the first National Strategy

24. Flood and Coastal Erosion Risk Management (FCERM) has evolved since the first National Strategy which was published 9 years ago. We want to build on those improvements, but also allow the changes made since the first Strategy to stabilise and for their effects to be monitored.
25. Over the life of the current Government term (between 2016 and 2021) we have invested over £390 million capital and revenue in flood and coastal schemes and essential maintenance, benefitting over 45,000 properties. The funding has been prioritised for communities at greatest risk using new methodology and data from all sources of flooding.
26. In support of the FCERM and Coastal Risk Management Programmes, an advisory board has been set up to aid decision making and share best practice.
27. We have developed a National Programme of Investment for FCERM. This provides a consistent approach to prioritising flood schemes to those communities most at risk, ensuring we are targeting the right places. This meets an objective in the outgoing Strategy and also Wales Coastal Flooding Review¹⁵ recommendations. This work included enhancing the Communities at Risk Register¹⁶ to include risk from surface water (pluvial) flooding so that all sources could be considered.
28. A National Asset Database has been initiated which will provide, for the first time, a complete overview of asset ownership and condition across Wales.
29. Further mapping improvements are being introduced in 2020 with the new **Flood Risk Assessment Wales (FRAW)**. This is helping improve our understanding of risk and, together with the improved asset data, gives a much more realistic estimation of true flood risk from all sources.
30. Since the first National Strategy, our understanding of coastal risk has improved significantly. The Coastal Groups were tasked with preparing the second iteration of **Shoreline Management Plans (SMPs)**, agreed in 2014. RMAs are working on the actions arising and their policies have been informing development decisions, other plans and strategies.

West Rhyl Coastal Defence Scheme



West Rhyl is in a low lying area of the town at risk from flooding from both the sea and the adjacent river estuary.

Between August 2011 and July 2015, Denbighshire County Council completed the West Rhyl Coastal Defence Scheme to reduce the risk of flooding to over 2,700 properties. The scheme cost £15.7 million to complete with £4.7 million from the European Regional Development Fund and £520,000 from Denbighshire County Council.

¹⁵ naturalresources.wales/evidence-and-data/research-and-reports/reports-evidence-and-data-on-flooding/wales-coastal-flooding-review-delivery-plan-phase-2-recommendations/

¹⁶ Available from NRW

31. Our SMPs will be complemented by coastal adaptation guidance. A challenge going forward is considering coastal erosion as part of a wider process of coastal change in combination with rising sea levels and increasingly frequent storm events.
32. In order to support Coastal Local Authorities deliver schemes in line with the SMPs, the Welsh Government developed a £150 million Coastal Risk Management Programme, with construction commencing from 2019.
33. The storms of 2013-14 led to the Wales Coastal Flooding Review, making 47 recommendations. Whilst NRW published a Closure Report in 2017, we expect all RMAs to continue their collaborative work in implementing recommendations and strengthening our knowledge and resilience around flood and coastal risk.
34. In 2018, the Welsh Government supported the re-establishment of a Wales Coastal Monitoring Centre (WCMC). Conwy, Gwynedd, the Vale of Glamorgan Councils and Welsh Local Government Association (WLGA) take a collective lead, assisting all coastal RMAs by managing and sharing relevant data on coastal processes.
35. An update to the Wales Flood Response Framework¹⁷ was published by the Welsh Government and Wales Flood Group in 2016. This assists those who participate in, and support, the response to flooding and those communities affected.
36. The Welsh Government have provided emergency funding and support across Wales, notably over £7 million after the 2013/14 storms and £4.4 million (to date) in response to the February 2020 flooding, to repair assets, support RMAs and re-build our resilience. Additional support was also provided in 2020 direct to those homeowners and businesses who suffered flooding.
37. In response to calls from Local Authorities for additional support on maintenance and low-cost risk alleviation, a new Small Scale Works Grant was introduced in 2016/17. A review of this fund found it offered excellent benefits and value for money. Some of these schemes have already worked to prevent flooding or alert officials to take pre-emptive action.
38. European funding for flood risk management schemes came to a close in June 2015. The report on this programme of work showed that it had surpassed its target of benefitting 2,700 properties by reducing risk to 8,800 homes and businesses across Wales.

Rockfield Estate, Monmouthshire – Small Scale Works Grant



Through the Small Scale Works Grant 2018/19, Monmouthshire County Council accessed funding to deal with a surface water flooding issue around the Rockfield Estate in Monmouth. Flooding had occurred as a result of blockages to the main trash screen over a culvert.

The works involved installing two new trash screens to collect small debris before it gets to the larger trash screen downstream.

This scheme has reduced the likelihood of at least 5 properties being flooded.

Looking ahead – what next for flood risk management in Wales

39. In line with the Natural Resources Policy we recognise the role of nature based solutions in providing cost effective and efficient interventions to challenges such as flooding and the risks posed by climate change.
40. Close working between RMAs will remain vital. We will encourage collaborative working rather than single RMAs focusing on defence-orientated work. In particular, we want to see more catchment approaches to managing water and introducing Natural Flood Management (NFM) and hybrid schemes where appropriate.
41. Options for regional working are being progressed by WLGA following their report completed in July 2018¹⁸, and we look forward to understanding the benefits this may bring to flood and coastal erosion risk management.
42. Partnership funding contributions will become more important as we look to integrate flood schemes with other infrastructure and environmental projects to bring multiple benefits and seek sustainable, better value interventions.
43. In alleviating risk there will still be a place for hard defences. However this will be complemented by Natural Flood Management (NFM), natural measures, **hybrid schemes** and **green infrastructure**, which have worked well in places like Swansea, Colwyn Bay, Pontarddulais and Borth.
44. We will develop our learning around the use of NFM and further encourage its use by providing funding support for its delivery and ongoing monitoring, including 100% grant funding for a trial period commencing 2020/21.
45. In the context of UK's exit from the EU, we want to maintain standards and continue sharing best practice and innovation with Europe. Brexit could provide opportunities in terms of shaping legislation to the needs of Wales for better flood risk management in the future.
46. Continued improvement through mapping of risk and understanding the effect of our FCERM assets will help direct funding to those who need it most.
47. Climate change is increasing the risk (frequency and consequence) of flooding from all sources and we will explore how RMAs can help communities adapt to this risk and build resilience to flood events.
48. The Welsh Government's flood and coastal programmes are well placed to deliver wider wellbeing benefits through economic gain as well as social and environmental improvements. The new **FCERM Business Case Guidance**¹⁹ encourages inclusion of those **wider benefits** in business cases for schemes. Seeking out and including such benefits alongside the reduction of risk, can demonstrate the true value of our flood and coastal programmes.

Pontarddulais Flood Alleviation Scheme



The town of Pontarddulais has witnessed flooding on numerous occasions from the River Dulais, most recently in 2003, 2005 and 2008. NRW led on a £6.1m scheme to construct a flood storage area upstream to hold water back and prevent the town from flooding. Completed in 2019, the scheme reduces the risk of flooding to 224 homes and 22 businesses. As well as benefitting property, this scheme was designed to provide ecological benefits including the creation of a wetland area and planting of over 3,000 trees and shrubs.

The scheme is a good example of alleviating flood risk upstream and providing additional benefits without impacting on the character of a town.

18 www.wlga.wales/SharedFiles/Download.aspx?pageid=62&mid=665&fileid=2042

19 New Business Case Guidance for FCERM projects will be published alongside this Strategy on the Welsh Government's flood pages.

49. We will develop a stronger pipeline of flood and coastal schemes with our RMAs. We are trialling full 100% grant support for all preparatory work towards schemes in 2020/21 to accelerate delivery and highlight where funding is required. This will help to make a greater case for long term funding settlements, such as that received from 2017 to 2021, and allow us to plan ahead with more certainty.
50. The new **Flood and Coastal Erosion Committee (FCEC)** will advise on strategy, highlight best practice and provide support to Government and the RMAs.
51. The new Wales Coastal Monitoring Centre (WCMC) will continue to establish itself after commencing in 2019/20, providing RMAs with consistent and reliable data and helping to raise awareness of coastal processes and climate change.
52. We will work ever more closely with our communities, including engagement with young people and schools. We will involve them in decisions that are made about managing risk and provide better information on all aspects of flooding and erosion, as well as the assets which protect then guidance on what to do before (preparation), during (response) and after (recovering from) a flood.
53. We will work with colleagues developing the Environmental Growth Plan for Wales to maximise its impact on flood alleviation and tackling coastal erosion.

National Strategy Objectives and Measures

- 54. The Flood and Water Management Act requires this National Strategy to specify the objectives for managing flood and coastal erosion risk and the measures proposed to achieve them.
- 55. We set out an aim and 5 objectives in this Strategy. They complement each other and overlap but, collectively, are intended to reduce risk to life.
- 56. **The aim of this National Strategy is to reduce the risks to people and communities from flooding and coastal erosion.**
- 57. We will do this through coordinated and prioritised activities which align with the sustainable management of our environment and further our understanding of risk, recognising the challenges of climate change.

It will be delivered through **5 objectives**, focusing the activities of RMAs:

- 58. The Strategy includes new objectives on:
 - **Improving our understanding of risk:** emphasising the importance of accurate information to help decision-making and inform the public. This highlights the importance of research, monitoring and investigations, modelling and mapping, and sharing this information effectively so that others can also make informed decisions.
 - **Preventing exposure to risk:** recognising the importance of using flood data and aligning with planning policy to inform better development and infrastructure decisions, not locating people into high risk areas and avoiding the build up of future problems which will require difficult and expensive solutions to resolve.
- 59. The **measures** described in this National Strategy will help to deliver the objectives and reduce the present and future risk for people, homes and businesses from flooding and coastal erosion.
- 60. The measures for this Strategy are found within the text in the following chapters, and all together in Chapter 6 at the end of this document for ease of reference.

Figure 4: National Strategy Aim and Objectives



Flood and Coastal Erosion Risk

Types of flooding and coastal erosion

61. The term 'flood and coastal erosion risk' covers all flooding from rivers, the sea, reservoirs, **ordinary watercourses**, **groundwater** and surface water, as well as **coastal erosion**.
62. Flood is defined within the **Flood and Water Management Act 2010** as "any case where land not normally covered by water becomes covered by water", but excludes flooding from sewage and burst water mains.
63. **Surface water flooding (pluvial)** happens when rainfall saturates the ground and drainage systems and excess water cannot drain away. Whilst more common in urban areas, it also affects rural communities, hitting transport, agriculture and the local economy. It can occur at any time of year: whilst winter sees more rain coming from Atlantic weather systems, the summer months bring an increased risk of flash flooding.

Garth, Maesteg – surface water flooding



On 20th November 2016, communities in the Bridgend County Borough Council area experienced heavy rainfall, resulting in flooding across the county. The extreme rainfall in combination with blocked culverts, overloaded systems, and run-off from adjacent land resulted in 44 properties suffering internal flooding.

Debris, such as fly-tipping, stones, gravel, and vegetation, was washed downstream in the flood water, becoming lodged against the culvert grids, blocking the culvert. Following this flood event, the Local Authority has worked with landowners to reduce debris in and around the watercourses to avoid culverts becoming blocked. Flood sensors have also been introduced to provide early warnings of potential blockages.

River Elwy, St Asaph, Denbighshire



Over 300 properties in St Asaph were flooded in November 2012 when the river Elwy overtopped its banks following a long period of rain across north Wales, which saw widespread flooding across the region.

A review of the existing flood defences in St Asaph resulted in work to upgrade the defences and replace an existing bridge with a higher, wider structure.

This £6 million project, led by NRW, was completed in 2019, reducing flood risk to over 600 properties and providing amenity benefits along the river.

The scheme performed well in 2020 when Storm Ciara generated the biggest flood event on the River Elwy since records began in 1974, limiting the number of properties affected to less than 10.



64. Coastal or sea flooding usually occurs when high tides combine with severe weather resulting in coastal or estuarine communities being flooded. A combination of significantly high tides, high on-shore winds and low atmospheric pressure can result in increase in tide level known as storm surge.
65. River flooding (**fluvial**) tends to follow sustained rainfall resulting in high river levels and river banks being breached, or defences overtopped.
66. When some of these occur together, we call this a combination flood event.
67. Reservoirs present a flood risk to communities; however that risk is well managed in line with the requirements of the Reservoirs Act, meaning that the likelihood of a flood from a reservoir in Wales is very low.
68. Sewer flooding is not directly addressed within this strategy as it is the responsibility of the water and sewerage companies. However, we recognise the impacts and consequences sewer flooding can have.
69. Coastal erosion is defined as the wearing away of land by wave action, tidal currents, wave currents, drainage, weathering or high winds. While some parts of the coast are eroding, others are **accreting** and we need to better understand these interactions to ensure our interventions are appropriate.
70. Due to its coastal geology, the rate of coastal erosion in Wales is generally low compared to some parts of England. However, evidence from the SMPs suggests that over the next 100 years we will see an increase in number of coastal communities at risk from rising sea levels and erosion.
71. Natural habitats such as sand dunes, intertidal areas such as beaches or salt marsh, and cliffs provide a natural barrier to erosion around the coast. Coastal erosion can change the width, height, position or slope of these natural habitats, or undermine existing coastal defences, which can result in coastal flooding.

Risk and Likelihood

72. When considering the risk associated with flooding and coastal erosion, the term 'risk' encompasses two aspects:
 - The likelihood of an event happening, and
 - The impact that will result if flooding or coastal erosion occurs
73. It is not possible to stop all flooding or coastal erosion; these are natural processes and in some locations it may be more sustainable to allow nature to take its course. However when people, communities and businesses are threatened we can manage the risk by reducing the **likelihood** of an event and its associated impacts and consequences.
74. Both the likelihood and impact of flooding and coastal erosion are anticipated to increase over time due to factors such as climate change and a growing population putting pressure on Local Authorities for housing development.
75. The likelihood of flooding depends on a number of factors, including weather patterns, geology, topography and land use. A long period of heavy rainfall for example is likely to result in higher river levels, increased run-off and/or over saturation of soils which all increase the likelihood of a flood.
76. The likelihood of coastal erosion and the rate at which it occurs also depends on a number of factors, including the prevailing sea conditions, the frequency and severity of coastal storm events, the presence of defences and the coastal geology, topography and environment.
77. Our understanding of the risks of flood and coastal erosion is improving as more research is undertaken. Research projects such as that into the joint probability of waves and sea levels²⁰, as well as data collected by the WCMC will further improve our understanding of the risks to our coastal communities.
78. Information on flood risk from all sources is available on NRW's website through the Flood Risk Assessment Wales (FRAW) data and maps.

Climate Change Adaptation

79. The Senedd was the first Parliament in the world to declare a climate emergency. We have now strengthened the Welsh Government's response to the climate emergency by publishing a new 5-year **climate change adaptation** plan entitled Prosperity for All: A Climate Conscious Wales²¹.
80. Wales is already experiencing adverse impacts from climate change such as sea level rise, flooding and heatwaves. The evidence is clear that events similar to the 2020 storms are becoming more common.
81. Research²² by the Met Office has indicated that there is an increased chance that Wales will see higher sea levels and increased storminess, an increase in intense rainfall events and more frequent flooding.
82. The UK Climate Change Risk Assessment²³ published in 2017, highlighted increases in instances of coastal and inland flooding, affecting people, property and infrastructure in Wales. Climate projections from 2018 indicate sea level rise of between 28cm and 62cm for Cardiff under a medium emissions scenario by 2080²⁴.
83. The implications of climate change and sea level rise are wide ranging and will affect all aspects of society, including social, economic, cultural, environmental and health sectors.
84. Climate change is considered in our mapping and modelling, using the UK Climate Projection (UKCP) figures. Guidance and advice on the use of these figures for RMA's is issued and available by the Welsh Government and NRW. This is particularly important where long term policies are in place, such as SMPs, or for planning purposes. We will ensure these are periodically reviewed and considered when setting policy for managing flood and coastal risk.
85. This Strategy and our wider FCERM programme will help to manage some of the effects of climate change through activities in those areas prone to flooding or coastal erosion. However, we cannot prevent all flooding and we will need to use a range of approaches to not only reduce the risk where we can, but to adapt our communities and infrastructure to be prepared for severe weather events and rising sea levels.
86. A key part of this work will be in recognising the risks and adapting in an intelligent and robust way. This may involve maintaining and improving defences, but equally will also mean better management of land and water across a catchment to reduce run-off, intelligent planning and retro-fitting of our towns and cities and, in some cases, creating space for water and recognising the need to move out of harm's way.

87. In all cases, we also need to build resilience within communities so when flooding does occur, its residents and our RMA's know what to do and can both respond and recover quickly to lessen the likelihood of long-term impacts. Adaptation should form part of that recovery, so communities and RMA's do not return to a pre-existing state of vulnerability after a flood, but take the opportunity to 'build back better' and improve their preparedness and ability to respond to future events; this is also called adaptive resilience. We cover more on this topic under coastal adaptation.

Impacts

88. Flooding and coastal erosion can have a variety of consequences and impacts, not only on wellbeing but wider economic, environmental and social factors. All types of flooding carry a risk to life, either for those directly affected or for others involved in attempting to help them.
89. Physical harm and injuries can arise directly or as a result of flood impacts, for example from a weakened building or structure. Flood and erosion events can also lead to communities suffering disruption to transport infrastructure, power and water supplies, while also increasing the public health risks associated with contact with chemicals or sewage.
90. We recognise the impacts flooding can have on mental health during and after a flood, including long-term effects which can continue long after the event itself. This may be from the flooding incident and associated loss, or from being displaced or re-homed whilst repairs are undertaken, whilst other symptoms such as insomnia and depression can also result. A study by Public Health England²⁵ recorded a significant association between displacement due to flooding and symptoms of depression, anxiety and post-traumatic stress.
91. A 2017 report²⁶ for Joseph Rowntree Foundation found that socially vulnerable neighbourhoods are over-represented in areas prone to flooding, but most significantly in areas prone to coastal and tidal flooding.
92. Certain parts of society are less able to cope with the effects of flooding; the most vulnerable are the very young, the elderly and disabled or already in poor health, who may require additional support during a flood event. Public Health Wales maintains public health advice on flooding on its webpage²⁷.

21 gov.wales/prosperity-all-climate-conscious-wales

22 Thompson, V et al, High risk of unprecedented UK rainfall in the current climate, 2017 Nature Communications 8

23 www.theccc.org.uk/wp-content/uploads/2016/07/UK-CCRA-2017-Wales-National-Summary.pdf

24 UKCP18 Science Overview Report

25 Munro, A et al, Effect of evacuation and displacement on the association between flooding and mental health outcomes, 2017 Lancet Planet Health

26 Present and future flood vulnerability, risk and disadvantage: A UK assessment, Sayers, P., Penning-Rowsell, E., Horritt, M. (2017).

27 www.wales.nhs.uk/sitesplus/888/page/43887

93. The economic impacts of a flood can be widespread with damage to vehicles, buildings and structures, including bridges and flood assets themselves. Roads can become impassable, whilst agricultural land and livestock can be lost. The 2014 Somerset flooding demonstrated how a prolonged flood event to a rural area can have significant effects on residents and the economy.

94. For the individual, the economic impact can also be significant if a property is not insured. In recent years, improvements have allowed homeowners living in areas of high flood risk to obtain affordable insurance through the Flood Re28 initiative.

Storms Ciara and Dennis, February 2020



Pontypridd Town Centre

Number of flooded properties: 158



Pentre

Number of flooded properties: 169

February 2020 brought devastating flooding to Wales with successive storms and record rainfall levels. More than 2,000 homes and 600 businesses suffered internal flooding affecting areas that had not seen flooding for decades. However, this figure would have been higher were it not for our network of flood defences, which operated successfully to prevent or reduce further flooding.

River levels in many places hit record or near-record heights. Along the Taff, levels were 80cm higher in places than those for the 1979 floods, however, over 9,000 homes were protected by its defences. Across Wales, that figure rises to around 73,000 with many more benefitting from assets managed by Local Authorities. Most of Wales was affected, with significant damage to properties in communities including Llanrwst, Llanfair Talhaiarn, Tylorstown, Nantgarw, Pontypridd, Pentre, Llanhilleth, Crickhowell and Mountain Ash.

An emergency flood relief-funding scheme was launched to support flood victims across communities, businesses and those Local Authorities affected.

100% grant funding was also made available by the Welsh Government to enable NRW and Local Authorities to carry out £4.4m of emergency repairs to flood risk infrastructure, defences and culverts.

95. The impacts of coastal erosion are no less devastating and may be catastrophic at the point of impact. Domestic home insurance does not cover coastal erosion, which can result in financial hardship for residents of properties at risk. Prior to an erosion event, properties at risk are likely to become blighted and lose significant value.

96. Many culturally significant sites are located in areas at risk from flooding or erosion, like our coastal paths, nature reserves, monuments and beaches. Stakeholders and RMAs should work together to discuss how to prepare, adapt and/or build resilience of such areas in response to climate change.

Wales Coastal Flooding 2013/14



Damage at Newgale, Pembrokeshire blocking road

The coastal flooding seen in Wales in the winter of 2013/14 affected homes, businesses, road and rail networks and utilities as well as causing damage to FCERM assets around the coastline.

Over 300 properties flooded with further 1400 properties evacuated. In addition, more than 15 km of road was affected by flooding, blocked by beach material or temporarily closed for safety.

However, the national review following this event estimated that, as a result of ongoing investment in our coastal defence network, 99% of the properties and land at risk was protected, preventing £3 billion of damages.

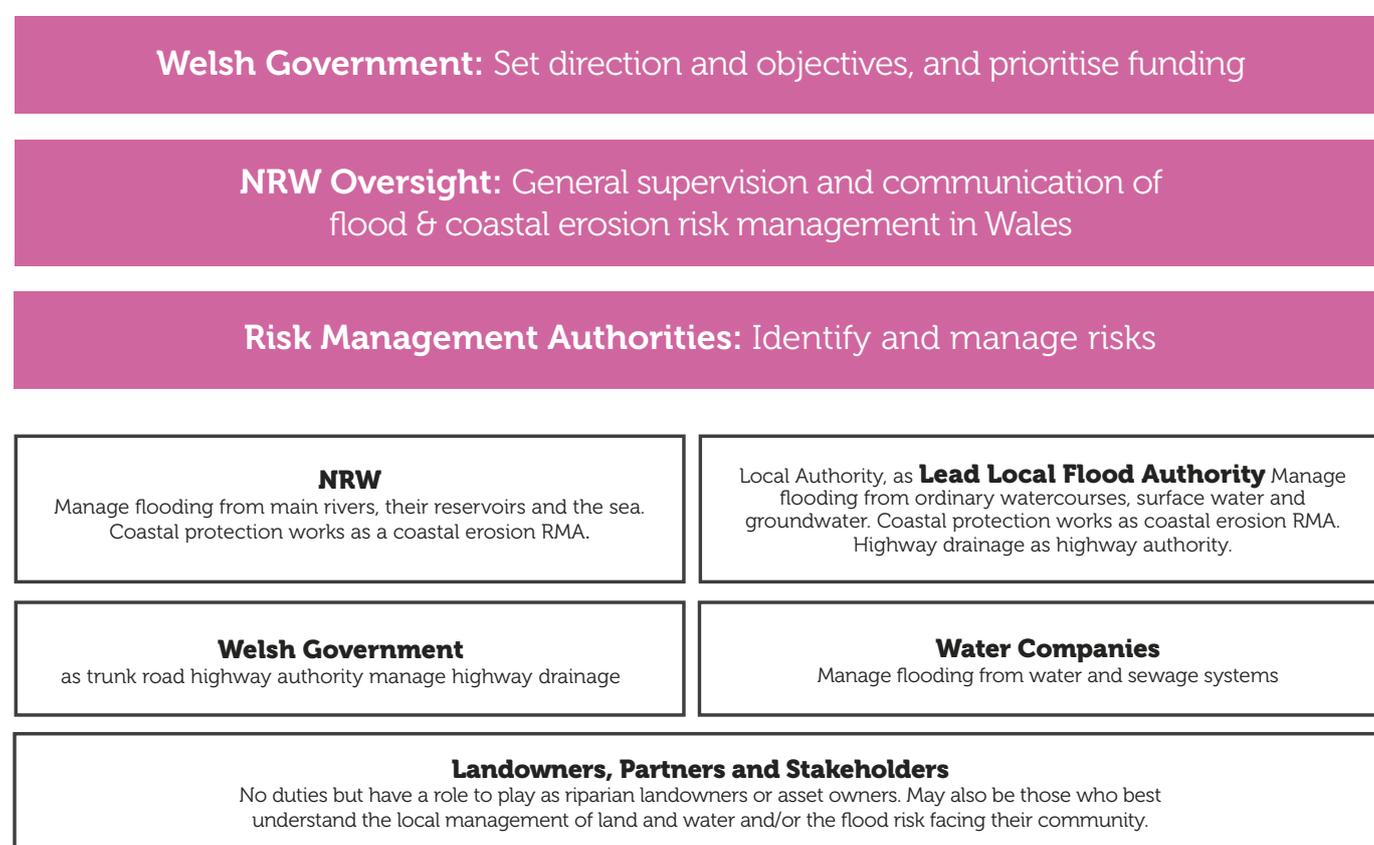
97. Flooding and coastal erosion have an effect on the natural landscape. Soil loss as a result of flooding can be significant as it supports agriculture, biodiversity and can impact on water quality. The Welsh Government will work with agricultural partners to encourage appropriate land management practices and NFM schemes to reduce run-off and soil erosion.
98. Whilst some natural habitats like salt marsh also serve a flood defence function, other sensitive habitats may be damaged or take years to recover from flooding. Following the coastal flooding of 2013/14, NRW recorded the Welsh coast's vulnerability to severe weather events and possible impacts on biodiversity²⁹. Their report demonstrated the importance of managing coastal ecosystems to be resilient and adapt to the pressures brought by climate change.
99. The Government understands the careful balance needed between protecting our coastal communities at risk whilst recognising its important environmental, cultural and economic value.
100. Defences around our coastline in combination with sea level rise can result in loss of intertidal habitat; this is referred to as coastal squeeze. Where this impacts on our European designated sites, the Habitats Regulations requires us to compensate for these losses. We have established a National Habitat Creation Programme to scope for and provide any necessary habitat compensation as a result of our flood and coastal interventions.

Roles and Responsibilities

Welsh Risk Management Authorities

101. Flood and Coastal Erosion Risk Management in Wales involves a number of organisations, including 28 **Risk Management Authorities (RMAs)**. The basic responsibilities of key stakeholders in Wales are set out below:

Figure 5: Overview of Roles and Responsibilities



102. The parties above all have a role to play, working collaboratively in delivering the objectives of this Strategy.

103. RMAs have powers and responsibilities in terms of the risks they manage, but there are also places where these interact or are shared. An example is the combined role which Local Authorities and NRW play as a **coastal erosion risk management authority**³⁰. Each body should consult the other on any such coast protection works and look for wider wellbeing opportunities where appropriate.

104. This Strategy emphasises the importance of wider catchment and wellbeing considerations. We therefore strongly encourage collaborative working in the sharing of ideas, liaison with communities and addressing flood and coastal erosion risk.

105. RMAs have a duty to co-operate with each other in the exercise of their FCERM functions. The Welsh Government expects this from all RMAs in managing risk, their reporting duties and in the response to flood or coastal erosion incidents.

30 Under the Coast Protection Act 1949 www.legislation.gov.uk/ukpga/Geo6/12-13-14/74/contents amended under Schedule 2 of the Flood and Water Management Act 2010.

106. Many of the powers which NRW and Local Authorities utilise to carry out works to manage risk come from the Water Resources Act (1991) and Land Drainage Act (1991). There is not a duty on RMAs to undertake such works but statutory powers to manage risks from certain sources.
107. Roles and responsibilities are not entirely straightforward for the public, or stakeholders, and the FCEC will be helping the Welsh Government explore ways to clarify the legislation.
108. The expectation from Welsh Ministers is that RMAs will assess and then, where viable, bring forward appropriate projects or interventions in those communities at greatest risk. This may be evidenced by the Wales Flood Map, Flood Risk Management Plans, or a Local Flood Risk Management Strategy, amongst other modelled risk and asset information. It can also be informed by actual flood or coastal erosion events, including the need for repairs or improvements which become apparent after an incident, for example, where there is an immediate risk to life or through recommendations in a flood investigation report.
109. Where there is an immediate risk to life, for example through flooding to multiple homes, RMAs should utilise their powers to quickly assess the viability of undertaking repairs, notify the Welsh Government and intervene if appropriate. These powers are not dependent upon the RMA owning the asset or riparian responsibilities, but are consistent with their remit to manage risk from certain sources as set out in this Strategy and in legislation³¹.
110. Under the Civil Contingencies Act 2004 NRW and Local Authorities as Category 1 Responders, and Water undertakers for an area wholly or mainly in Wales as Category 2 Responders, are responsible for maintaining plans which can be used in an emergency for reducing, controlling or mitigating flooding action in connection with operability of certain flood management assets.
111. This chapter specifically covers the roles of those organisations categorised as RMAs. The wider role of emergency responders is covered by the Wales Flood Response Framework³².

Organisations

112. Specific roles and responsibilities of organisations are explained below.

Welsh Government

113. Welsh Ministers set strategic direction and have overall responsibility for flooding and coastal erosion policy in Wales. As part of that role, the Welsh Government produces and publishes the National Strategy and ensures compliance and implementation of measures to achieve its objectives. It is responsible for FCERM legislation through powers under the Government of Wales Act.
114. The Welsh Government manages the FCERM Programmes, including allocating budget to RMAs, appraising Local Authority schemes, and developing a programme of investment.

Risk Management Authorities (RMAs)

115. The Flood and Water Management Act 2010 sets out how this Strategy must specify the Welsh RMAs and the flood and coastal erosion risk management functions that may be exercised by those authorities.
116. In Wales there are 28 RMAs:
- **Natural Resources Wales (NRW).**
 - The 22 Local Authorities as **Lead Local Flood Authorities (LLFA)** and highway authorities.
 - Water companies operating in Wales, of which there are currently 4³³.
 - The Welsh Government, as highway authority for trunk roads.
117. Usually, Risk Management Authorities (RMAs) who commission construction of new or improved flood and/or coastal erosion risk management schemes will take responsibility for future maintenance, unless an agreement is made between two RMAs to take over maintenance responsibility³⁴.
118. Third party structures which help to manage flood or coastal erosion risk may be designated under the Flood and Water Management Act 2010 by the relevant RMA to prevent them being altered, removed or replaced without consent. This helps to ensure they continue to work as an FCERM asset and the owner does not inadvertently increase risk to themselves, their neighbours or surrounding area³⁵.
119. All FCERM assets must be identified on a Local Authority's asset register, this should then be reflected in the National Asset Database and accessible to the public.
120. The following infographic contains examples to help clarify roles and responsibilities and what to do in the event of flooding.

31 As set out in section 165(1) of the Water Resources Act (1991), section 14A of the Land Drainage Act (1991) and reinforced through the Flood and Water Management Act 2010.

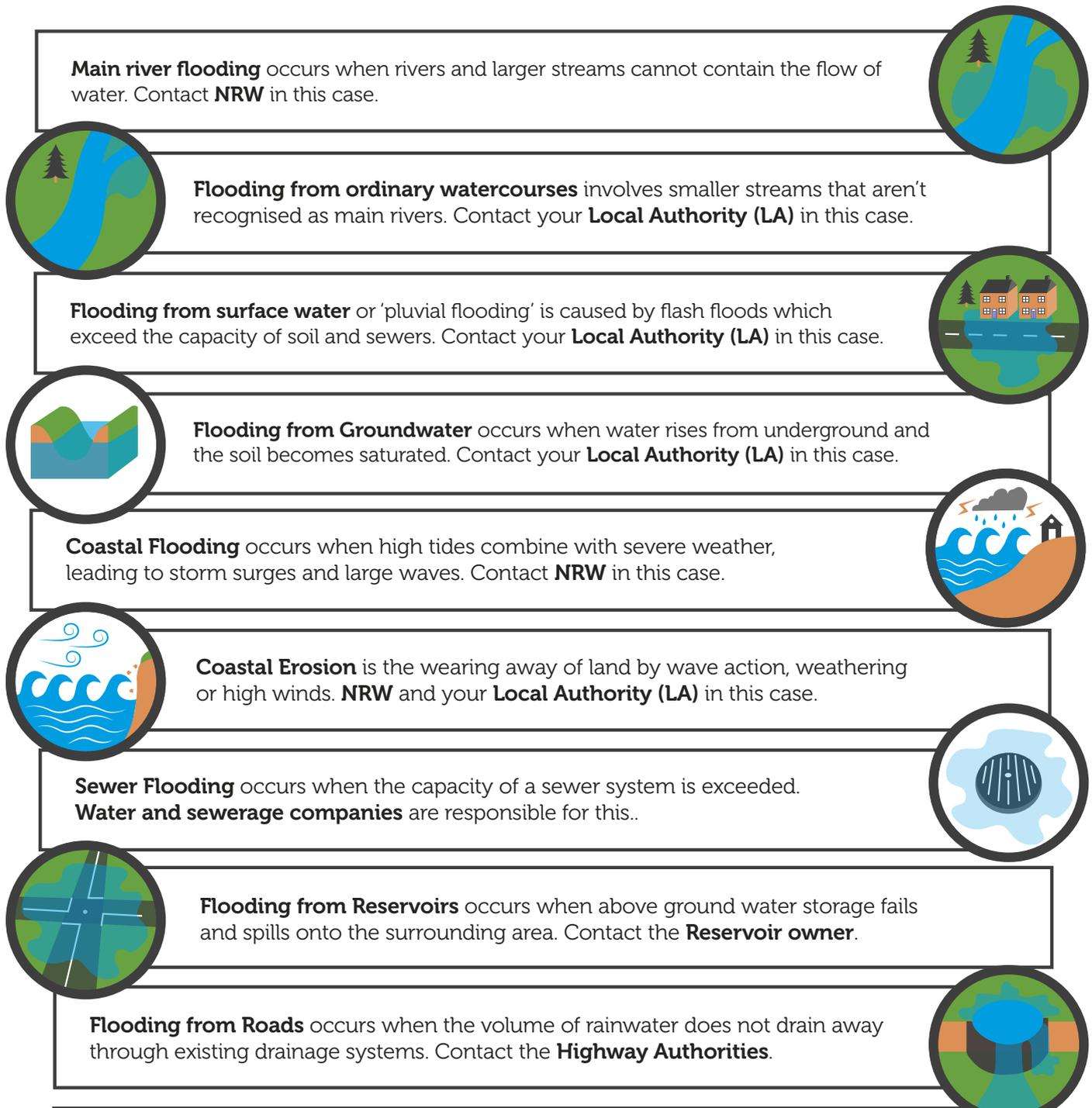
32 gueddill.gov.wales/topics/environmentcountryside/epq/flooding/flooding2/responseframework/

33 Water companies operating in Wales are currently Dwr Cymru Welsh Water, Hafren Dyfrdwy, Albion Water and SSE Water

34 An exception may be where a RMA has agreed to work on behalf of another under Section 13 of the Flood and Water Management Act 2010. Any such arrangement should make clear who is responsible for ongoing maintenance.

35 Further guidance available at www.gov.uk/government/publications/designation-of-third-party-structures-and-features-for-flood-and-coastal-erosion-risk-management-purposes

Figure 6: Types of flooding & who you should contact

**Risk Management Authorities' Contact Details:**

- > Sewer flooding will depend on the **Water Company** responsible for the system.
- > **The Highway Authorities** are the Welsh Government for motorways and major trunk roads and Local Authorities for other roads.
- > If you are a **Riparian Landowner**, meaning you own land next to a waterway, you **may be** responsible for maintaining and repairing a flood defence. To learn more contact **NRW** for main rivers or your **LA** for ordinary watercourses.
- > To report an incident to NRW call 03000 653 000 or visit naturalresources.wales/about-us/contact-us/report-an-environmental-incident/ To find your **LA** visit www.gov.uk/find-local-council

Natural Resources Wales (NRW)

121. NRW's role can be split into 3 distinct areas

- i. Strategic oversight and general supervision over all FCERM matters.
- ii. Activities they do on behalf of, or in collaboration with, RMAs.
- iii. Activities they deliver in the management of flooding from main rivers and the sea and in managing coastal erosion.

122. Activities under (iii) relates to the functions and powers NRW has to manage flood risk from main rivers and the sea. NRW can also manage risk from other watercourses which flow into main rivers and undertake certain activities on ordinary watercourses to reduce risk, such as altering water levels and existing works. NRW are also recognised as a coastal erosion risk management authority under the Coastal Protection Act 1949.

123. Their strategic oversight and general supervision role (i) is about having a Wales-wide understanding of all sources of flooding, coastal erosion and the risks associated with them, on a consistent basis to provide advice to the Welsh Government as well as helping inform RMAs and the public.

124. This is needed to optimise planning and investment for effective flood risk management, in a risk based, transparent and consistent way. It is also helpful to the public as NRW become established as the go-to organisation for national information on flood and coastal erosion risk, including flood warnings, risk mapping and information on resilience and responding.

125. The oversight and supervision role includes tasks undertaken by NRW on a Wales-wide basis. This can include activities requested by the Welsh Government³⁶ which NRW are considered the most appropriate body to lead upon:

- Providing technical advice and support to the Welsh Government and RMAs;
- Monitoring and reporting progress on implementing the National Strategy through Section 18 reports;
- Forecasting, warning and informing on potential and actual flooding from all sources in collaboration with Met Office partners;
- National flood awareness programmes and national advice on flood support, providing consistent advice to the public, RMAs and responders;
- Managing the National Asset Database in partnership with all RMAs;
- National flood and coastal erosion risk mapping for all sources, including FRAW, the Wales Flood Map and National Coastal Erosion Risk Map (NCERM);

- Supporting research requirements in Wales, through independent research and the joint research programme with EA, the Welsh Government and Defra with input from WLGA and RMAs;
- Monitoring habitat loss and the management of the National Habitat Creation Programme;
- Co-ordinating SMP update process;
- Statutory consultees on relevant matters such as planning;
- Co-ordinating activities and certain plans on behalf of Welsh RMAs;
- Issuing Environmental Permits for certain watercourse and FCERM activities.

126. NRW carries out all **Internal Drainage Board (IDB)** functions in Wales and hence can also manage risks from ordinary watercourses, surface water and groundwater in those drainage districts.

Local Authorities as Lead Local Flood Authorities, SuDS Approval Bodies, Highway Authorities and Category 1 Responders

127. **Lead Local Flood Authorities (LLFA)** are responsible for managing flood risk from surface water and ground water, or from an ordinary watercourse.

128. LLFAs have duties under the following legislation:

Flood and Water Management Act 2010:

- Prepare and maintain a Local Flood Risk Management Strategy for their areas, coordinating views and activity with other local bodies and communities through public consultation and scrutiny, and delivery planning. They must consult RMAs and the public about their strategy;
- Investigate significant local flooding incidents and publish the results of such investigations;
- Maintain a register of structures and features likely to affect flood risk;
- Co-operate with other RMAs.

Flood Risk Regulations 2009:

- Contribute to the production of Flood Risk Management Plans.

129. LLFAs have powers under the **Land Drainage Act 1991**, which allow them to:

- Manage flood risk from ordinary watercourses
- Manage flood risk from surface water or groundwater
- Monitor, maintain, operate or repair works to manage flood risk from sea. Additional works to manage risk from the sea will require consent from NRW.

All such works must be in accordance with their Local Flood Risk Management Strategy.

³⁶ The Welsh Government may direct NRW to undertake work and sets out priority activities expected against funding allocations in an annual FCERM Remit Letter.

130. Coastal Local Authorities are also designated as a coastal erosion risk management authority under the **Coast Protection Act 1949**, which gives them powers to protect the land against erosion or encroachment by the sea. Under the Act, councils can do works to protect against coastal erosion and defend against sea flooding where they are best placed to do so and with approval from NRW. This is a power but not a duty.
131. Local Authorities are responsible for drainage of local highways under the Highways Act, s100.
132. Under the **Civil Contingencies Act 2004**, Local Authorities are also Category 1 responders giving them duties to:
- maintain arrangements to warn the public, and to provide information and advice to the public, if an emergency is likely to occur or has occurred
 - play a lead role in emergency planning and recovery after a flood event and must have plans to respond to emergencies, and control or reduce the impact of an emergency.
133. Local Authorities also act in their role as both a LLFA and Local Planning Authority to provide advice on surface water drainage. Implementing effective SuDS on new development requires a joined-up approach by the Local Authority across multiple disciplines, and early involvement of drainage/flood risk engineers, landscape architects, highways engineers, biodiversity and amenity staff, building control and planners to secure effective SuDS.

Water and sewerage companies

134. Water and sewerage companies have operational responsibility for drainage via public sewers (foul, surface-water and/or combined).
135. Local Authorities, in their role as highways, planning and RMAs will actively collaborate with water and sewerage undertakers on long term planning for drainage, including the preparation of drainage and wastewater management plans, water company business plans and Local Development Plans.
136. The Flood and Water Management Act 2010 places a number of statutory duties on water and sewerage companies including:
- A duty to act consistently with the National Strategy;
 - A duty to have regard to the Local Flood Risk Management Strategies; and
 - A duty to cooperate with other RMAs, including sharing data.

Welsh Government as Highway Authority

137. The Welsh Government has a responsibility for trunk road drainage under the Highways Act, s100.

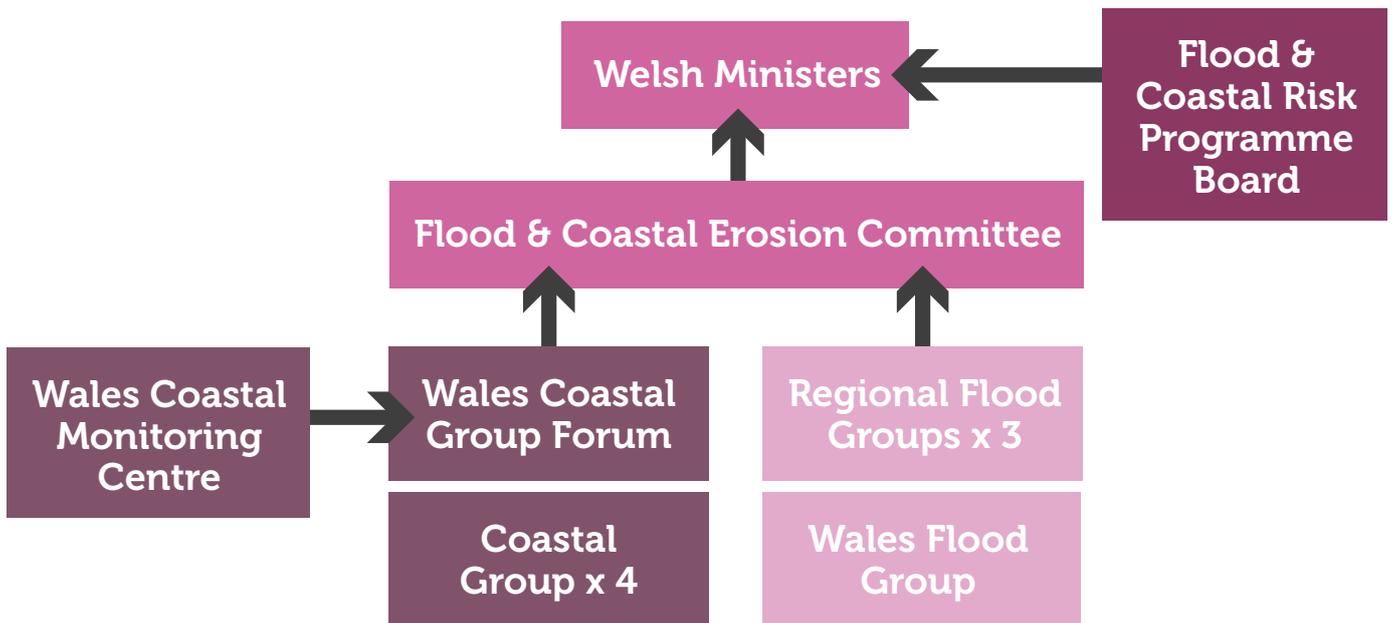
Network Rail

138. Whilst legislation does not impose an official role on Network Rail, their maintenance of assets on the coast gives them a role in coastal defence.

Groups and Committees

139. There are a number of established Groups and Committees which help to deliver different aspects of FCERM across Wales. The links between the groups are shown below.

Figure 7: Links between Group and Committees



140. The Wales Flood Group does not have any formal links to the groups or committees shown above but instead provides a link to Resilience Groups and influences the work of others within FCERM. It is a sub-group of the Wales Resilience Partnership Team which supports the Wales Resilience Forum chaired by the First Minister.

141. Both the Wellbeing of Future Generations Act and the Flood and Water Management Act 2010 require collaboration. The Welsh Government encourages catchment approaches, with partners working at a catchment scale to manage flood risk. In addition, the Welsh Government encourages Coastal Local Authorities and NRW to work together where appropriate to manage the risk from coastal erosion and flooding.

142. The Flood and Coastal Erosion Committee (FCEC) will, through its links with all RMAs and stakeholders, be well placed to consider the need for future changes to legislation to improve FCERM in Wales.

The Welsh Government has asked the Flood and Coastal Erosion Committee, in its advisory capacity, to consider and recommend changes to legislation to enable improvements to FCERM in Wales.

MEASURE 1: Flood and Coastal Erosion Committee to establish the scope and consider the need for changes to legislation to clarify and support the delivery of FCERM in Wales by 2022.

Objectives supported: A-E

Flood and Coastal Erosion Committee (FCEC)

143. The purpose of the Committee is to advise Welsh Ministers on all FCERM matters in Wales, including awareness raising, preparation and community resilience to flooding. Formed in 2019, the Committee will provide high level advice, working closely with RMAs and the Welsh Government.
144. It will establish its own programme of advisory activity that may reflect both immediate and longer term national priorities, including responding to consultations, identifying research needs and highlighting best practice in Wales and elsewhere.
145. The Committee will provide an independent review of the Section 18 report prior to publication.

Section 18 Report

Prepared under the terms of the Flood and Water Management Act, NRW produce this report for Welsh Ministers on FCERM in Wales.

The report is compiled with input from all Risk Management Authorities, providing an opportunity to report on progress on the measures in the National Strategy, as well as wider FCERM matters and best practice across Wales.

Further details on this report can be found in the Monitoring section.

Coastal Groups

146. Coastal Groups are made up of Local Authorities, NRW, the Welsh Government and other bodies with coastal responsibilities, such as Network Rail. The Coastal Groups are responsible for producing, implementing and monitoring progress of the SMPs. As a consequence of the coastal groups being responsible for the SMPs, they have a regional strategic overview of coastal management.
147. Coastal Group chairs lead group meetings and represent Coastal Groups at external groups and fora as necessary. They provide advice on coastal issues, share good practice and identify opportunities for joint working. They historically, and currently still do, play an active role in coastal monitoring. There are four coastal groups in Wales: Severn Estuary, Swansea and Carmarthen Bay, Cardigan Bay and Liverpool Bay.

Wales Coastal Group Forum (WCGF)

148. The Wales Coastal Group Forum comprises chairs of each coastal group listed above along with NRW, WLGA, National Trust and Network Rail.

149. The role of the Forum is to represent the collective interests of coastal groups and to provide and communicate the strategic direction to coastal groups on coastal risk management matters. To do so the Forum will:
- Share information and good practice between coastal groups and other interested parties.
 - Provide feedback to the Welsh Government on coastal issues and policy.
 - Promote common reporting and monitoring standards.
 - Raise the profile of coastal flooding and erosion risk.
 - Support the development of key strategic documents around communication and coastal adaptation.
150. The WCGF Chair helps to maintain a link to the FCEC, which ensures a good flow of information between the two.

Wales Coastal Monitoring Centre

151. The Wales Coastal Monitoring Centre (WCMC) was founded to assist all coastal RMAs by managing and sharing relevant data on coastal processes, it is funded through the Welsh Government.
152. The WCMC will develop a strategic approach to coastal monitoring in Wales, supporting this Strategy through delivery of the evidence needed to make informed decisions to better manage coastal risk.
153. The Centre is managed by a consortium of Coastal Local Authorities and the Welsh Local Government Association. The Wales Coastal Group Forum acts as an advisory panel to provide strategic direction and support to the WCMC.

Coastal risk should be managed using the best available information.

MEASURE 2: Delivery of annual topographic surveys by Wales Coastal Monitoring Centre on behalf of Coastal Groups to measure change in the most at risk coastal areas in Wales.

Objectives supported: A and C

Wales Flood Group

154. The role of the Wales Flood Group is:
- To create a forum for representatives of the Welsh Government, Local Resilience Forums and individual Category 1 and 2 responder (as defined in Civil Contingencies Act 2004).
 - To support the development and implementation of a programme of work to improve Wales' resilience to flooding
 - To work in partnership with Local Resilience Fora, and category 1 and 2 responders in delivering these actions effectively.

Regional flood groups

155. Set up in 2012, there are 3 regional flood groups in Wales, South East Wales, South West Wales and North Wales. They are attended by LLFAs, NRW, Dŵr Cymru Welsh Water and WLGA. They provide a forum:
- To provide a source of shared expertise and experience;
 - Timely sharing of information and data;
 - Explore the feasibility of sharing resources and knowledge;
 - Identify and assess the need for technical subgroups;
 - Facilitate consultation on Local Flood Risk Management Strategies;
 - Promote dialogue and exchange of information between group and the Welsh Government including feedback to and from the Flood and Coastal Risk Programme Board;
 - Share expertise and best practice and explore with other disciplines how a model of flood preparedness could be extended to encompass response to other incidents and emergencies.

Flood and Coastal Risk Programme Board

156. From 1st April 2019 the FCERM Programme Board and the Coastal Risk Management Programme Board have been merged to form one "Flood and Coastal Risk Programme Board". The purpose of the Board is to provide advice to Ministers, drive the Programmes forward and support the delivery of outcomes and benefits.

Flood and Coastal Erosion Risk Management

157. This Strategy aims to manage flood and coastal erosion risk to people and communities, delivered through 5 objectives, set out in Chapter 2.
158. This chapter is divided into 5 sections to reflect the objectives. Each section describes the actions or measures which RMAs and others can take to help deliver those objectives.



Objective A: Improving our understanding and communication of risk

Flood and coastal risk information and mapping

159. To fully understand flood and coastal erosion risk and communicate it to the people of Wales, we need to use the most current data and mapping available. The data and maps are available to the public³⁷ to help people understand the risk to their property, to take ownership of that risk taking action where practical.
160. Our understanding of coastal erosion and flood risk from rivers, the sea and surface water is continually improving thanks to better modelling, mapping and from lessons learned from actual flood events. Since the first Strategy the following maps and data have been published:
- Shoreline Management Plans (SMPs)³⁸
 - Updated Flood map for surface water
 - **National Coastal Erosion Risk Management (NCERM)** map
 - Updated Development Advice Map.
161. These complement and inform Flood Risk Assessment for Wales (FRAW) and the Flood Map for Planning, which come together under the Wales Flood Map. They show the likelihood or chance of a flood from rivers, sea and surface water:

Figure 8: categories of flood risk

Risk	Chance of flooding in any given year
High	Greater than or equal to 1 in 30
Medium	Less than 1 in 30, but greater than 1 in 100
Low	Less than 1 in 100, but greater than 1 in 1,000
Very Low	Less than 1 in 1,000

162. Flood risk data is shown through FRAW. This is an important product for all involved in flood risk management, providing a national assessment of risk from all sources of flooding for both public and professional use. It also informs the Communities at Risk Register and our FCERM programme.
163. New data through the FRAW states that 245,118 properties are at risk of flooding from all sources in Wales. These new figures (2019) differ from previous counts as they now include surface water risk and utilise a more accurate methodology. Figure 9 below sets out the number of properties at flood risk whilst figure 10 demonstrates how some properties are prone to more than one source of flood risk. This overlap helps to explain the double-counting inherent in flood risk data and why the individual numbers of properties at risk from different sources, as shown in figure 11, can be greater.

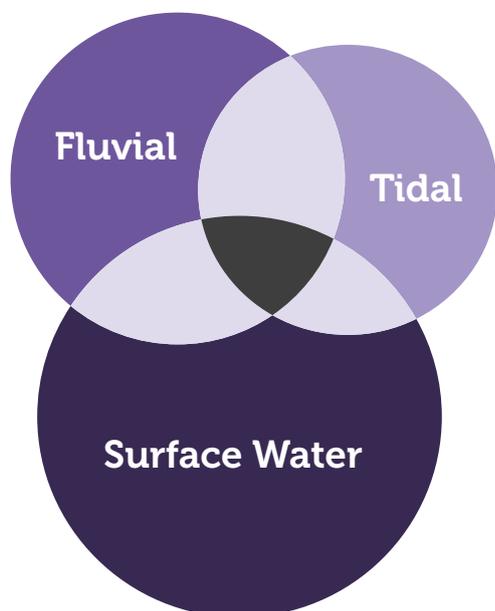
Figure 9: Number of properties at risk, taken from FRAW, 2019

Combined Flood Risk	Properties at risk
High	117,100
Medium	44,668
Low	83,350
Total	245,118

³⁷ National flood and coastal erosion risk information and maps are accessed through NRW's website naturalresourceswales.gov.uk/flooding/

³⁸ www.gov.uk/government/publications/shoreline-management-plans-smps/shoreline-management-plans-smps

Figure 10: Venn diagram showing properties at risk, by three sources of flooding.



1 source	Fluvial only	43,643
1 source	Tidal only	33,129
1 source	Surface Water only	101,565
2 sources	Fluvial and Tidal	29,977
2 sources	Tidal and Surface Water	11,825
2 sources	Surface Water and Fluvial	20,358
3 sources	Fluvial, Tidal and Surface Water	4,621
Total		245,118

Figure 11: FRAW 'at risk' property counts against source (rounded to nearest 50)

	Residential	Non-residential	Total
Fluvial	77,850	12,300	90,150
Tidal	62,300	8,750	71,050
Surface Water	115,700	14,100	129,800
Overall total of properties at risk in Wales (including double/triple counting)			291,000
Overall total of properties at risk in Wales (excluding double/triple counting)			245,000

164. We want to understand the number of homes and businesses³⁹ at high, medium and low risk of flooding from rivers, sea and surface water so we can measure and show improvement as a result of FCERM investment and assess progress against this Strategy's overarching aim. Full details and maps utilising the new FRAW data will be published by the end of 2020.

We want the public to understand the risk of flooding to their property. The new Flood Risk Assessment Wales (FRAW) will identify the flood source and level of risk to all communities in Wales.

MEASURE 3: NRW to publish new FRAW maps in 2020 alongside the Strategy and update every 6 months to reflect changes in National Asset Dataset

Objectives supported: A-E

We want to monitor the reduction in risk and benefit to properties as a result of our investment.

MEASURE 4: NRW to provide data on the number of homes and businesses at high, medium and low risk of flooding from all sources on an annual basis based on FRAW updates.

Objectives supported: A and C

165. To understand risk, we need accurate data on properties, assets and flooding. The following table (figure 9) shows the types of data, mapping and plans available and how they are used to inform decision making on investment in FCERM. We expect all RMAs to work to ensure data and maps reflect the current risk, undertaking reviews and updates in line with the schedule below.

³⁹ Businesses includes key services such as schools, railway stations, hospitals, dentists etc. i.e. all properties which are not 'residential'

Figure 12: Flood and coastal risk maps and plans with update schedule

Map/data	Maintained	Updated	Used to inform
Wales Flood Map	NRW	6 Monthly	Collective term for the FRAW and Flood Map for Planning.
Flood Risk Assessment Wales (FRAW) Map	NRW	6 Monthly	Public and professional use. Map showing detailed information on flood risk from all sources. Provides data on number of properties at varying flood risk and how properties benefit from schemes and investment.
Flood Map for Planning	NRW	6 Monthly	Public – information on likelihood of flooding from all sources. Informs decisions by planners, insurance industry, and on house purchase. This will replace the Development Advice Map for planning decisions upon publication of the new TAN 15.
National Coastal Erosion Risk Management map (NCERM)	NRW	As new data available within Wales Flood Map	Properties at risk from coastal erosion; Wales Flood Map products; Planning decisions; Habitat Regulation Assessments; Coastal adaptation; SMPs.
Communities at Risk Register (CaRR)	NRW	Annually	Identifies and assesses the hazards that might affect the local resilience. Used to help prioritise investment in the most at risk communities.
National Asset Database	NRW	Annually	Communities at Risk Register, FRAW, Wales Flood Map and helps support investment in maintenance.
Plans			
Shoreline Management Plans (SMPs)	Coastal Groups	As new data available	Short, medium and long term coastal policy and coastal management projects. Development Plans and strategic decisions.
Preliminary Flood Risk Assessment	NRW/Local Authorities	Every 6 years	Report Flood Risk Areas to Europe
Flood Risk Management Plans	Local Authorities/ NRW to co-ordinate	Every 6 years	5 year programme of work. Reporting to Europe
Local Flood Risk Management Strategies	Local Authorities	Within 2 years of National Strategy	Management and communication of local flood risk. Identification of key areas for FCERM interventions.

To ensure the public and stakeholders are using the most up to date information on flood risk and coastal erosion.

MEASURE 5: Risk Management Authorities to update maps, plans and data in line with the schedule set out in Figure 12 of the National Strategy.

Objectives supported: A-E

166. We want Local Authorities to provide updates to NRW on risk levels following investigations, updated modelling, completion of new alleviation schemes and improvements and enhancements to existing defences. This will enable timely updates to the Wales Flood Map, FRAW, National Asset Database and Communities at Risk Register and is set out in the Memorandum relating to FCERM Grants.
167. RMAs should provide as-built information and post construction modelling information to NRW within 6 months of completion of works. NRW will then incorporate updated information into GIS risk models, FRAW and the defended layer in the Wales Flood Map in line with the updates in the figure 8. The information shall include the location and number of properties benefitting from the asset and the type of flooding it helps alleviate.
168. In 2016 we started work developing the National Asset Database to collate information on significant assets owned by NRW and Local Authorities, also recording condition and responsibility for maintenance. This database will help clarify roles and responsibilities by identifying ownership and asset condition.
169. Realising the benefits of FCERM investment and showing how risk has reduced in a community is a key part of any flood and coastal scheme. The information not only improves our understanding of risk through updates to the models, but can assist regeneration, improve information for planning and development decisions and informs our flood risk reporting.
170. We want the public and local businesses to understand the benefits of FCERM schemes and become more involved in decisions affecting their area. Seeing how risk has reduced on maps and plans demonstrates how schemes have made a difference. This can link to wellbeing and economic benefits through improved peace-of-mind, lower insurance premiums and can help to regenerate an area by making it a more attractive place to live, work and invest in.

To support decision making and reflect reduced risk from investment.

MEASURE 6: NRW and Local Authorities will work together to ensure that by end of 2021 the National Asset Database will contain data on FCERM assets owned or designated by Risk Management Authorities.

MEASURE 7: NRW will work with Local Authorities to develop a process to ensure all updates are incorporated in the National Asset Database within 6 months of any completed works or changes otherwise required, by the end of 2021.

MEASURE 8: NRW to utilise the National Asset Database to ensure Wales Flood Map reflects the reduced risk from all flood alleviation schemes by 2022.

Objectives supported: A-D

171. Coastal erosion risk is shown through the **National Coastal Erosion Risk Map (NCERM)** which is managed by NRW. Erosion risk is unlikely to change as frequently as flood risk but we continue to learn more about erosion risk through our coastal monitoring programme and the work of RMAs.
172. NRW will work with the coastal groups, Wales Coastal Monitoring Centre (WCMC) and RMAs to review the NCERM and ensure it remains correct. Any corrections or updates to the map should be made promptly and reported to the relevant Local Authority and the Welsh Government.

To provide easily accessible information for the public on coastal erosion.

MEASURE 9: NRW to ensure the National Coastal Erosion Risk Map (NCERM) matches SMP policies by 2021 and shows erosion rates as bands in the Wales Flood Map products by end of 2022

Objectives supported: A-E

Flood Risk Management Plans

173. The legislative requirement for flood risk management planning in Wales is governed by the Flood Risk Regulations, which encourages improvement in flood risk assessment, maps and plans, over a six year cycle.
174. The UK Government has started the process of leaving the EU. We will continue to work to the Flood Risk Regulations which remain operable in UK law, and to work to the deadlines in the Floods Directive⁴⁰.
175. We have made a conscious decision to improve these plans by moving towards a consolidated risk assessment for all sources of flooding. This will use the FRAW and Communities at Risk Register to cover all flooding and significant flood defence assets. By using this data to inform the current cycle of flood risk assessment, Flood Risk Management Plans, based on risk from all sources of flooding, will utilise the best available information and reflect investment priorities for Wales, helping to inform the RMAs medium term programmes of work.

Shoreline Management Plans

176. A Shoreline Management Plan (SMP) is a large-scale assessment of the risks associated with coastal processes. They are non-statutory documents but the Welsh Government want to see them considered both in local decision making and strategic planning, such as Local Development Plans and Local Flood Risk Management Strategies. Their aim is to identify and set out the preferred coastal risk management policies to reduce the risks to people and the developed, historic and natural environments, over the long term⁴¹. Neighbouring responsible bodies then work together, whether at Coastal Group level, or Local Authority/land owner level, to communicate and implement the Plans.
177. SMPs identify the most sustainable policies over the next 100 years based on a review of available evidence and an assessment of risks and impacts including consideration of technical, environmental, social, economic and local factors.
178. SMP policies should take account of the relationships with other defences, developments and processes, and avoid committing future generations to inflexible and expensive options for defence.
179. Welsh SMPs cover:
- SMP 19 Anchor Head to Lavernock Point (Both side of the Severn Estuary)
 - SMP 20 Lavernock Point to St Ann's Head (South Wales)
 - SMP 21 St Ann's Head to Great Ormes Head (West of Wales)
 - SMP 22 Great Ormes Head to Scotland (NW England and North Wales)⁴²

180. There are 4 **policy options** in SMPs:
- **Hold the existing defence** line maintaining or improving defences in their present position.
 - **Advance the existing defence line** by building new defences on the seaward side of the existing defence.
 - **Managed realignment** allowing the shoreline to move back, with management to encourage or control its extent.
 - **No active intervention**, where there is no more investment in existing defences.
181. Policy options are defined for three epochs in SMPs: short-term 0-20 years, medium-term 20-50 years, and long-term 50-100 years, taken from a baseline of 2005. GIS data for SMPs is available online.⁴³
182. However the epochs are not absolute and timing decisions on implementation should be informed by factors like rate of sea level change and detailed local studies, taking into account social and wellbeing factors as well as environmental opportunities.
183. The preferred management policies set out in SMPs should influence and inform the preparation of Strategic and Local Development Plans and their coastal policies. Particular attention should be paid to where a change of coastal policy is proposed in an SMP, where coastal defences will no longer be maintained, or where a managed realignment policy will be established. Development plans should include appropriate policies to manage development in such areas. This may include identifying areas where development would be unsuitable or where coastal adaptation demands policies be set out to help support any long-term masterplan for property and infrastructure in the area.
184. The SMPs are living documents and should be reviewed and amended where more up to date information, such as climate change projections, is available. Coastal Local Authorities may undertake detailed local studies to review the policies in the SMPs using the most current data. Where evidenced, it may be appropriate to change the SMP policy for a particular location.
185. Changing SMP policies needs to be underpinned by robust reasoning, evidence and adequate supporting assessments to demonstrate why the preferred policy is not fit for purpose. It should not necessarily be seen as common place to change policies and careful consideration is required not to de-value importance and appropriateness of existing SMPs.
186. The Coastal Groups are responsible for producing and managing the SMPs. Coastal Groups should be made up of all authorities with an operational responsibility for the coast, and organisations with an interest in the shoreline. Further detail can be found in the Roles and Responsibilities section.

40 Directive 2007/60/EC on the assessment and management of flood risks

41 Shoreline Management Plan guidance – Volume 1, Defra 2006

42 SMPs are numbered sequentially around the coast of England and Wales; these 4 SMPs cover the Welsh coastline.

43 ile.gov.wales/catalogue/item/ShorelineManagementPlanCoastalErosion

187. Wales Coastal Group Forum will work with Coastal Groups to standardise a reporting method, by introducing criteria to emphasise progress on actions. This will support Measure 10 of this Strategy.
188. In addressing coastal flooding and implementing actions in the SMPs, Local Authorities may wish to speak to the WCMC and NRW, who prepare and maintain technical guidance on coastal standards of service against flooding. NRW continue to model risk from the sea, and are conducting research to improve understanding of joint probability and develop best practice guidance.
189. Flooding can span country boundaries so RMAs that border England must co-operate with the Environment Agency and other English RMAs to make improve flood risk management and consider partnership funding.
190. The Environment Agency is working with English coastal groups to improve access and use of SMPs through the development of a web-based tool. The Welsh Government will extend this to include the four Welsh SMPs. NRW and Coastal Group Forum will liaise with the Environment Agency on this extension.

Action Plans arising from the SMPs set out measures relevant to each stakeholder, and are for Coastal Groups to monitor and progress.

MEASURE 10: Coastal Groups to report annual progress on SMP Action Plans to the Welsh Government through the Wales Coastal Group Forum.

MEASURE 11: Coastal Groups to report on the implementation of SMP2 epoch 1 policies, through Wales Coastal Group Forum to the Welsh Government, by 2025.

Objectives supported: A-D

Coastal monitoring

191. Wales' coastline is a dynamic environment. Man-made alterations to the coastline such as coastal defences impact on natural systems, particularly where controls have been put in place altering the way sediment moves along the coast. We need to improve our understanding of the long term trends and changing nature of those coastlines in order to manage the risks of flooding and erosion
192. We want RMAs to work together through the WCMC, collecting data to common standards and sharing expertise so that a long term repository of information can be built up over time supporting our strategy of prioritising investment.



Objective B: Preparedness and Building Resilience

Community resilience and behaviours

193. The resilience of a community to flooding is a measure of how it responds to and recovers from a flood event. A resilient community is well prepared for a flood and knows what action to take to reduce the potential impacts and damage caused. It is also able to minimise the disruption caused and recovers quickly from flood events. RMAs, the emergency services and voluntary organisations all have a role to play in improving community resilience.
194. We also talk about environmental resilience and the ability for ecosystems to adapt and recover from flooding. Whilst the personal and economic aspects of resilience are covered here, there is more on the resilience of catchments under the Natural Flood Management section (paragraphs 201-213).
195. The immediate response of a community to a flood can be improved greatly if they are prepared for the event, aware of the risks, and understand what practical actions they can take and who is most appropriate to help them at the time they need it most.
196. Under the Civil Contingencies Act 2004, all Category 1 and 2 responders⁴⁴ have a duty to warn and inform the public if a flood emergency is likely to occur.
197. Under the Water Resources Act 1991, NRW provides a flood warning service to the public for river and coastal flooding. NRW have established agreements under the Civil Contingencies Act 2004 with certain telecom providers to pre-register customers who live in flood warning areas onto its warning service. The public can also sign up for free flood warnings online via NRW's website⁴⁵ or by calling Floodline⁴⁶.
198. Understanding forecasts, assessing flood risk and communicating it is a key part of being prepared. Working in partnership with the Met Office and Flood Forecasting Centre, NRW assess risk from river, coastal and surface water and publish a 5 day flood forecast on its website. The Flood Forecasting Centre issue a Flood Guidance Statement to Category 1 & 2 Responders in Wales.
199. There can be physical and psychological impacts from a flood event. We therefore support action to improve the resilience of communities so they are prepared to respond more effectively and recover quicker. This may include receiving flood warnings, the preparation of community flood plans and outreach work with residents, businesses and schools.
200. We want to encourage RMAs to have conversations with communities around their own management of risk and help them to become more resilient to the impacts of flooding. Closer collaboration between NRW and Local Authorities to develop and engage with communities should become common practice.

44 www.legislation.gov.uk/ukpga/2004/36/contents

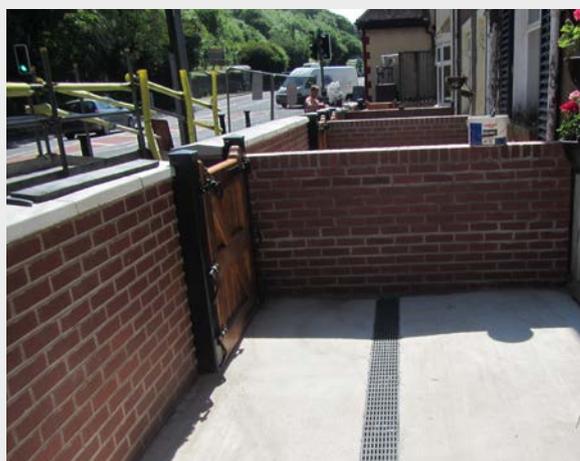
45 naturalresources.wales/flooding/sign-up-to-receive-flood-warnings/?lang=en

46 www.gov.uk/sign-up-for-flood-warnings

201. Some elements of flood and coastal risk management are best handled by an individual household or business, for example, ensuring they are adequately insured, knowing what to do when flooding is expected and implementing resilience measures so they can recover quickly with less disruption to everyday life or their business.
202. Such behavioural change and work around accepting and managing risk requires support and information that is easily accessible. NRW have information on what to do before, during and after a flood which will be enhanced as part of their online flood support improvements (see measure 11) including the new flood maps.
203. It remains the responsibility of a home or business owner to have adequate insurance cover against flooding. Affordability of home insurance has been significantly improved in Wales through the take up of a UK Government initiative called **Flood Re**, introduced in 2016 under the Water Act (2014).
204. As well as making more affordable home insurance available to those at flood risk, part of Flood Re's remit is to provide information to consumers about how to increase their understanding on flood risk and how they can take action to reduce that risk i.e. become better prepared. Further information can be found on the Flood Re website⁴⁷.
205. Flood Re only applies to homes built before 2009 to help deter new development being located in flood prone areas. The Welsh Government supports this principle and directs new homes away from areas identified as medium or high risk through planning policy and TAN 15.
206. Property Flood Resilience measures can help to prevent flood water ingress into a building or aid rapid recovery following a flood event. This can reduce repair costs and the misery and disruption caused by flooding. These measures can be installed as either a preparatory measure for properties at risk of flooding, or retrofitted during the repair of buildings after they have been flooded. RMAs may also consider such interventions where NFM or traditional defences are difficult to implement or justify, however it remains the responsibility of the homeowner or business to take action to protect their property and belongings during a flood.

207. We have supported the work undertaken by the Construction Industry Research and Information Association, CIRIA, following consideration of a recommendation within the Bonfield Review⁴⁸ to prepare a code of practice to standardise the UK provision of property flood resilience. The guidance⁴⁹ was published in February 2020.

Property Flood Resilience



Following the 2018 flooding of 5 properties in Penarth, the Vale of Glamorgan Council installed a new boundary wall incorporating floodgates which continues to protect the community.

47 www.floodre.co.uk/

48 Defra, The Property Flood Resilience Action Plan, - www.cii.co.uk/news-insight/news/articles/property-flood-resilience-code-of-practice/90370

49 www.ciria.org/ItemDetail?iProductCode=C790F&Category=FREEPUBS

Awareness Raising

- 208. A 2013 report into the need for Flood Support Service for Wales⁵⁰ identifies a series of tasks to improve support to communities before, during and after a flood. All RMAs have a part to play in this support and through their awareness-raising activities.
- 209. The Flood Awareness Wales programme, run by NRW and fully funded by the Welsh Government, helps communities understand their flood risk and practical steps they can take to manage the risk.
- 210. Flood Awareness Wales helps volunteers from communities to develop and maintain their own Community Flood Plans. Flood plans capture information a community will need in the event of a flood, including the actions need to prepare, respond and recover, also referred to as ‘before, during and after’ a flood. Flood Awareness Wales has helped over 1000 communities, schools and businesses across Wales develop flood plans and has been commended through an independent review⁵¹.

- 211. NRW are considering bringing the Flood Awareness Wales programme of work within its normal NRW flood awareness activities and digital improvements to improve access to information. The Welsh Government want to see this work continue, complemented by ongoing improvements to online flood information and social media activity.
- 212. Local Authorities also play a role in raising awareness of flood risk in communities. The Welsh Government understands that Local Authorities find this objective challenging, given the varying levels of resource available, and can seek advice and assistance from NRW. A recent report by WLGA⁵² on the options for management of flood and coastal erosion on a regional basis proposes such an approach to delivering flood awareness.
- 213. The preparation, design and construction of an alleviation scheme can be an excellent opportunity to raise awareness and involve residents, schools, landowners and local businesses in decisions which will affect their community. This can be especially effective when planning catchment scale schemes, explaining NFM and introducing engineering and FCERM to young people. Such outreach work is grant eligible and should be included in business cases.

Wales Coastal Monitoring Centre outreach work with schools



WCMC has worked with local schoolchildren and linked up with schools in American Samoa, Fiji and Australia, developing a series of lessons on climate change and coastal monitoring for year 6 pupils. This has been developed in line with the new school curriculum (2022) and lessons will be freely available to download for other schools to use.

This is an example of how flood projects can embed the principles of 5 ways of working, as set-out in the Well-Being of Future Generations Act, and bring people from around the world facing similar challenges together.



50 Welsh Government, Flood Advocacy & Support Service for Communities in Wales, 2013
 51 Collingwood Environmental Planning, Independent Review of Flood Awareness Wales, 2016
 52 www.wlga.wales/SharedFiles/Download.aspx?pageid=62&mid=665&fileid=2042

214. Mapping and messaging has already been improved following a recommendation from the Wales Coastal Flooding Review⁵³ and the Public Accounts Committee⁵⁴ to develop consistent advice and online information to the public before, during and after a flood. The publication of FRAW in the Wales Flood Map will further underline our commitment to continuous improvement in communicating risk.
215. The Welsh Government has asked NRW to continue working with Local Authorities on improving digital information provision to the public. Recent research has indicated that the public require clear, concise and consistent information which can be easily accessed via smart phones as well as more traditional methods of communication. Building on this research, NRW will continue to develop their online flood pages to become the central hub of information for flood and coastal risk in Wales.
216. The measure below meets the recommendation from the National Assembly's Public Accounts Committee; however we recognise this work is continuously improving as we benefit from new information and changes in the way it is accessed.

We want to improve awareness and access to information on flood and coastal risk management.

MEASURE 12: NRW to complete their online flood information improvements, working with WLGA and Local Authorities, by 2021. This will include publication of the Wales Flood Map products, understanding flood warnings and advice on building resilience and responding to flooding.

Objectives supported: A, B, D and E

Reducing risk at Crindau, Newport



Crindau, Newport has a long history of tidal flooding. Existing defences were in very poor condition, offering a low level of protection up to a 1 in 10 year flood event.

NRW's Crindau Flood Risk Management Scheme will reduce flood risk to 667 properties, providing protection against a 1 in 200-year event. The scheme has been designed to be adaptive to climate change beyond 2064.

Phase 1 included constructing flood walls behind the industrial properties and a new embankment through Shaftesbury Park. Several seated terraces have been built overlooking the playing field to enhance this local amenity and a new footpath and cycleway now run through the entire park.



Objective C: Prioritising investment to the most at risk communities

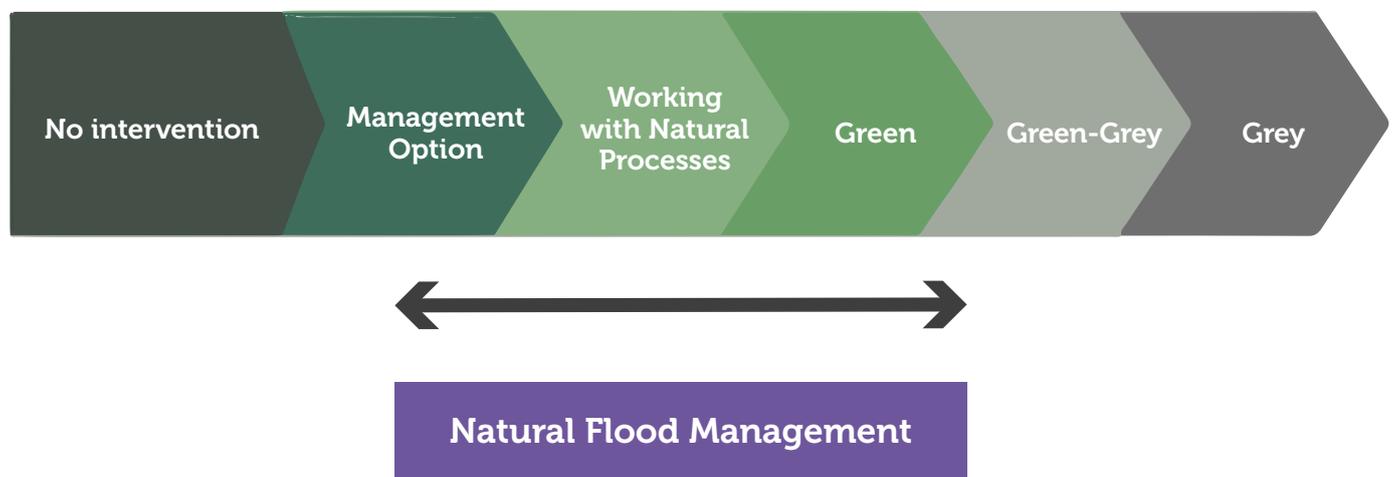
217. As communities have developed so has a significant network of flood risk management assets, coastal protection and drainage infrastructure to help reduce the risks faced. Although these arrangements have generally worked well in the past, and are still working in most parts of Wales, the effects of climate change mean that the pressure on our existing infrastructure will increase significantly.
218. It is not possible, nor is it sustainable, to protect all areas from flooding or coastal erosion. Flood alleviation schemes reduce, but do not completely remove the risk of flooding. No matter how big the defence, there is always a possibility it can be breached or over-topped, leading to ever-more catastrophic consequences. Therefore, there will always be a residual risk that drainage and defences alone cannot address and a reason why raising awareness with the public is important.

⁵³ Recommendation 15, Wales Coastal Flooding Review: Delivery Plan for Phase 2 recommendations cdn.naturalresources.wales/evidence-and-data/research-and-reports/reports-evidence-and-data-on-flooding/wales-coastal-flooding-review-delivery-plan-phase-2-recommendations/?lang=en

⁵⁴ Recommendation 4, Public Accounts Committee report on Coastal flood and erosion risk management in Wales, June 2017 www.assembly.wales/laid%20documents/cr-ld11073/cr-ld11073-e.pdf

- 219. Interventions to reduce flood risk are prioritised according to risk using the Communities at Risk Register and evidence of flood events, alongside supporting information on properties and wider benefits.
- 220. The Welsh Government prioritises FCERM schemes which primarily reduce risk to homes. Businesses and public buildings can also benefit from flood alleviation schemes, in particular those schemes which reduce risk to a mix of development types such as homes and shops along a high street or local district centre. Schemes which only reduce risk to businesses remain eligible but should not be prioritised over schemes which reduce risk to homes.
- 221. Planning policy directs highly vulnerable development, such as homes, away from high and medium flood risk areas. Less vulnerable developments may be permitted in the flood plain where the risk is considered acceptable for that development use and can be appropriately managed. FCERM schemes should not be required to defend these developments.
- 222. Traditionally, flood and coastal risk interventions have been focused on engineering measures such as walls, groynes, embankments, and drainage improvements. However, in some instances these interventions have led to adverse impacts or increased risks elsewhere; RMAs should use appropriate modelling to establish any negative impacts associated with such measures.
- 223. In line with the Flood and Water Management Act 2010, reducing the risk of flood and coastal erosion can include working with natural processes or Natural Flood Management (NFM). This approach is in line with our Natural Resources Policy, and is encouraged in all FCERM interventions, either as a stand-alone or hybrid scheme. This approach also supports the First Minister’s vision for Wales to become a **World leader in green technology and sustainability**.
- 224. During the option appraisal undertaken as part of scheme development, we encourage RMAs to consider a broad spectrum of measures options,

Figure 13: Option appraisal continuum



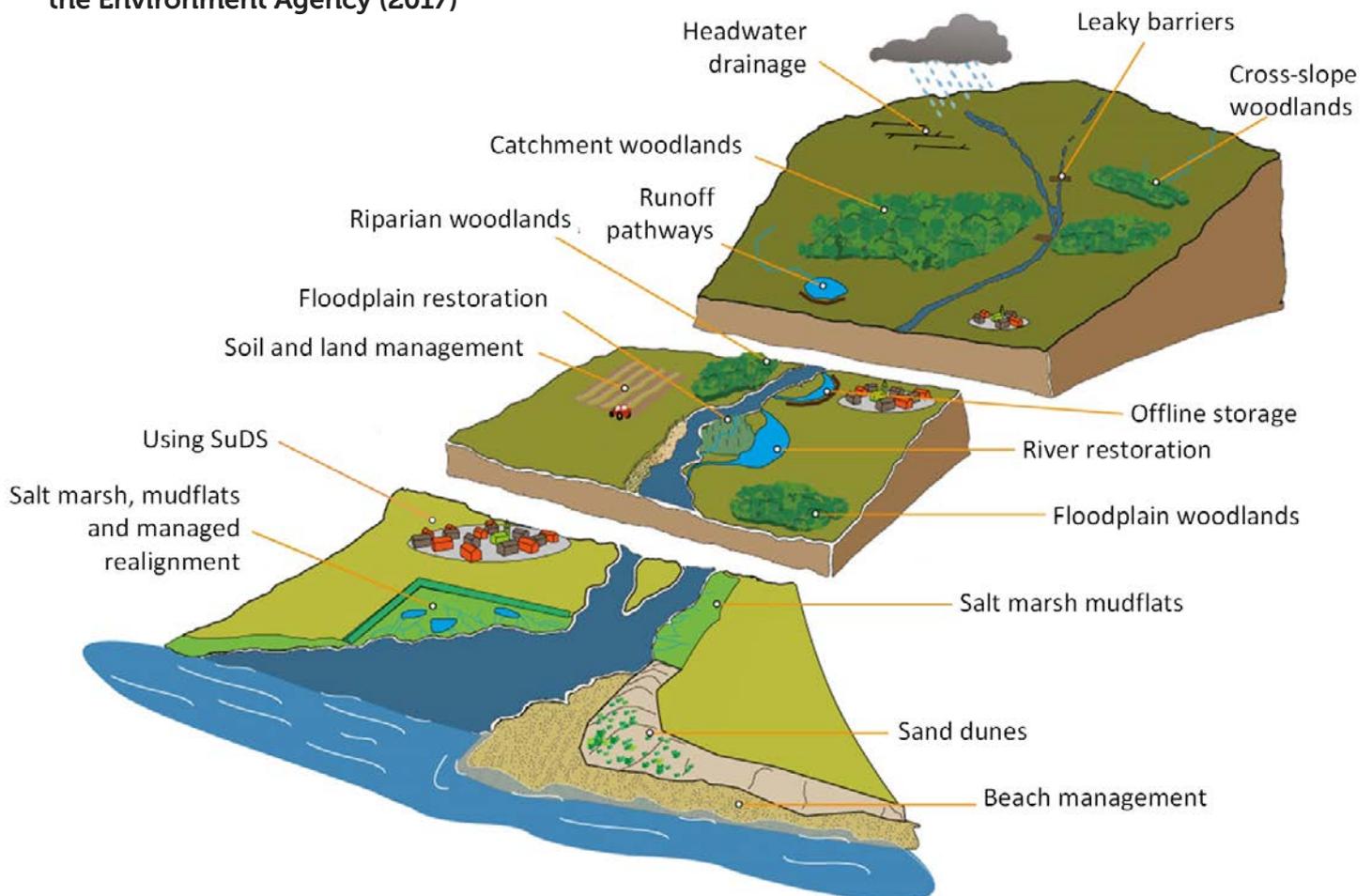
225. The continuum shows options for intervention including managing the behaviours which cause the problem, through NFM, to 'grey' or 'hard' interventions. Whilst traditionally flood risk management has involved hard engineering interventions to the right of this spectrum, we want to see more measures which work with natural processes to reduce flood risk.

Natural Flood Management

226. A key priority of this Strategy is to deliver more natural interventions and catchment approaches to help improve environmental, social and economic resilience. This includes working with natural processes and green infrastructure on the above spectrum, and collectively defined as **Natural Flood Management (NFM)**. Mitigating flood risk through NFM also aligns with the Natural Resources Policy and our move towards a low carbon based economy, outlined in the Economic Action Plan⁵⁵.

227. NFM has been described as “reducing flood and coastal erosion risk by implementing measures that help to protect, restore and emulate the natural functions of catchments, floodplains, rivers and the coast”⁵⁶. Examples of NFM include interventions such as tree planting, offline storage areas, in-stream obstructions, soil and land management, dune and beach management and creation of new wetlands.

Figure 14 – Catchment Diagram, Working with Natural Processes, Adapted from the Environment Agency (2017)



⁵⁵ gov.wales/sites/default/files/publications/2019-02/prosperity-for-all-economic-action-plan.pdf

⁵⁶ www.gov.uk/government/uploads/system/uploads/attachment_data/file/654431/Working_with_natural_processes_evidence_directory.pdf

228. NFM can reduce water flows through the catchment, research however indicates it may not be so effective in isolation, or during extreme flood events. It can be effective in larger catchment scale projects or when used in conjunction with more traditional interventions, acting to reduce and delay peak flows, so reducing the risk of other defences failing or being overtopped. In these cases, the use of NFM can result in smaller and less obtrusive hard defences being required within the catchment. We refer to such a mix of methods as **hybrid schemes**.

229. NFM and/or hybrid schemes are eligible for FCERM grant funding as long as the objective is to reduce flood risk to properties; see chapter 6.

230. The flood alleviation scheme in Swansea Vale incorporated a flood storage area and re-naturalised the flood plain for both biodiversity and amenity benefit. It is an example of a fluvial hybrid intervention which the Welsh Government is keen to support.

Swansea Vale Flood Storage Area



Completed in 2014, this £6.9 million scheme made space for water by forming new earth embankments creating an area to hold flood water from the River Tawe and its tributaries during flood events. As well as raised embankments the scheme creates more space for water by setting back the flood defences at the top end of the river and taking out three redundant bridges to allow more water to pass.

The NRW scheme has provided wider benefits such as the creation of a natural wetland area which has enhanced 6ha of brownfield industrial land as green space for local people to enjoy and new habitat to support wildlife. 3km of National Cycle Network was upgraded along the river including a new footbridge.

231. The Welsh Government's **FCERM Business Case Guidance** states that RMAs must consider the use of NFM in developing options for new assets and maintenance.

232. There has been significant research into NFM since the publication of the previous National Strategy. The "Working with Natural Processes" research⁵⁷, Natural Flood Management Handbook (SEPA)⁵⁸ and "Green approaches in river engineering"⁵⁹ provide case studies and information which RMAs may find helpful to better understand where and how certain types of interventions may work.

233. NRW have published maps⁶⁰ to support the delivery of NFM, identifying potential locations for such measures in a catchment. The maps have been made available as open data and should be used as the basis for starting conversations about NFM as a collaborative catchment-based approach in conjunction with other RMAs and partners.

57 www.gov.uk/government/publications/working-with-natural-processes-to-reduce-flood-risk

58 www.sepa.org.uk/media/163560/sepa-natural-flood-management-handbook1.pdf

59 Green approaches in river engineering – supporting implementation of Green Infrastructure. Roca et al. HR Wallingford, (2017)

60 naturalresources.wales/flooding/managing-flood-risk/maps-for-natural-flood-management/?lang=en

Gurnos Woods, Powys – Small Scale Scheme/ Natural Flood Management



Powys County Council have installed a series of green engineering measures to reduce flooding associated with a small watercourse in Ystradgynlais.

Prior to the scheme, the culvert system could not cope with flows and was blocking due to silt and stone washing downstream. The works undertaken involved the construction of leaky dams, straw bale dams and willow structures to slow down the flow of water. Block stones have also been installed to reduce the force of the water and prevent erosion of the embankments.

Powys have monitored these interventions since construction and have witnessed a number of significant benefits: all debris is being held behind each structure reducing blockages; flows within the channel are clearer allowing for increased wildlife to the area; reduced peak flows of flood waters and reduced erosion of the embankments.

234. As well as reduction in flood risk, NFM may provide wider benefits such as carbon storage, recreation, biodiversity improvements and social wellbeing. The use of these measures can also help RMAs demonstrate delivery against the Well-being of Future Generations (Wales) Act, and duties under the Environment Wales Act, as they encourage an integrated approach to delivery and provide opportunities for collaboration with neighbouring authorities and land owners.

235. We want to improve our understanding of the benefits of NFM, particularly on performance and long term maintenance requirements. We will continue to engage in research in this field and encourage RMAs to monitor outcomes of NFM to understand its benefits and to feed into research where appropriate.

236. We will encourage further take-up by introducing full grant support for NFM schemes for at least two years, commencing 2020/21. A key element of this additional support is monitoring outcomes and sharing experiences in its use with other RMAs so that we can learn lessons on all stages of NFM delivery.

237. NFM measures are already being implemented across Wales⁶¹. Drawing on lessons learnt and ongoing research⁶² into this area will help to improve our wider understanding of the impact and effectiveness of different measures in various locations and scales. This will help inform future best practice and aid investment decisions, and we expect RMAs to share their experiences and research through existing groups and fora.

238. Future land management policy⁶³ is currently being devised to replace the Common Agricultural Policy once the UK has exited the EU. It focuses on the delivery of environmental public goods such as targeted interventions to reduce flood risk. This initiative is likely to widen the implementation of NFM, including by those without direct responsibility for flood risk management.

239. This Strategy complements forestry and agriculture policies to help reduce flood risk through reduced run off, and for appropriate tree planting, ploughing and cultivation practices to be encouraged for the same reason. The benefits of tree planting in appropriate parts of a catchment are still being understood, but research⁶⁴ is demonstrating that it does reduce risk and provide biodiversity benefits as part of a package of measures.

61 naturalresources.wales/media/680131/flood-coastal-erosion-risk-management-in-wales-2014-2016.pdf

62 www.nerc.ac.uk/research/funded/programmes/nfm/

63 gov.wales/brexit-and-our-land-our-response

64 Research on the impact of tree planting on flood risk is documented in the Working With Natural processes Evidence Directory – www.gov.uk/government/publications/working-with-natural-processes-to-reduce-flood-risk including a case study at Pontbren.

Green-grey infrastructure

240. We acknowledge the importance of green-grey interventions in flood alleviation and coastal erosion. We want to see FCERM infrastructure become more sustainable in the long term and work increasingly in conjunction with nature based solutions to improve resilience and provide wider benefits to ecosystems.

241. **Green-grey interventions** include a natural component to improve the biodiversity, ecology and aesthetics of an engineered structure whilst maintaining the integrity of the defence. It can be described as naturalising hard structures to mimic the natural environment. They can create space for recreation and help with **climate change mitigation** and adaptation or incorporate natural habitat, such as mud flats or salt marsh, into an FCERM scheme. Examples include adding features defences, such as concrete units which mimic rock pools, or building texture into sea walls and river embankments to encourage biodiversity⁶⁵.

Vertipools, Isle of Wight⁶⁶



Vertipools have been attached to the side of dock in Fishbourne, Isle of Wight in 2017 during an investment project to improve ferry and port facilities.

They provide an artificial rock pool which retain water as the tide recedes providing a habitat for fish and invertebrates. Marine life which colonise the pools can also strengthen the integrity of the structure and improve its resilience by providing a covering of organisms such as barnacles, mussels and seaweeds. They are also used for educational purposes allowing local school children on fieldtrips to undertake rock pooling activities and learn about marine biology.

242. Research such as 'Integrated Green Grey Infrastructure'⁶⁷ (IGGI) demonstrates opportunities to 'green the grey' and add wider benefits to a traditional scheme. Like NFM, green-grey infrastructure should be considered when planning new defences or during maintenance of existing defences and is grant eligible.

We want to encourage the take-up of NFM in Wales. We will support pilot studies and interventions designed to reduce flood and coastal erosion risk to better understand its benefits.

MEASURE 13: The Welsh Government will fully fund NFM schemes for a trial period, commencing 2020/21, and publish new guidance to further encourage take-up and the sharing of lessons on its practical delivery.

MEASURE 14: The Welsh Government will work cross policy to ensure NFM is considered in wider land and water management, including agriculture and in NRW Area Statements.

Objectives supported: A, B and C

We want to see NFM as an option for every FCERM scheme as set out in our FCERM Business Case Guidance.

MEASURE 15: The number of NFM and hybrid schemes undertaken will be reported to the Welsh Government annually through grant reporting, and reported to Welsh Ministers by NRW in the Section 18 report.

Objectives supported: A, B and C

⁶⁵ Living Flood Defence Walls: Reconciliation Ecology in an Urban Estuary" Francis et al. (2015). Technical Report.

⁶⁶ www.artecology.space/wightlink

⁶⁷ Naylor, L. A., Kippen, H., Coombes, M. A., Horton, B., MacArthur, M. and Jackson, N. (2017) Greening the Grey: A Framework for Integrated Green Grey Infrastructure (IGGI). Technical Report. University of Glasgow, Glasgow



Objective D: Preventing more people becoming exposed to risk

243. The focus of FCERM is justifiably on reducing risk to communities located in at-risk areas. Historically, development along rivers, estuaries and the coast has been required for trade, economic or agricultural purposes but has, over time, put people at increasing risk from flooding. Advances in engineering and construction mean some of those dangers can be managed, but some risk always remains and as this grows it may require expensive alleviation schemes and constant maintenance to keep people safe.
244. With better, more open, flood data, we can make more informed decisions on where to develop and how to adapt our communities to actively remove elements of risk. We can also provide the public with the information they need to understand how flooding may affect them so they can make their own choices on avoiding or managing their own personal risk.
245. This new objective underlines the importance of sensible decision-making, from personal choices to government policies, so as not to further increase flood or coastal erosion risk or store up problems for the future.

Managing development risk

246. Planning plays a crucial role in managing development to avoid inappropriate siting, reduce flood risk where possible and not increase risk elsewhere. The Welsh Government's policy of directing development away from areas at high risk of flooding and managing water is set out in Planning Policy Wales and **Technical Advice Note (TAN) 15** which complements this Strategy.
247. Flood risk must be considered at the earliest opportunity not only to avoid inappropriate development but also to enable the sustainable management of water into new housing development. The statutory requirement for **Sustainable Drainage Systems (SuDS)** in managing run-off helps reduce flooding risk, on site and further down catchment, relieving pressure on drainage systems and improving water quality.
248. In January 2019, SuDS⁶⁸ became a mandatory requirement for the management of surface water on new developments. This fully reflects the need to protect and enhance the environment, in a controlled way similar to a natural process.

249. This all forms a vital part to the response in adapting to climate change and helping to achieve sustainable development. SuDS can also create opportunities for biodiversity improvements and recreation, as highlighted by Public Health Wales, amongst others, in improving health and mental well-being⁶⁹.

250. Evidence also suggests good quality SuDS may contribute to reduced or sequestered greenhouse gas emissions, providing important benefits for climate change mitigation.

We will ensure the requirement for SuDS in new properties is being implemented and working as intended.

MEASURE 16: The Welsh Government to commence a review of the effectiveness of SuDS legislation in 2021

Objectives supported: B and C

251. Development in coastal areas requires additional considerations which take into account the characteristics and challenges posed by such a location. In addition to flood and coastal erosion risk, the SMPs are a material consideration for Local Development Plans and development decisions in coastal locations. Further advice is contained in paragraphs 155-166 and within TAN 15.
252. TAN 15 will provide clearer and more robust policy advice on managing areas at high and medium flood risk. There is a careful balance to be struck as some development on flood plains may still be necessary due to the way our towns and cities have grown around rivers, estuaries and the coast. An outright ban on all flood plain development would sterilise growth in and around most of our populated areas, and lead to increased pressures to allow development on agricultural land and other greenfield areas.
253. TAN 15 proposes a new higher-risk zone where vulnerable development, such as new homes, cannot be located. It also sets clear tests to allow resilient development into appropriate lower-risk areas when safe to do so and where it will not increase flood risk elsewhere. Such a risk-based approach complements this Strategy, and will help to reduce the number of people living in high and medium flood risk areas. It also ensures the Welsh Government upholds its part of the Flood Re insurance agreements⁷⁰.
254. FCERM schemes should not be considered in defending land for the development of new homes (see paragraphs 220-221), reinforcing our policies to discourage inappropriate development in higher risk areas.

68 Schedule 3 to the Flood and Water Management Act 2010 makes provisions for sustainable drainage. Details of the regulatory framework and Statutory SuDS Standards and guidance are available at: gov.wales/sites/default/files/publications/2019-06/statutory-guidance.pdf

69 A summary of links between open space and health can be found at: [Green Space and Health \(2016\) researchbriefings.files.parliament.uk/documents/POST-PN-0538/POST-PN-0538.pdf](https://researchbriefings.files.parliament.uk/documents/POST-PN-0538/POST-PN-0538.pdf)

70 Consultation stage Memorandum of Understanding, Water Bill, 2013 consult.defra.gov.uk/flooding/floodinsurance/supporting_documents/20130626%20Flood%20Insurance%20MOU%20June%202013%20unprotected.pdf

255. Managing development in relation to flood risk relies on the most current information being available for advice and strategic decisions. TAN 15 will use the Wales Flood Map as the key source of flood advice for planners, withdrawing the previously used Development Advice Map to help stop any confusion over which map to use or which is most up-to-date. NRW are responsible for managing and updating the Wales Flood Map, providing clarity to the public and planners alike. However all RMAs have a role to play in providing asset data to NRW, as described earlier in this chapter, to ensure decisions are made using the most up-to-date information.

We want Planning and FCERM policies to complement each other, reducing risk by preventing inappropriate development in the flood plain and helping Planning Authorities make clear decisions based upon the best available information.

MEASURE 17: The Welsh Government to update TAN 15 by 2021 recognising the flood risk information now available to Local Planning Authorities

Objectives supported: B and D

Coastal adaptation

256. **Coastal adaptation** is the process of adjustment, to manage the increasing risks to coastal areas associated with climate change. However, many of the same principles apply to communities away from the coast, alongside rivers or in places prone to heightened surface water run-off and flash flooding.
257. Our understanding of climate change is improving all the time, but we know it will result in rising sea levels and more intense storm events putting coastal communities at increasing risk. SMPs complement national policy and set out the agreed options to sustainably manage our coast over the next 100 years. Text earlier in this chapter gives more detail on SMP policies.
258. Coastal interventions should be adaptive and sensitive to the environment they sit within as well as providing adequate protection to the communities they serve. The need to plan for coastal adaptation is particularly important for communities where SMP policies will change from 'holding the line' to 'managed realignment or 'no active intervention'.
259. We have established the Coastal Risk Management Programme to provide funding to Local Authorities between 2019 and 2022 for coastal adaptation and risk management in line with the SMPs and in acceptance of the increasing risk coastal communities face from climate change.
260. We cannot defend our entire coastline. There will be instances where it becomes unsustainable or counter-productive to maintain some defences in their present position. Defences can also lead to coastal squeeze of intertidal habitats and may increase sediment or beach loss by concentrating erosion or scour. Large populated areas are likely to remain reliant upon some form of coastal infrastructure (as well as fluvial). However, it is important to note they do not remove all risk; there remains the chance of catastrophic failure of a defence, significant overtopping or groundwater flooding.
261. Coastal Local Authorities, NRW and private asset owners should consider how infrastructure can be adapted to higher sea levels before the risk becomes excessive. Similarly, RMAs should consider how to implement a change in coastal management long before the SMP indicates it. Monitoring of coastal processes is an essential part of this so that the RMAs are well informed of increasing risk and can manage and communicate that risk to the community well in advance.

Fairbourne, Gwynedd



Difficult decisions are being made where communities are facing rising sea levels and increased storminess which come with a warming climate. Fairbourne, Gwynedd, is an example of this, sitting on a low-lying sand-bar behind coastal and estuarine defences which will become increasingly difficult to manage. The defences have been earmarked for managed realignment in the SMP as this is considered the most sustainable solution to keep residents safe in the long-term.

Fairbourne has received considerable media attention, however, such issues are not confined to this village; there are communities across the UK which will face similar risks and difficult decisions over the next century. In Wales, 95 coastal areas will move from a 'holding the line' policy (defending) to 'no active intervention' or 'managed realignment' by 2100. Around 40 of those areas may require relocation of property.

A policy of managed realignment does not mean the complete withdrawal of support. The Welsh Government continue to provide funding for defences, maintenance and adaptation studies in Fairbourne. Since 2013, £8 million has been invested to keep its residents safe, plan ahead and adapt. Ongoing research is also helping us to understand impacts and how similar communities can be supported through an adaptation process.

We recognise the wider influence such policies have on people and across Government. Such change has widespread social, economic and environmental effects, both directly or indirectly, through a need to adapt, relocate or invest in greater resilience.

The impact of such strategic and long-term adaptation has been highlighted as the media share SMP findings and risk data to a wider audience. We have learnt lessons about communicating difficult messages and remain committed to being open and transparent. We believe it is preferable to work together with communities, preventing risk and planning ahead for the next century, than to withhold information on flood or coastal erosion.

262. We support the role of nature based solutions in managing coastal flooding, erosion and adapting to climate change in line with the policies set out in SMPs. This may offer alternative opportunities in areas where defences will be realigned, or a step away from routine maintenance towards a more natural coastline.

263. The Welsh Government has established a Wales Coastal Monitoring Centre (WCMC) to provide coastal authorities with consistent and reliable data on processes and helping to understand longer-term trends (see paragraph 148).

264. Adaptation planning should take into account the timing of the proposed action. Acting too soon can risk disruption in communities at risk, but acting too late risks impacts in those areas. Providing clear information and evidence is key so that residents and businesses are aware of decisions which may affect them and can become involved in the long-term planning which may bring change to their coastline and community.

Examples of interactive coastal adaptation from Pays Basque, France



The town of Bidart and neighbouring beaches in the Basque Region have introduced interactive noticeboards to help illustrate some of the different ways coastline adaptation can be managed, along with costs and impacts on people and the environment.



- 265. The Coastal Groups should prioritise those communities where engagement is needed to communicate coastal adaptation messages and develop adaptation plans where there is a change to a No Active Intervention or Managed Realignment policy.
- 266. Local Authorities are expected to take SMPs into account through their Local Development Plans and in their Local Flood Risk Management Strategies.
- 267. The Welsh Government's preference is for the SMP position for each section of the coast to be supported in Strategic and Local Development Plans and Strategies relating to infrastructure or activity on the coast such as marine planning, agriculture or housing. SMPs are a material consideration in Local Development Plans and it is right for such strategic, long term policies to be placed in that context so that they can be considered in forward planning and shaping development around the Welsh coast. In developing a plan for coastal adaptation, Local Authorities shall communicate the SMP policy and timescales across relevant departments and stakeholders.
- 268. Where new information becomes available that may influence an SMP policy for a stretch of coastline, it should be reviewed by the Local Authority and relevant Coastal Group. Information on how and why SMP policies should be amended at a local scale is outlined earlier in this chapter.

- 269. Where major populations and critical infrastructure dictate reliance upon hard defences, consideration should be made to lessen risk by building resilience in those communities through supportive measures, such as a flood plan. Further coastal interventions may also be required such as beach nourishment or breakwaters to absorb wave energy and further reduce risk.
- 270. We recognise a need for further guidance on communicating SMP policies and will work with stakeholders to develop Coastal Adaptation Guidance, informed by ongoing research in places like Fairbourne, Gwynedd, to provide practical advice to practitioners and communities.

We need clear advice on coastal adaptation for Risk Management Authorities and communities

MEASURE 18: The Welsh Government to work with the Coastal Groups and NRW to develop further guidance on coastal adaptation by 2022

Objectives supported: A, B and D

271. Climate change can result in coastal squeeze: the loss of coastal habitat as a result of sea level rise against infrastructure, rising land or cliffs. Whilst we prioritise the protection of coastline to reduce the consequences for communities and people, there is a need to recognise the impact of sea level rise on the environment and economy of Wales. The definition of coastal squeeze and how it is measured has been the subject of recent research⁷¹ supported by the Welsh Government.
272. The National Habitat Creation Programme is a Welsh Government initiative managed by NRW. It has been established to compensate for the coastal squeeze associated with new Local Authority and NRW schemes which implement 'hold the line' or 'advance the line' policies in SMPs, helping to meet our responsibilities under the Habitats Directive (EU) and Habitats Regulations.
273. The Habitats Directive⁷² requires EU Member States to monitor the conservation status of European protected habitats. The Welsh Government has asked NRW to undertake this role as part of the National Habitat Creation Programme.
274. NRW manage the National Habitat Creation Programme in delivering timely and appropriate compensatory measures to address coastal squeeze losses. The requirements for compensatory measures and progress with delivery including extent, habitat type and location need to be reported annually.

275. Whilst NRW manage the National Habitat Creation Programme, its success is dependent upon support from all RMAs. In line with the Wellbeing of Future Generations Act we ask all RMAs in Wales to collaborate towards this goal, identifying and contributing compensatory habitat.

NRW will manage the requirements for the National Habitat Creation Programme.

MEASURE 19: NRW to develop and establish an appropriate monitoring programme to support and inform the National Habitat Creation Programme by 2022

Objectives supported: C

Cwm Ivy, Salt Marsh Creation



Cwm Ivy Marsh, on the North Gower coast, is a site of lowland fen meadow and freshwater ditches behind a sea wall defence, owned by the National Trust. The SMP policy for this section of the coast is No Active Intervention, with no planned investment in new defences as it is not cost effective and the natural environment is considered capable of responding effectively.

The marsh was protected by a sea wall since the 17th century which over the years was increased in size and strength. In 2014, the wall breached and the sea is now reclaiming the land, transforming Cwm Ivy from freshwater marsh to saltmarsh. The area of new saltmarsh created is around 20 hectares, growing to a potential of 38 hectares.

71 What is Coastal Squeeze; Jacobs Research – not yet published

72 Article 11, 92/43/EEC on the conservation of natural habitats and of wild fauna and flora

Asset maintenance

276. RMA should establish a programme of regular inspection and maintenance for their FCERM assets.
277. **Maintenance** of flood risk assets is key to maintaining the existing standard of protection against flood and coastal erosion, and will be informed by individual asset registers⁷³ and asset management plans. The National Asset Database will collate this information and record asset condition and responsibility for maintenance.
278. As well as funding new schemes, the FCERM programme also provides capital for major maintenance works and revenue for more routine operations. As we continue to implement schemes, the need for maintenance will continue to increase. This is the case for NFM as well as hybrid, green-grey and hard defences.
279. RMA must consider maintenance requirements when appraising new FCERM interventions to ensure their long-term maintenance is sustainable. These ongoing financial commitments need to be factored into business plans.
280. We recognise the need for long term investment to sustain our resilience to flood and coastal erosion risk. Information to support future funding need will be evidenced through an update to the Future Flooding in Wales report (see paragraph 284).



Objective E: Providing an effective and sustained response

Emergency Response

281. The Civil Contingencies Act 2004 requires statutory responders to maintain plans for preventing and preparing for emergencies. The Wales Flood Response Framework provides responding organisations with information, guidance and key policies on responding to a flood.
282. NRW and Local Authorities are also Category 1 responders under the Civil Contingencies Act 2004, and have responsibilities for reducing, controlling or mitigating flooding.
283. The Wales Coastal Flooding Review recommended NRW develop potential 'impact scenario' assessments, maps and/or statements across Wales, which will help to inform the response required for different events. This has been reinforced by a Flood Warning Service Review carried out by NRW.
284. Flooding poses a risk to Wales' national infrastructure such as health, transport and energy services. There are certain assets termed Critical National Infrastructure (CNI) which, if damaged, would cause significant impacts and/or hamper rescue efforts during flood events. They can also make the effects more widespread, like the loss of energy substations or water supply would impact communities some distance from the flood itself.
285. After the immediate impacts of the flood have been addressed, the recovery process begins. This varies depending on the scale of the damage but also on how resilient or prepared the community were.
286. The Wales Flood Response Framework⁷⁴ was published in 2017 and explains how different partners and emergency services respond to flooding in Wales. Whilst the Framework's primary aim is to inform those who participate and support the response of communities affected by flooding, it also gives the public information on how responder agencies plan for, respond to and recover from flooding incidents.
287. Local Authorities, as Category 1 responders under the Civil Contingencies Act 2004, have a duty to prepare a Response Plan containing information on training and emergency exercises and their frequency, and shall cover flood incident management. Emergency exercises must⁷⁵ be run at a local level to test the response, recovery arrangements and emergency readiness.
288. Since 2017 the three Fire and Rescue Services in Wales have had a duty to respond to flooding⁷⁶.

⁷³ Section 21 of the Flood and Water Management Act 2010 requires Lead Local Flood Authorities to establish and maintain a register of flood risk structures or features, which will include information on ownership and state of repair.

⁷⁴ Welsh Government, Wales Flood Response Framework, 2017 gov.wales/sites/default/files/publications/2019-06/wales-flood-response-framework.pdf

⁷⁵ Civil Contingencies Regulations 2005, regulation 25a

⁷⁶ The Fire and Rescue Services (Emergencies) (Wales) (Amendment) Order 2017

Review of flood events

289. The Wales Flood Response Framework outlines the need for the Welsh Government to be made aware of events resulting in flooding to properties from all sources.
290. We want RMAs to work with LRFs to develop a process for managing and collating data on flooding in a standard format to report to Welsh Ministers within an agreed timescale. This should reduce double-counting and provide a consistent record of impacts between responders

Following a flood event, the Welsh Government want to be made aware of immediate impacts affecting properties allowing swift decisions to be made on support

MEASURE 20: The Welsh Government, WLGA, NRW and LRFs to standardise immediate reporting of flooding to properties and erosion events by end of 2021, in line with the Wales Flood Response Framework

Objectives supported: A, C and E

291. There are also opportunities to learn lessons, understand more about the risk to that area and update models and mapping with information on flood extents. The collection and updating of such data takes longer and is not intended to be a part of the above measure but to come alongside Section 19 flood reporting.
292. Section 19 of the Flood and Water Management Act 2010 requires Lead Local Flood Authorities (Local Authorities in Wales) to undertake investigations on floods and publish its results. These are useful in understanding the full extent of impacts, improving our data models and may inform maintenance regimes or further alleviation works. The Local Authority should notify NRW and the Welsh Government once the investigation report is published.
293. In carrying out an investigation report, Local Authorities must notify any relevant RMAs who have flood risk management functions in relation to the event. We expect other RMAs, including NRW, water companies and neighbouring Local Authorities, to fully collaborate in these cases.
294. The Welsh Government wants RMAs to use Section 19 reports as part of local evidence in support of business cases for future investment where appropriate, alongside detailed modelling and assessment of future flood risk.

295. Whilst no threshold is set in statute, the Welsh Government expects Section 19 reports to be undertaken **where 20 or more homes in one area experience internal flooding**. Local Authorities can choose a lower threshold and assess this in relation to each event, noting that floods affecting fewer homes can still cause considerable damage and/or loss of life.
296. The length and complexity of Section 19 reports is for the LLFA to decide and should be proportional to the scale of flooding, if the cause of flooding is already well understood, or the type of action proposed.
297. Whilst the content is for the Local Authority to decide, every report must cover the legislative requirements around whether the relevant RMA(s) has exercised, or plan to exercise its functions or powers in response to the flood. In addition, and in support of the legal requirements, we expect the reports to provide details on the scale of the flooding and provide recommendations on further reducing the risk of flooding in future. We will continue working with Local Authorities and the FCEC to make Section 19 reporting clearer for the public and less burdensome on those producing them.

We want Section 19 investigation reports to be simpler for Local Authorities to undertake and easier for the public to understand

Measure 21: Flood and Coastal Erosion Committee, WLGA and Local Authorities to collaborate and establish high-level requirements and supporting guidance for Section 19 flood investigation reports by 2023

Objectives supported: A, C and E

Funding Flood and Coastal Erosion Risk Management

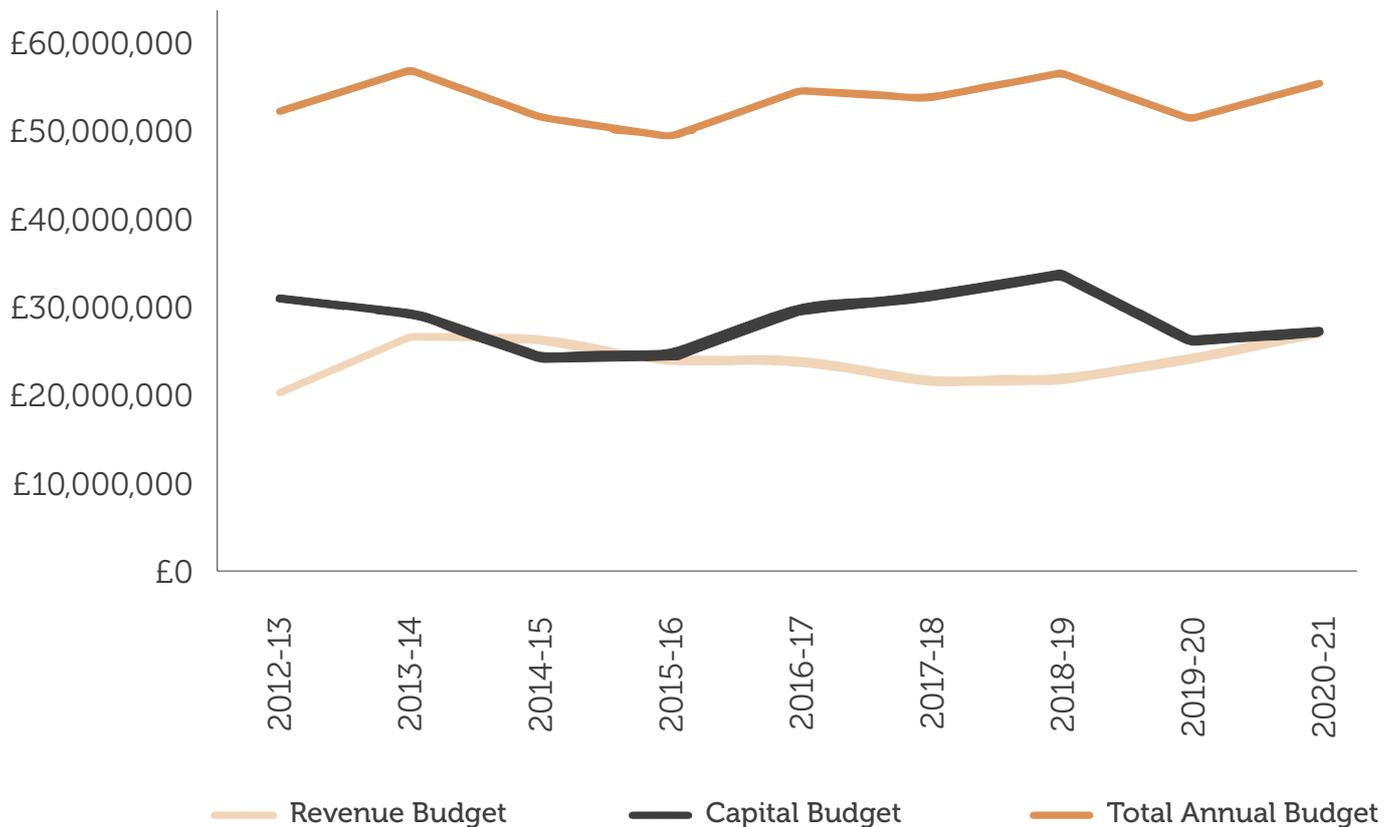
Funding and budgets for FCERM

298. Decisions on the allocation of funding for devolved functions including flood risk management are made by Welsh Ministers who may provide revenue and capital grants in relation to FCERM activities.

299. Since the release of the first National Strategy, the Welsh Government has invested over £600 million in FCERM⁷⁷. This includes funding from the European Regional Development Fund (ERDF), which ended in June 2015 and the Coastal Risk Management Programme.

300. Our average annual investment (revenue and capital) in FCERM in Wales over the past nine financial years (since 2011/12) has been £53.9 million.

Figure 16 – Summary of Welsh Government investment since 2011.



77 Figure covers capital and revenue from April 2012 to March 2021.

301. Climate change is likely to increase the risk of flooding, not only through sea level rise but also from more frequent and intense storms, storm surges and increased wave size. We therefore need to continue to invest in FCERM across Wales.
302. Reports and reviews into recent flood events have shown that the Welsh Government's sustained investment in flood risk management, defence assets, awareness raising and warning systems have had a positive impact, lessening the impact of storms and flooding to communities. However, we cannot become complacent and need to accept that similar or worse coastal storms will happen again and investment needs to be maintained.
303. The Welsh Government provides NRW and Local Authorities with the opportunity to apply for grant funding to support their role as RMAs to carry out flood and coastal risk management activities. The process for applying for this funding, including eligibility criteria and grant rates, is set out in the **FCERM Grant Memorandum**⁷⁸.
304. Funding is also available to water companies operating in Wales where they are working alongside Local Authorities and/or NRW on schemes and where the work being carried out by them is outside of their statutory obligations..

Porthcawl Town Beach Sea Defence scheme



The Town Beach scheme, completed in 2019, upgrades the original defence, constructed in 1887, as well as more recent works which had reached the end of their operational life and become vulnerable to damage and overtopping by the sea during storm conditions.

The £3 million project is designed to reduce risk from flooding and erosion to 260 properties including multiple businesses and key infrastructure along the promenade.

The public were consulted throughout the process and helped shape decisions on access and aesthetic elements of the scheme. The new structure is made up of 5 interlocking pre-cast concrete sections in the form of a terrace, the toe of which is protected by rock armour.

Thanks to these improvements the town beach area remains a safe, viable and attractive place to live, work and visit for current and future generations.

305. From 2019 our investment was boosted by the commencement of the **Coastal Risk Management Programme** which will support an additional £150 million investment in coastal schemes. This programme has been established to support Local Authorities in responding to the challenges of climate change and implement the actions and risk management set out in the SMPs.
306. The programme will enable a concentrated period of investment over a 3 year construction period from April 2019 to support coastal schemes reduce the risk to homes and businesses whilst also delivering wider benefits.
307. A new Small Scale Works Grant was introduced in 2016 to support Local Authorities carry out smaller works, NFM and essential maintenance through a simplified process. This funding is available annually for works up to £150,000 and has proved successful in driving delivery and risk reduction, with £4.3 million allocated for such schemes in 2020-21.
308. Revenue remains a vital part of FCERM funding. It is utilised by NRW and Local Authorities for work such as flood forecasting, risk mapping, awareness raising and maintenance of assets to ensure they continue to function effectively.
309. The Welsh Government does not provide flood alleviation or recovery grants to individual homeowners; it is the responsibility of homeowners and businesses to ensure their property has adequate insurance against flood damage. We focus our funding on community or catchment scale measures to reduce risk and realise greater benefits.
310. We encourage RMAs to submit business cases for resilience measures on a community scale, such as flood gates or small scale street improvements where the cost of a major flood defence cannot be justified. The Small Scale Works Grant is well-suited to such projects.

311. We want to focus FCERM funding on preventative action, i.e. putting in place measures to reduce the risk of flooding occurring, rather than reactive work. However, there will be times when flooding occurs and additional support is required urgently by a RMA. This demonstrates the importance of reporting flooding to the Welsh Government so the need is evidenced and conversations around support can start as soon as possible.
312. There is no automatic FCERM funding to RMAs who have been flooded. Government cannot predict flooding events and pre-allocate flood funds for such emergencies which may not be utilised. However, the Welsh Government will continue to consider support post flooding on a case-by-case basis and have previously provided exceptional support to repair critical FCERM assets and rebuild resilience after flooding. Significant clean-up costs will continue to be considered under the Emergency Financial Assistance Scheme (EFAS)⁷⁹.

Future funding and longer-term programme pipelines

313. The major flooding of 2020 has brought into sharp focus the need for a compelling programme of investment across Wales to ensure our defences remain fit for purpose and to accelerate the delivery of new FCERM schemes where required, acknowledging how such events will happen more often with climate change.
314. Effective forward planning and programme delivery is key to address growing flood risk. The Welsh Government will work with RMAs to develop a 5 to 10 year investment programme of future schemes. To help achieve this, and aid the response to recent flooding, a package of changes to the FCERM programme were announced in April 2020⁸⁰.
315. The changes include a higher grant rate for coastal flood and erosion schemes, plus full grant support for NFM projects. In addition, 100% grant will be provided, over a trial period, to develop business cases, carry out consultations and draw up designs for flood and coastal schemes.
316. This package of support represents a renewed strategic approach to provide the support our RMAs need, whilst accelerating delivery and building our resilience to climate change with a stronger pipeline of future projects.

317. A longer investment programme will also help to evidence future FCERM funding requirements and assist the transition from the Coastal Risk Management Programme upon its completion in 2022. It will cover all FCERM schemes, including wider catchment approaches and NFM.

We want to build a stronger pipeline of FCERM projects reflecting the increasing risk from climate change

MEASURE 22: The Welsh Government will work with Risk Management Authorities to develop a 5 to 10 year investment programme pipeline

Objectives supported: A-D

318. The new Flood Risk Assessment Wales (FRAW) and National Asset Database will further help to realise and communicate the impact of FCERM investment by showing where assets are improved and the associated reduction in risk.
319. In 2010, Environment Agency Wales published their Future Flooding in Wales report, which helped to inform the level of investment needed to manage flood and coastal erosion risk. We want to see this updated using the latest climate change projections and FRAW to inform future investment needs for all sources of flooding and coastal erosion.

We want to update our long-term investment requirements utilising the latest risk data and climate change projections

MEASURE 23: NRW will work with Local Authorities and the Welsh Government to publish long-term investment requirements for FCERM, complementing FRAW, by end of 2021

Objectives supported: A-D

⁷⁹ gov.wales/emergency-financial-assistance-bellwin-scheme-local-authorities

⁸⁰ gov.wales/written-statement-flood-and-coastal-risk-management-programme-2020-21

Prioritisation

320. The Welsh Government prioritises FCERM funding to schemes which primarily reduce risk of flooding or coastal erosion to existing homes. Businesses and other infrastructure may also benefit, especially in larger schemes, however additional costs or protection to third party assets must be subject to a partnership contribution proportionate to those assets benefitting.
321. The Communities at Risk Register provides a consistent way of considering and ranking flood risk from all sources. We have made a commitment to use this to help prioritise investment, however in doing so acknowledge this is just one tool in this process. Locally available information on past flood events is just as important and is also considered in prioritising the FCERM programme.
322. A methodology for prioritising FCERM funding was approved in 2018 after consultation with RMAs, which includes:
- Communities at Risk Register ranking
 - Details of previous flood events
 - Properties benefitting
 - Benefit to cost ratio
 - Opportunities for wider benefits
 - Opportunities for partnership funding
323. Funding is available to support schemes which reduce risk to existing homes and businesses or maintain an original standard of protection. This includes new FCERM assets, maintenance or improvements to existing assets, development of future schemes, carrying out NFM or installation of property resilience measures to support communities at risk.

324. There is no fixed standard of protection; however the Welsh Government encourages alleviation schemes which remove homes from high or medium risk (less than a 1% risk of fluvial flooding or 0.5% risk of coastal flooding). This helps FCERM policy to align with planning and insurance standards.

325. FCERM funding is not available to enable new development and schemes reducing the risk solely to new homes or businesses will not be prioritised.

Wider benefits and partnership funding contributions

326. In line with the Wellbeing of Future Generations Act 2015 and the FCERM Business Case Guidance, RMAs applying for funding are encouraged to identify wider benefits which could be achieved through their FCERM schemes. This could include regeneration opportunities, improvements to habitats/biodiversity, mental health or recreational benefits.
327. Recent examples of schemes with wider benefits include:
- The flood alleviation scheme at Tal-y-bont, Gwynedd, which also benefits the A55 Trunk Road, reducing the risk of road closures on this vital link;
 - The Swansea Vale Scheme which, whilst reducing risk to homes and businesses, also provides recreational and biodiversity benefits; and
 - The Colwyn Bay coastal scheme which allowed for regeneration of the area, increasing tourism and jobs for the town.
 - Extensive amenity improvements to parkland at Roath Brook flood scheme

Amenity improvements at Roath Brook



The Roath Brook Flood Scheme benefits 360 homes and 45 businesses in the community. NRW were able to integrate improved flood protection within an Edwardian park garden and improve the public realm, softening hard features with urban landscaping, upgrading paths and adding new access to the park gardens.

The scheme reduced risk by making improvements at several locations, widening the river channel and replacing a road bridge to increase the brook's flow capacity

328. The Welsh Government wants to encourage greater consideration of partnership funding to attract further investment in FCERM. An approach to partnership funding was introduced by DEFRA in 2011 and has been recently reviewed⁸¹.

329. Partnership Funding can deliver innovative approaches to managing flood and coastal erosion risks. Early consideration of how multiple funding factors can be introduced to reduce costs ought to be considered. Thus bringing joint solutions together with different aims of partners and potential investors. In turn this will deliver wider benefits on a much larger scale than those related to flooding or coastal erosion alone.

330. Where significant benefits are identified to third parties, it is expected RMAs will work both internally and externally (for example with infrastructure providers, utilities, industry and commerce) to identify and secure appropriate partnership funding contributions from those benefitting from a scheme.

331. Such partnerships can bring considerable additional benefits and offer better value to each party than working separately. However, we also acknowledge such discussions are not straightforward and will be influenced by existing priorities and work programmes within each sector. Understanding and sharing long-term programmes can help identify such opportunities well in advance to enable a more collaborative approach to partnership funding.

332. Where benefits to homes plays a minor role in a scheme being developed and the main beneficiary is to other assets or commercial sectors, these schemes are unlikely to be prioritised for funding through the FCERM programmes. However, financial contributions to such schemes could be considered based on the proportion of benefit to homes.

We will encourage partnership funding contributions in Wales and learn from the approaches established elsewhere

MEASURE 24: The Flood and Coastal Erosion Committee will explore opportunities to maximise partner contributions and investment in FCERM by 2022.

Objectives supported: C

Partnership work and hybrid approaches

Cwmaman Flood Alleviation Scheme, Rhondda Cynon Taf



This 2019 scheme benefitted from a partnership approach with a new school under construction.

Cwmaman is a former mining village situated on a steep, reactive catchment. Eight storm events in 2018 had resulted in widespread flooding, impacting highways, residential and commercial properties, two schools and three sub-stations.

With over 1km of deep culverts it was impractical to increase capacity so alternative approaches were created to reduce and delay peak flows.



The project redesigned the existing weir to provide storm water attenuation within the upper catchment area during heavy rain, reusing reclaimed materials.

The £1.05 million project recycled suitable excess material from the school development as aggregate for the flood alleviation scheme

81 Defra: Further evaluation of partnership funding - FD2702 (2018)

Monitoring and Reporting of this National Strategy

333. Section 18 of the Flood and Water Management Act 2010 sets out how information on the application of this Strategy must be reported to Welsh Ministers by NRW.

334. The Flood and Coastal Erosion Committee has agreed to provide an independent review of each Section 18 report prior to publication, at the request of the Welsh Government⁸².

335. The Section 18 report will be produced every two years after publication of this Strategy. It should:

- provide an update on its measures and objectives;
- include dialogue on how the lead(s) have undertaken each measure;
- assess the level of flood and coastal erosion risk in Wales;
- details of major new FCERM schemes and projects;
- reference major flooding incidents and link to the [Section 19] reports;
- provide examples of good FCERM practise in Wales, including but not limited to, novel or innovative projects, the use of NFM, partnership working, information provision and community participation.

336. Welsh RMAs must co-operate with NRW and Welsh Ministers in the preparation of the Section 18 Report⁸³.

337. The Strategy and Section 18 reports will be utilised to monitor and report reductions in the number of properties at risk and progress against measures.

The Welsh Government will also publish a summary of this National Strategy online.

The following pages summarise the National Strategy aim, objectives and measures.

⁸² Under part 9 of the Flood and Coastal Erosion Committee for Wales Regulations 2017

⁸³ Under Sections 13 and 14 of the Flood and Water Management Act 2010

Summary of Measures

338. The aim and objectives for this National Strategy are shown below followed by a table containing each measure, background to the reason for the measures and links to which objectives they will help to deliver.

Reduce the risk to people and communities from flooding and coastal erosion.



A. Improving our understanding and communication of risk



B. Preparedness and building resilience



C. Prioritising investment to the most at risk communities



D. Preventing more people becoming exposed to risk



E. Providing an effective and sustained response to events

Number	Background	Measure	Lead	Objective supported
1	The Welsh Government has asked the Flood and Coastal Erosion Committee, in its advisory capacity, to consider and recommend changes to legislation to enable improvements to FCERM in Wales	Flood and Coastal Erosion Committee to establish the scope and consider the need for changes to legislation to clarify and support the delivery of FCERM in Wales by 2022	FCEC	A-E
2	Coastal risk should be managed using the best available information	Delivery of annual topographic surveys by Wales Coastal Monitoring Centre on behalf of Coastal Groups to measure change in the most at risk coastal areas in Wales	Coastal Groups and WCMC	A and C
3	We want the public to understand the risk of flooding to their property. The new Flood Risk Assessment Wales (FRAW) will identify the flood source and level of risk to all communities in Wales	NRW to publish new FRAW maps in 2020 alongside the Strategy and update every 6 months to reflect changes in National Asset Dataset	NRW	A-E
4	We want to monitor the reduction in risk and benefit to properties as a result of our investment	NRW to provide data on the number of homes and businesses at high, medium and low risk of flooding from all sources on an annual basis based on FRAW updates	NRW	A and C

Number	Background	Measure	Lead	Objective supported
5	To ensure the public and stakeholders are using the most up to date information on flood risk and coastal erosion	Risk Management Authorities to update maps, plans and data in line with the schedule set out in Figure 12 of the National Strategy	NRW, Local Authorities	A-E
6	To support decision making and reflect reduced risk from investment	NRW and Local Authorities will work together to ensure that by end of 2021 the National Asset Database will contain data on FCERM assets owned or designated by Risk Management Authorities	NRW, Local Authorities	A-D
7		NRW will work with Local Authorities to develop a process to ensure all updates are incorporated in the National Asset Database within 6 months of any completed works or changes otherwise required, by the end of 2021.	NRW, Local Authorities	A-D
8		NRW to utilise the National Asset Database to ensure Wales Flood Map reflects the reduced risk from all flood alleviation schemes by 2022	NRW	A-D
9	To provide easily accessible information for the public on coastal erosion	NRW to ensure the National Coastal Erosion Risk Map (NCERM) matches SMP policies by 2021 and shows erosion rates as bands in the Wales Flood Map products by end of 2022	NRW	A-E
10	Action Plans arising from the SMPs set out measures relevant to each stakeholder, and are for Coastal Groups to monitor and progress	Coastal Groups to report annual progress on SMP Action Plans to the Welsh Government through the Wales Coastal Group Forum	Coastal Groups	A-D
11		Coastal Groups to report on the implementation of SMP2 epoch 1 policies, through Wales Coastal Group Forum to the Welsh Government, by 2025	Coastal Groups	A-D
12	We want to improve awareness and access to information on flood and coastal risk management	NRW to complete their online flood information improvements, working with WLGA and Local Authorities, by 2021. This will include publication of the Wales Flood Map products, understanding flood warnings and advice on building resilience and responding to flooding	NRW	A, B, D and E
13	We want to encourage the take-up of NFM in Wales. We will support pilot studies and interventions designed to reduce flood and coastal erosion risk to better understand its benefits	The Welsh Government will fully fund NFM schemes for a trial period, commencing 2020/21, and publish new guidance to further encourage take-up and the sharing of lessons on its practical delivery	Welsh Government	A, B and C
14		The Welsh Government will work cross policy to ensure NFM is considered in wider land and water management, including agriculture and in NRW Area Statements	Welsh Government	A, B and C
15	We want to see NFM as an option for every FCERM scheme as set out in our FCERM Business Case Guidance	The number of NFM and hybrid schemes undertaken will be reported to the Welsh Government annually through grant reporting, and reported to Welsh Ministers by NRW in the Section 18 report	All RMAs	A, B and C

Number	Background	Measure	Lead	Objective supported
16	We will ensure the requirement for SuDS in new properties is being implemented and working as intended	The Welsh Government to commence a review of the effectiveness of SuDS legislation in 2021	Welsh Government	B and C
17	We want Planning and FCERM policies to complement each other, reducing risk by preventing inappropriate development in the flood plain and helping Planning Authorities make clear decisions based upon the best available information	The Welsh Government to update TAN15 by 2021 recognising the flood risk information now available to Local Planning Authorities	Welsh Government	B and D
18	We need clear advice on coastal adaptation for Risk Management Authorities and communities	The Welsh Government to work with the Coastal Groups and NRW to develop further guidance on coastal adaptation by 2022	Welsh Government and Coastal Groups	A, B and D
19	NRW will manage the requirements for the National Habitat Creation Programme	NRW to develop and establish an appropriate monitoring programme to support and inform the National Habitat Creation Programme by 2022	NRW	C
20	Following a flood event, the Welsh Government want to be made aware of immediate impacts affecting properties allowing swift decisions to be made on support	The Welsh Government, WLGA, NRW and LRFs to standardise immediate reporting of flooding to properties and erosion events by end of 2021, in line with the Wales Flood Response Framework	Welsh Government/ Wales Flood Group	A, C and E
21	We want Section 19 investigation reports to be simpler for Local Authorities to undertake and easier for the public to understand	Flood and Coastal Erosion Committee, WLGA and Local Authorities to collaborate and establish high-level requirements and supporting guidance for Section 19 flood investigation reports by 2023	FCEC/WLGA and Local Authorities	A, C and E
22	We want to build a stronger pipeline of FCERM projects reflecting the increasing risk from climate change	The Welsh Government will work with Risk Management Authorities to develop a 5 to 10 year investment programme pipeline	Welsh Government and all RMAs	A-D
23	We want to update our long-term investment requirements utilising the latest risk data and climate change projections	NRW will work with Local Authorities and the Welsh Government to publish long-term investment requirements for FCERM, complementing FRAW, by end of 2021	NRW	A-D
24	We will encourage partnership funding contributions in Wales and learn from the approaches established elsewhere	The Flood and Coastal Erosion Committee will explore opportunities to maximise partner contributions and investment in FCERM by 2022	FCEC	C

Glossary/Definitions

Accretion:

The gradual extension of land by natural forces, as in the addition of sand to a beach by the sea, or the extension of a floodplain through the deposition of sediments by repeated flooding.

Climate Change Adaptation:

Adjustments in natural or human systems in response to actual or expected climate change, or its effects, which moderates harm or exploits beneficial opportunities.

Climate Change Mitigation (also known as Decarbonisation):

Intervention to reduce the sources of, or to enhance the sequestration of, greenhouse gases.

Coastal adaptation:

The process of adjustment due to actual or expected climate change. Adaptation seeks to moderate or avoid harm to communities.

Coastal erosion:

The wearing away of land and the removal of beach or dune sediment by wave action, tidal currents, wave currents, drainage, weathering or high winds.

Coastal erosion risk:

A measure of potential coastal erosion in terms of likelihood and impact.

Coastal erosion risk management authority

Defined under the Coastal Protection Act 1949, as amended through Schedule 2 of the Flood and Water Management Act 2010. Authorities with certain powers to carry out coastal protection work. In Wales, these are the coastal Local Authorities and NRW.

Coastal Risk Management Programme:

This programme has been established to help Coastal Local Authorities deliver actions in the Shoreline Management Plans.

FCERM Business Case Guidance:

The Welsh Government guidance on preparing a business case for FCERM capital funding, issued to Local Authorities and NRW and published by the Welsh Government.

Flood and Water Management Act 2010:

An Act of Parliament updating and amending legislation to address the threat of flooding and water scarcity.

Flood and Coastal Erosion Committee (FCEC):

An independent advisory body to the Welsh Ministers and Welsh Risk Management Authorities on matters relating to flood and coastal erosion risk management.

Flood Risk Assessment Wales (FRAW):

A national assessment of risk from all sources of flooding for public and professionals.

Flood and Coastal Erosion Risk Management (FCERM):

The management of all aspects of flood and coastal erosion risk through understanding risk (probability and consequence) and seeking to modify these factors to reduce its impacts.

Green infrastructure:

Provides flood risk management solutions, traditionally done with hard engineering, by utilising the natural properties of native vegetation. Green measures involve exclusive use of natural materials to manage risk.

Green-grey interventions:

Enhancement of grey infrastructure projects to create and deliver environmental/ biodiversity benefits. Green-Grey measures use natural materials in combination with traditional engineered materials to reduce risk.

Groundwater:

Water held underground in the soil or in pores and crevices in rock.

Hybrid schemes:

The use of Natural Flood Management alongside traditional interventions.

Internal Drainage Board (IDB):

An operating authority which is established in areas of special drainage need in England and Wales with permissive powers to undertake work to secure clean water drainage and water level management within drainage districts.

Lead Local Flood Authority (LLFA):

Local Authority (the County Council or County Borough Council) for the area as defined in the Flood and Water Management Act.

Likelihood:

A term describing the chance of something happening, normally in terms of very low, low, medium or high likelihood, and with the everyday phrases 'possible but not expected', 'possible', 'probable' and 'expected'. Can also be expressed as a percentage, e.g. 1% chance of flooding each year.

Local Resilience Forum:

A group required under the Civil Contingencies Act, 2004 who are responsible for the coordination of emergency planning in local areas.

Main river:

A watercourse shown as such on the Main River Map, and for which NRW has responsibilities and powers, to protect, risk of life where there is real evidence of a flood risk.

Maintenance:

Work done to preserve the condition of a defence and maintain a standard of protection.

Measure:

Actions specified to achieve the objectives for managing flood and coastal erosion risk.

National Asset Database:

A database of flood assets managed by NRW. Intended to improve the analysis and mapping of risk and maintenance of those assets. It will hold data on flood assets maintained by Risk Management Authorities, with detail on their location, ownership and condition.

National Coastal Erosion Risk Management (NCERM):

The National Coastal Erosion Risk Management map shows the estimated erosion extents based on current understanding. The maps show scenarios under the agreed SMP policy as well as under 'no active intervention' over the 3 SMP periods.

Nature Based Solutions:

Natural Flood Management (NFM) is sometimes referred to as nature based solutions, particularly in the Natural Resources Policy, however, the NFM term is more widely used and recognised in flood risk management.

Natural Flood Management (NFM):

Measures that help to protect, restore and emulate the natural functions of catchments, floodplains, rivers and the coast. NFM takes many different forms and can be applied in urban and rural areas, and on rivers, estuaries and coasts. This term covers both coastal and flood risk management solutions in this document.

Ordinary watercourse:

All watercourses that are not designated as main river, and which are the responsibility of Local Authorities or, where they exist, Internal Drainage Boards.

Risk Management Authority (RMA):

A Welsh Risk Management Authority is defined in Section 6 of the Flood and Water Management Act 2010 as NRW; a Lead Local Flood Authority, a district council for an area where there is no unitary authority, or a highway authority wholly in Wales; an internal drainage board for an internal drainage district that is wholly or mainly in Wales; a water company that exercises functions in relation to an area in Wales.

Recovery:

The process of rebuilding, restoring and rehabilitating a community following an incident.

Shoreline Management Plan (SMP):

A large scale assessment of the risks associated with coastal processes and helps reduce these risks to people and the development, historic and natural environments. Shoreline Management Plans are based on sediment cell boundaries relating to the movement of sand and shingle along the coast.

Sustainable Drainage System (SuDS):

Approach to surface water management which helps to deal with excesses of water by mimicking natural drainage processes.

Surface water flooding:

Also known as pluvial flooding. When the rate of rainfall exceeds the rate that water can infiltrate the ground, soil or drainage systems.

Surface water runoff:

The amount or rate of water sheeting off land into watercourses or causing flooding elsewhere.

Technical Advice Note (TAN) 15 – Development and Flood Risk:

TAN 15 supports Planning Policy Wales and provides advice regarding development on flood plains, including consideration of flood risk from all sources.

Wider benefits:

Wider benefits help to deliver the Wellbeing of Future Generations objectives providing additional gain. In the context of this Strategy, those gains or benefits would be through the delivery of flood and coastal erosion risk management. This means that aside from reducing the flood or coastal erosion risk to a community, a scheme may deliver other benefits such as recreation, tourism and/or biodiversity.