

Archwilydd Cyffredinol Cymru
Auditor General for Wales

Coastal Flood and Erosion Risk Management in Wales



WALES AUDIT OFFICE
SWYDDFA ARCHWILIO CYMRU



Cover and Part 2 photographs courtesy of Giles W Bennett.

Part 1 and Appendices photographs courtesy of Martin Gibson.

I have prepared and published this report in accordance with the
Government of Wales Act 2006.

The Wales Audit Office study team that assisted me in preparing this report
consisted of Andy Phillips, Verity Winn, Richard Workman, Mark Jeffs and
Rachel Harries under the direction of Matthew Mortlock.

Huw Vaughan Thomas
Auditor General for Wales
Wales Audit Office
24 Cathedral Road
Cardiff
CF11 9LJ

The Auditor General is independent of the National Assembly and government. He examines and certifies the accounts of the Welsh Government and its sponsored and related public bodies, including NHS bodies. He also has the power to report to the National Assembly on the economy, efficiency and effectiveness with which those organisations have used, and may improve the use of, their resources in discharging their functions.

The Auditor General, together with appointed auditors, also audits local government bodies in Wales, conducts local government value for money studies and inspects for compliance with the requirements of the Local Government (Wales) Measure 2009.

The Auditor General undertakes his work using staff and other resources provided by the Wales Audit Office, which is a statutory board established for that purpose and to monitor and advise the Auditor General.

For further information please write to the Auditor General at the address above, telephone 029 2032 0500, email: info@audit.wales, or see website www.audit.wales

© Auditor General for Wales 2016

You may re-use this publication (not including logos) free of charge in any format or medium. You must re-use it accurately and not in a misleading context. The material must be acknowledged as Auditor General for Wales copyright and you must give the title of this publication. Where we have identified any third party copyright material you will need to obtain permission from the copyright holders concerned before re-use.

If you require any of our publications in an alternative format and/or language please contact us using the following details: Telephone 029 2032 0500, or email info@audit.wales

Contents

	Summary	6
	Recommendations	13
1	Recent investment has improved coastal flood protection and delivered some wider benefits, although further work is needed to engage communities about the risks of coastal flooding and erosion	15
	Welsh Government funding for flood and coastal erosion risk management had been broadly stable from 2010-11 to 2016-17, with variation in EU funding from year to year	16
	Flood and coastal defence schemes have improved flood protection to thousands of properties over recent years and delivered other benefits, although the evaluation of wider benefits could be more comprehensive	22
	The Welsh Government has worked with partners to increase awareness of the risks of coastal flooding and erosion but there is evidence that the public still have a limited understanding of the implications of managed retreat	27
2	The Welsh Government and partners are improving their approach to managing the risks of coastal flooding and erosion, although the pace of change has been slower than planned	30
	The Welsh Government is pursuing a risk-based approach but has not yet set out what aspects of its strategy mean in practice, especially in areas facing managed retreat	31
	The Welsh Government has yet to fully develop parts of its long-term funding strategy	39
	Although there has been some progress, more work is needed to ensure that funding can be prioritised to areas of greatest need	44
	The Welsh Government plans to improve governance arrangements for future funding programmes	48
	Lack of capacity within the Welsh Government and councils has delayed progress and threatens to undermine the long-term approach to managing the risks of coastal flooding and erosion	50

Appendices	52
Appendix 1 - Audit Methods	53
Appendix 2 - Wales Coastal Flooding Review	55
Appendix 3 - Welsh Government funding for flood and coastal erosion risk management from 2010-11 to 2016-17	56
Appendix 4 - Applying the sustainable development principle	57

Summary

- 1 Sixty per cent of the population of Wales live on or near to the coast and across Wales 208,000 properties are at risk from flooding from rivers or from the sea. Over the next 100 years¹, the current estimation is that 2,126 properties could be at risk of coastal erosion, assuming that there is no active intervention. Coastal flooding and erosion is also a risk to agricultural land, businesses, key national infrastructure including transport and utilities, and to sites of cultural or environmental importance.
- 2 Coastal flooding usually occurs through a combination of high tides and severe weather. Estuarine communities and environments are particularly susceptible to flooding because severe weather is also likely to mean that rivers are in flood, and the effect of high tides is to hold back the release of river water into the sea. Sometimes, sustainable land management techniques such as the preservation of upland bogs and riverside trees can help to slow the release of river floodwater, reducing the rapid increase in river height that can exacerbate flooding problems downstream. Coastal erosion can also increase the risk of flooding from the sea. Topography, geology, land use, wave height, sea levels, and the frequency and severity of coastal storms all have an impact on coastal erosion. The impact of climate change will increase the risks of coastal flooding and erosion as the sea level rises, and although predicted to be slightly less frequent, extreme rainfall events will become more intense and storm surges will become larger (Box 1).

Box 1: Climate Change

In 2014, the Intergovernmental Panel on Climate Change reported² a number of changes in the climate system including warming of the atmosphere and ocean, diminishing levels of snow and ice, extreme precipitation events, and rising sea levels.

The most recent UK climate projections show that for the UK, the sea level rose by about one mm per year in the 20th century. Projections³ of UK absolute sea level for 2095 range from approximately 120 mm to 760 mm. Winter wave heights in the south-west of the UK are also expected to increase by 2100, both in terms of mean heights and extreme wave heights during severe weather, but there are uncertainties with these projections.

The UK Climate Change Adaptation Sub Committee is currently producing evidence for the 2017 Climate Change Risk Assessment that shows the rise in sea level this century increases the likelihood of a severe 1 in 100 year coastal flood event in west Wales to between a 1 in 10 and 1 in 20 year chance.

1 **Flood and Coastal Erosion Risk Management in Wales 2011-2014**, Natural Resources Wales, March 2014.

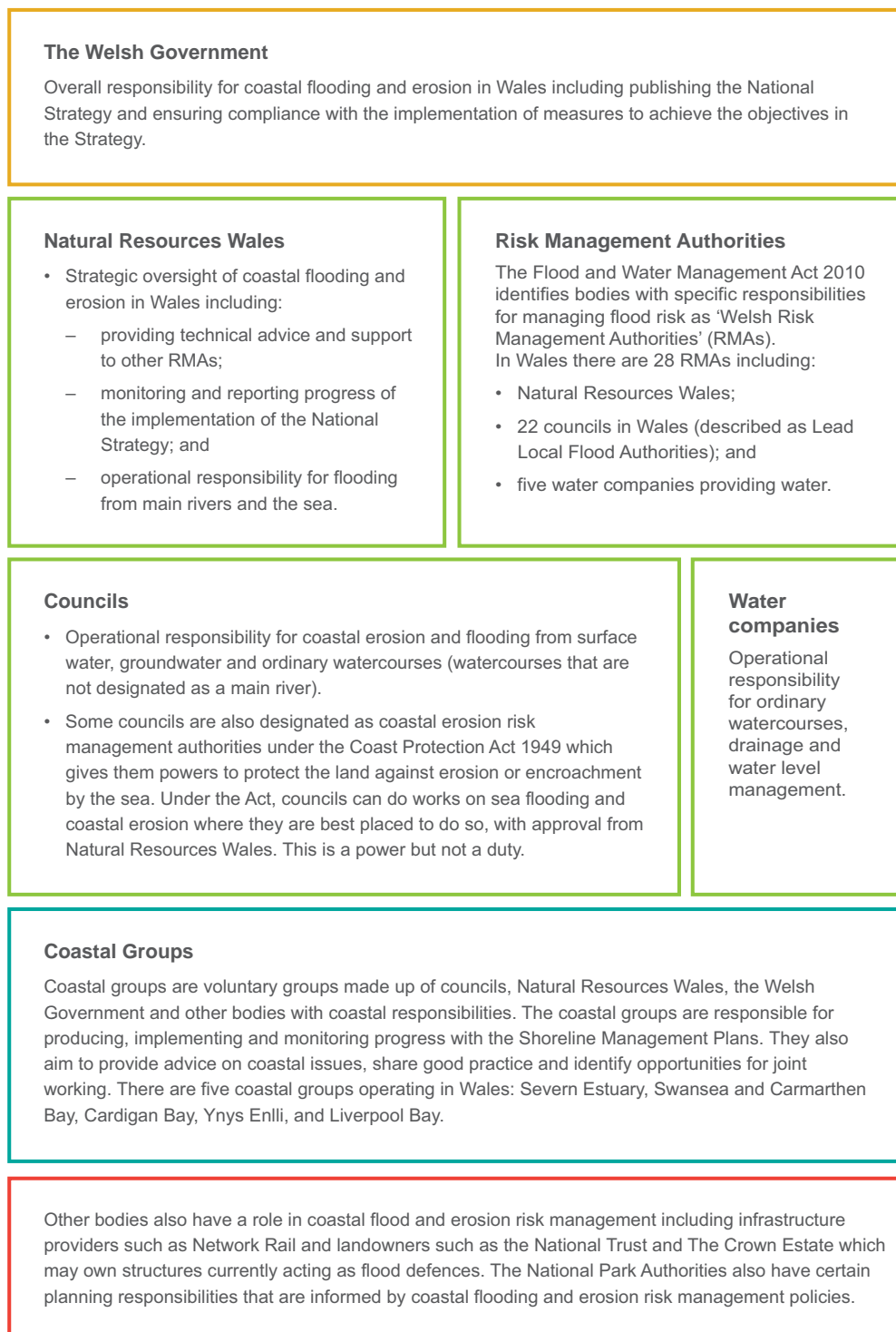
2 **Synthesis Report 2014**, Intergovernmental Panel on Climate Change (IPCC). The United Nations Environment Programme and the World Meteorological Organisation established the IPCC in 1988. The IPCC is the internationally accepted authority on climate change.

3 **UK Climate Projections: Marine and Coastal Projections, UKCP09, 2009**. Projections are set out on the **UKCP09 website** managed by the Environment Agency working with the Met Office.

- 3 The UK Government's Flood and Water Management Act (2010) placed a duty on the Welsh Government to produce a national strategy on flood and coastal erosion, and on the then Environment Agency Wales, to report to Welsh Ministers on progress to implement the strategy. The Act also places a duty on unitary authorities (councils) to develop and implement Local Flood Risk Management Strategies. The local strategies set out objectives for managing local flood risk from surface water, groundwater and ordinary watercourses. From 1 April 2013, Natural Resources Wales took over all of Environment Agency Wales' duties relating to flooding and coastal erosion⁴.
- 4 The Welsh Government published its National Strategy for Flood and Coastal Erosion Risk Management in Wales in November 2011. The National Strategy recognises that it is not possible to prevent all flooding and coastal erosion and builds on the principles of the Welsh Government's previous 'New Approaches Programme' which marked a move away from using traditional coastal defences to managing the risks of coastal flooding and erosion. The Strategy gives an overview of responsibilities for all of the organisations involved in managing the risks of coastal flooding and erosion (Figure 1) and sets out four key objectives:
 - a reducing the consequences for individuals, communities, businesses and the environment from flooding and coastal erosion;
 - b raising awareness of and engaging people in the response to flood and coastal erosion risk;
 - c providing an effective and sustained response to flood and coastal erosion events; and
 - d prioritising investment in the most-at-risk communities.
- 5 Organisations responsible for managing coastal flooding and erosion must also work together to produce Shoreline Management Plans. Shoreline Management Plans were first developed in the early 2000s as part of the UK Government's strategy for flood and coastal defence and have continued to be a key part of the approach in England and Wales (Box 2). In Wales, the Shoreline Management Plans are intended to inform strategic decisions about coastal protection including planning and development along the coast.

⁴ The Welsh Government created Natural Resources Wales on 1 April 2013, replacing three legacy bodies – the Countryside Council for Wales, Environment Agency Wales, and Forestry Commission Wales - as well as incorporating certain Welsh Government functions. On 1 April 2015, the Welsh Government transferred the functions of the three Internal Drainage Boards operating wholly or partly in Wales into Natural Resources Wales.

Figure 1: Roles and responsibilities for coastal flood and erosion risk management



Source: Wales Audit Office

Box 2: Shoreline Management Plans

Shoreline Management Plans set out coastal management policies for the next 100 years in three epochs: 0 to 20 years, 20 to 50 years and 50 to 100 years. Organisations responsible for managing coastal flooding and erosion started updating the Shoreline Management Plans in 2011, based on improved data about changes to the coastline. A further review of the Shoreline Management Plans is likely in the next five to 10 years. The policy options suggested in the plans fall into four broad areas:

- **Hold the line:** by maintaining or changing the standard of protection;
- **Advance the line:** by constructing new defences seaward of the original defences.
- **Managed retreat:** by allowing the shoreline to move backwards and identifying a new line for coastal defences. This approach has implications where protecting the community from progressive flood risk is likely to become unsustainable in the future and residents may have to move to areas of lower risk.
- **No active intervention:** where coastal defences will no longer be maintained. Monitoring and inspection of the shoreline will still be required. Under the Flood and Water Management Act 2010, organisations responsible for managing the risks of coastal flooding and erosion have no obligation to provide, or to maintain, coastal defences.

There are four Shoreline Management Plans in Wales including two which, for oceanographic reasons, overlap the border with England⁵.

- 6 The Welsh Government provides capital and revenue funding for Natural Resources Wales and for local councils to manage the risks of coastal flooding and erosion. The Welsh Government is changing the way it allocates funding through two new programmes:
 - a **The Flood and Coastal Investment Programme** will allocate funding to Natural Resources Wales and councils based on national priorities.
 - b **The Coastal Risk Management Programme** will provide capital funding to support council coastal protection schemes delivered between 2018-19 and 2020-21.
- 7 Our 2009 report on **Coastal Erosion and Tidal Flooding Risks in Wales**⁶ concluded that the Welsh Government's approach offered more sustainable solutions to managing coastal flooding and erosion. However, the report identified the need for the Welsh Government to show stronger strategic leadership, strengthen collaborative working and clarify the roles and responsibilities of all stakeholders. The report also recommended that the Welsh Government should work with partners to develop a way of prioritising investment based on the costs and benefits of coastal protection schemes. Since 2009, inquiries by the National Assembly's Public Accounts Committee (2010)⁷ and the Environment and Sustainability Committee of the National Assembly for Wales (2012)⁸ have also resulted in a number of recommendations for improvement.

5 North West England and North Wales Shoreline Management Plan (Liverpool Bay and Ynys Enlli Coastal Groups), West of Wales Shoreline Management Plan (Ynys Enlli and Cardigan Bay Coastal Groups), South Wales Shoreline Management Plan (Swansea and Carmarthen Bay Coastal Group), and the Severn Estuary Shoreline Management Plan (Severn Estuary Coastal Group).

6 **Coastal Erosion and Tidal Flooding Risks in Wales**, Wales Audit Office, October 2009.

7 **Coastal Erosion and Tidal Flooding Risks in Wales**, Public Accounts Committee, May 2010.

8 **Coastal Protection in Wales**, Environment and Sustainability Committee, October 2012.

- 8 In 2014, Natural Resources Wales was asked by the then Minister for Natural Resources and Food to review the impacts of the winter floods of December 2013 and January 2014. The **Wales Coastal Flooding Review** ([Appendix 2](#)) found that the overall response to the floods was 'coordinated and effective' but identified a number of areas for improvement in the overall approach. Many of the issues from the **Wales Coastal Flooding Review** had been identified by previous reviews. The recommendations have been grouped into 10 projects to improve coastal flooding and erosion risk management. These projects are included in the **Wales Coastal Flooding Review Delivery Plan** (2015).
- 9 On behalf of the Auditor General, Wales Audit Office staff have undertaken a further review to consider the progress that is being made by the Welsh Government and its partners to manage the risks of coastal flooding and erosion in Wales. This report assesses whether key objectives in the Welsh Government's National Strategy for Flood and Coastal Erosion Risk Management in Wales are being met but does not evaluate the effectiveness of emergency planning and resilience arrangements, nor the emergency response to flooding events. [Appendix 1](#) sets out more detail about our audit methods.
- 10 **Our overall conclusion is that recent Welsh Government investment has improved coastal protection and delivered some wider benefits. The Welsh Government and partners are improving their approach to managing the risks of coastal flooding and erosion, although the pace of change has been slower than planned. Further improvements are needed to address capacity issues, plan for the long term, and ensure that spending provides value for money. The Coastal Flooding Review Delivery Plan (2015) is providing impetus and the Welsh Government intends to refresh the National Strategy in 2017-18.**
- 11 The Welsh Government has allocated £381 million for inland and coastal flood and erosion risk management schemes and activities from 2010-11 to 2016-17, with more than half of this funding allocated to Natural Resources Wales (or Environment Agency Wales from 2010-11 to 2012-13). £219 million of funding was allocated for capital schemes from 2010-11, with £120 million of this allocated to coastal schemes; a figure that also includes £25.4 million from the European Regional Development Fund. Although EU funding ceased in 2015-16, the Welsh Government continues to allocate capital to coastal councils through the coastal protection grant. Investment has reduced the consequences of coastal flooding and erosion and led to other benefits including regeneration, increasing tourism, and creating employment. The Welsh Government has worked with partners to increase awareness of the risks of coastal flooding and erosion but there is evidence that the public still have a limited understanding of the implications of managed retreat.

- 12 The National Strategy clearly sets out the risk-based approach that the Welsh Government is pursuing, an approach that is based on learning from alternative approaches and engagement with key stakeholders. However, the Welsh Government has still not set out in its strategy some options to help councils to prepare communities for managed retreat. In addition, while partners work well together on specific initiatives, some roles, responsibilities and performance management arrangements remain unclear. It took longer than expected to finalise the Shoreline Management Plans and the Local Flood Risk Management Strategies, and some councils are only making slow progress to deliver related actions.
- 13 The Welsh Government's planned review of the National Strategy in 2017-18, together with new legislation including the Planning (Wales) Act 2015 and the Environment (Wales) Act 2016, presents a timely opportunity to more closely integrate flood risk management at a strategic level into wider policies, plans and funding arrangements. Moreover, from 1 April 2016, the key public bodies involved in the management of coastal flooding and erosion risk management – the Welsh Government, Natural Resources Wales, and local councils – have a duty under the Well-being of Future Generations (Wales) Act 2015 to demonstrate that they are applying the sustainable development principle in their decision making (Appendix 4).
- 14 There is now a broad understanding of the possible long-term costs of managing the risks of coastal flooding and erosion, and the Welsh Government has yet to develop parts of its long-term funding strategy. The Welsh Government has committed to contribute 75 per cent of the Coastal Risk Management Programme which will invest a maximum of £150 million on council capital schemes from 2018-19 to 2020-21. This funding can allow progress over the next few years with some of the priorities identified in the Shoreline Management Plans, but the Welsh Government's funding is dependent on councils contributing 25 per cent towards the cost of these projects within the Programme, including their ability to secure external contributions where such opportunities exist. The Welsh Government has not helped councils to secure options for external funding. The cost of meeting the priorities identified in the Shoreline Management Plans is estimated to increase from £20 million to £30 million per year over the next 50-100 years. The issue for the Welsh Government and councils is in sustaining enough funding for the implementation of Shoreline Management Planning policies after, and well beyond, 2020-21. More work is also needed to ensure that funding is prioritised to areas of greatest need.

- 15 The Flood Risk Management Wales Committee⁹ explored long-term funding options in 2013, but the Welsh Government has not formally responded to the Committee's recommendations. Councils are also concerned about their ability to fund their own contribution to new capital projects and to fund maintenance activity. While key partners have an improved understanding of risk, the Welsh Government is considering options but is still to determine the preferred way forward for the Wales Coastal Monitoring Centre, previously hosted by Gwynedd Council. There is still no national register of coastal defence assets.
- 16 The Welsh Government's arrangements for monitoring its coastal protection grant have been weak, although some changes from April 2016 seek to improve progress reporting, and clarify benefits realised and any savings. Arrangements for prioritising grant funding for council coastal infrastructure projects are unclear. Where councils have made an application for grant aid that is of acceptable quality and is shown to have a positive benefit-to-cost ratio, the Welsh Government has been able to fund all schemes without the need to compare risks to prioritise one scheme over another. The Welsh Government is currently developing governance arrangements for its Coastal Risk Management Programme and has put in place a board to oversee delivery and represent stakeholder interests. The Welsh Government has yet to finalise governance arrangements for its Flood and Coastal Investment Programme.
- 17 Previous reviews have highlighted that progress to implement flood risk management has been hindered by a lack of capacity in the Welsh Government and in the councils. These issues are a concern in the context of future financial pressures, including also potentially for Natural Resources Wales, and the possibility of local government reform presents both risks and opportunities in this regard.
- 18 The development of the Wales Coastal Flooding Review Delivery Plan (2015) is widely recognised by stakeholders as a positive step towards improving coastal flooding and erosion risk management in Wales. However, deadlines for key actions in the Delivery Plan often relate to writing reports on options for improvement rather than agreeing and implementing solutions. The challenge for the Welsh Government and partners will be in sustaining momentum and implementing solutions to deliver the Coastal Review recommendations as soon as possible.

⁹ The Environment (Wales) Act 2016 allows the Flood and Coastal Erosion Committee to replace the Flood Risk Management Wales Committee, providing an opportunity to more fully integrate a wider range of flood and coastal erosion issues than the previous committee.

Recommendations

- R1 The Welsh Government has made slower progress than it had planned to address some of the recommendations of previous reviews and actions outlined in the National Strategy. Many of these outstanding actions have since been reflected in the Wales Coastal Flooding Review (2014) and Wales Coastal Review Delivery Plan (2015). **In refreshing its National Strategy in 2017/18, the Welsh Government should:**
- a **Evaluate its progress against the recommendations of previous reviews and update the Wales Coastal Review Delivery Plan to address any residual issues. The plan should set realistic targets and timescales to implement solutions.**
 - b **Develop a strategy to identify long-term funding for coastal protection including funding from across government departments and external bodies, and particularly to deliver multiple benefits. The Welsh Government should work with partners to learn from the partnership funding model in England to understand how councils have been able to attract external funding (paragraphs 2.25-2.31).**
 - c **Work with partners to ensure that adequate funding is available for revenue activities such as maintenance, coastal monitoring and community engagement (paragraphs 2.36-2.37). This work should include a review of council spending through the Single Environmental Revenue Grant and other sources of revenue funding to consider the impact of the new arrangements on the funding of flood risk management activities.**
 - d **Better integrate coastal flood and erosion risk management at a strategic level with new legislation including the Planning (Wales) Act 2015, Well-being of Future Generations (Wales) Act 2015 and Environment (Wales) Act 2016 (paragraphs 2.9-2.11).**
- R2 The Welsh Government described roles and responsibilities in its National Strategy but stakeholders told us they were still not clear in certain respects. The Wales Coastal Flooding Review Delivery Plan includes a project led by the Welsh Local Government Association and Natural Resources Wales to clarify the roles and responsibilities of organisations responsible for managing flood risk. **The Welsh Government should clarify Natural Resources Wales' oversight role and how it differs from the Welsh Government's role to manage performance (paragraph 2.17).**
- R3 There is evidence that some communities are still unaware of the long-term implications of the Welsh Government's risk-based approach. Community engagement has been hampered by a lack of options in the national strategy to help councils to prepare communities for managed retreat. **The Welsh Government should develop options within the national strategy to help councils to prepare communities where it is likely that managed retreat will be required. These options should consider the legal and financial arrangements necessary to relocate people and assets away from flood risk (paragraphs 2.7-2.8). The Welsh Government should also set out how it will communicate the implications of its risk-based approach to the public (paragraphs 1.21 to 1.22).**

R4 Natural Resources Wales reports on its own activities and progress against the National Strategy under section 18 of the Flood and Water Management Act 2010 without the benefits of an independent review. **The Welsh Government should review section 18 reporting arrangements and consider an independent review of performance, or a peer review of Natural Resources Wales section 18 reports (paragraph 2.17).**

R5 The Welsh Government and Natural Resources Wales are members of the Joint Flood and Coastal Erosion Risk Management Research and Development Programme with the UK Government's Department for the Environment, Food and Rural Affairs (Defra) and the Environment Agency. Although stakeholders could do more to engage in this Programme, the Welsh Government and Natural Resources Wales could more effectively share good practice identified by the Programme, particularly with councils. **The Welsh Government should work with Natural Resources Wales to share and promote the good practice identified in the Joint Flood and Coastal Erosion Risk Management Research and Development Programme with councils (paragraph 2.6).**

Part 1

Recent investment has improved coastal flood protection and delivered some wider benefits, although further work is needed to engage communities about the risks of coastal flooding and erosion



- 1.1 This part of our report tries to set out where the Welsh Government has invested the £381 million that it has allocated to flood and coastal erosion risk management since 2010-11. The Welsh Government has prioritised flood and coastal erosion risk management during the current period of austerity, maintaining funding since 2011-12 at a time when there have been significant cuts in funding, and particularly capital, for other departments. Our national study **A Picture of Public Services 2015**¹⁰ sets out funding for the Welsh Government's departments in more detail.
- 1.2 We were not always able to disaggregate funding allocated to coastal flood and erosion risk management activities from non-coastal activities. Where possible we have reported 'real-terms' expenditure figures throughout the report, this means that we have made adjustments to account for inflation. 2014-15 has been used as the base year against which we adjust previous years. Real-terms figures are based on HM Treasury GDP deflators issued in December 2015.
- 1.3 We also consider evidence of the impact of coastal risk management schemes across Wales, and how well the Welsh Government and its partners are engaging the public in their approach to coastal flooding and erosion.

Welsh Government funding for flood and coastal erosion risk management had been broadly stable from 2010-11 to 2016-17, with variation in EU funding from year to year

Since 2010-11, the Welsh Government has allocated £120 million of capital to coastal schemes, but its revenue allocation of £162 million cannot be apportioned between coastal and non-coastal activities

- 1.4 The Welsh Government has allocated £219 million capital from 2010-11 to 2016-17¹¹, with £120 million of this allocated to coastal schemes. This comprised £95 million of funding from the Welsh Government and £25.4 million from the European Regional Development Fund (ERDF)¹². The Welsh Government also allocated £162 million in revenue funding for flood and coastal erosion risk management over the same period. The Welsh Government was not able to separate how much of this revenue was used for coastal flooding and erosion.
- 1.5 **Figure 2** shows the real-terms funding that the Welsh Government allocated to all flood and coastal erosion risk management each year since 2010-11. While **Figure 2** suggests a reduction in funding, the underlying picture is more complex, particularly due to variation in the amount of ERDF drawn down from year to year. In 2010-11, total capital funding reached a peak of £44.4 million in real terms, largely due to a particularly large allocation of ERDF for that year (**Appendix 3**). Annual variation in capital funding is expected to some extent: it may go up because large projects reach particular milestones or go down where there are

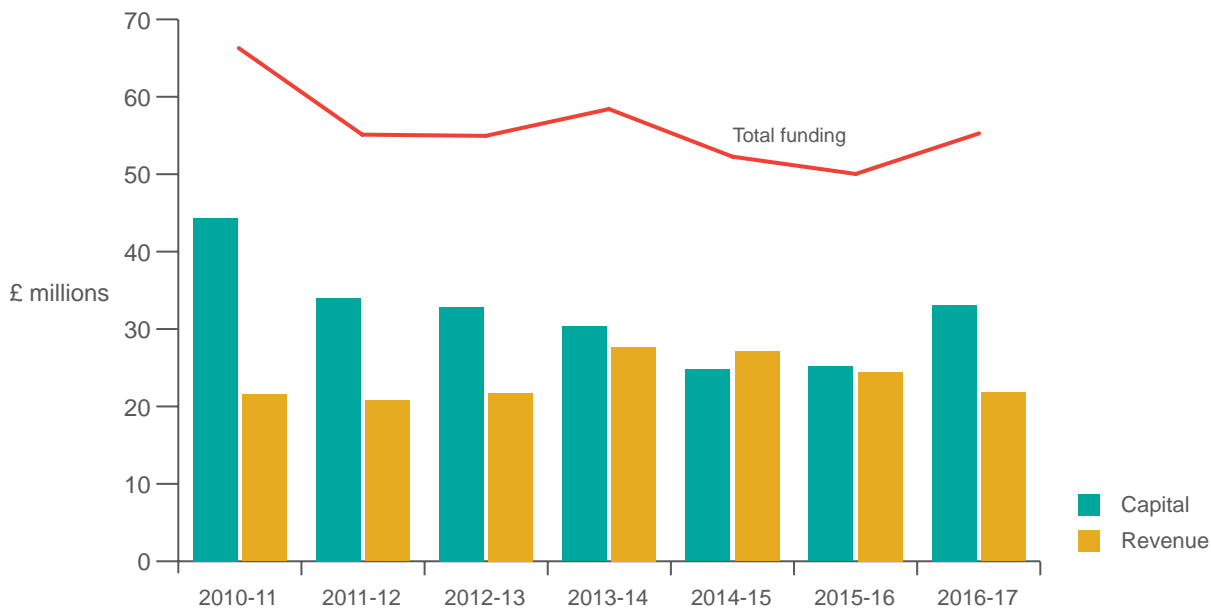
¹⁰ **A Picture of Public Services 2015**: report by Wales Audit Office showing the devolved public services' response to the challenges they have been facing and their plans to face the future pressures.

¹¹ As of May 2016, with additional capital allocation likely later in 2016-17.

¹² Until autumn 2015, capital funding for coastal protection has been available from European structural funds, in particular the ERDF. The allocation of that European funding is determined by the Welsh European Funding Office which is part of the Welsh Government. We were unable to obtain consistent information to map council spending across Wales in addition to any specific funding that the Welsh Government has provided. The information we have suggests that the additional spending by councils has been marginal since 2010-11.

delays in getting projects started. The position for 2016-17 is also complicated by £9.2 million of consequential funding¹³. Without this consequential funding, funding in real terms would have been £46.6 million which is slightly less than received in 2015-16. Leaving aside ERDF, the capital funding contribution from the Welsh Government has been largely static over the period since 2010-11. Revenue funding has risen slightly in real terms from 2011-12 to 2013-14, but has now returned to a similar level to the period 2010-11 to 2012-13.

Figure 2: Welsh Government and European Union funding for flood and coastal erosion risk management from 2010-11 to 2016-17, shown in real terms



Notes

- 1 The graph shows total funding for all types of flooding (inland and coastal), as well as for coastal erosion risk management.
- 2 These figures include £6.8 million capital of funding distributed across 10 councils to address the damage caused by the winter flooding of 2013-14, and £9.2 million of consequential funding allocated to the Welsh Government in 2016-17.
- 3 Capital funding includes core funding from the Welsh Government’s flood and coastal erosion budget as well as different Welsh Government funding programmes such as the Wales Infrastructure Investment Plan (WIIP), where bids will have had to be made on a case-by-case basis in competition with other priorities. Appendix 3 provides a breakdown of Welsh Government funding.
- 4 Revenue funding includes funding for councils to manage all sources of flooding and erosion through the Lead Local Flood Authority Grant, funding to help councils produce Local Flood Risk Management Strategies and revenue funding for Natural Resources Wales.

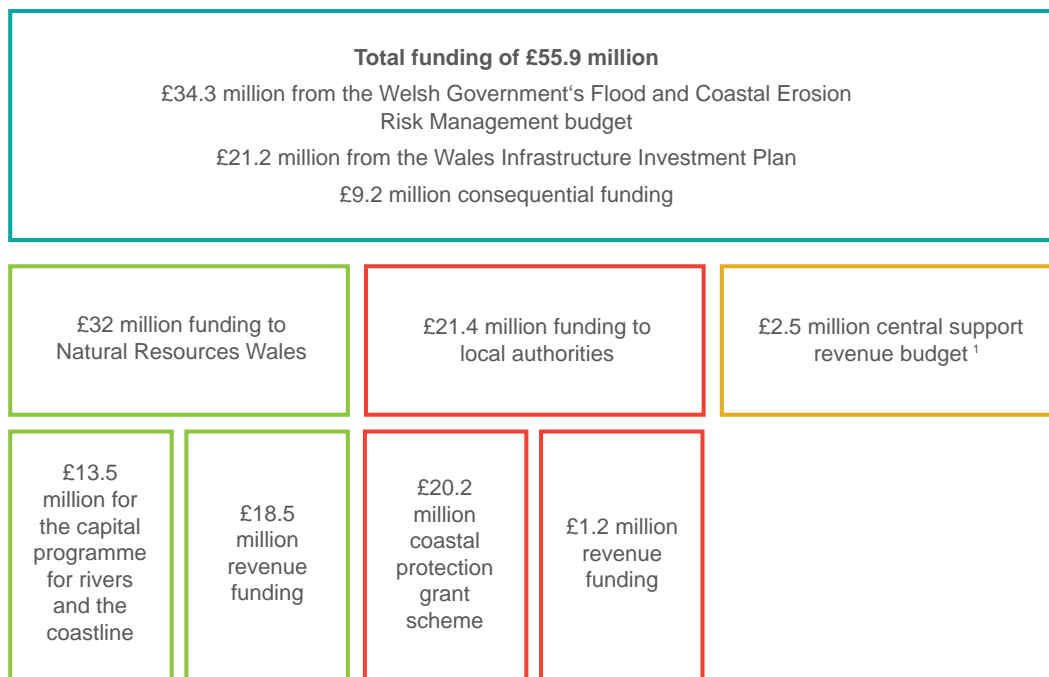
Source: Wales Audit Office analysis of Welsh Government data

¹³ As a result of the winter storms in England in 2015, the UK Government made additional funding available, even though Wales was not as badly affected by these storms as England. Under the Barnett formula through which central funding is allocated, Wales received an additional £9.2 million in 2016-17. The Welsh Government anticipates that all of this consequential funding will be included in the core Flood and Coastal Erosion Risk Management budget for 2016-17, although other departments undertaking flood work could also receive some of this funding.

In 2016-17, the Welsh Government allocated more than half of its budget for flood and coastal erosion risk management to Natural Resources Wales

1.6 The Welsh Government splits its funding for Natural Resources Wales between its Capital Investment Programme for rivers and the coastline, and revenue funding for staff and other activities such as community engagement. Natural Resources Wales funds maintenance of coastal defences through a mix of capital and revenue budgets depending on the size and nature of repairs. **Figure 3** shows the distribution of funding in 2016-17.

Figure 3: Welsh Government and European Union funding allocated for flood and coastal erosion risk management 2016-17 in cash terms



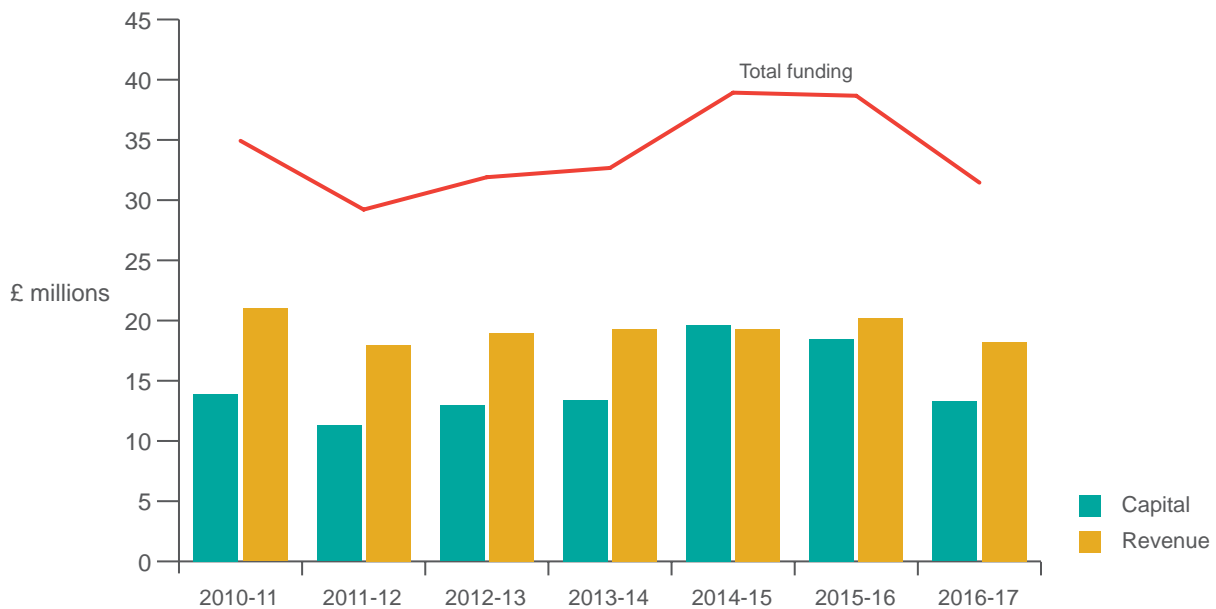
Note

Central support revenue budget covers coastal monitoring, research, conferences and exhibitions, administration and IT costs, consultancy fees for additional policy and project work, as well as salaries and training for the Welsh Government's Flood and Coastal Erosion Risk Management Branch.

Source: Wales Audit Office analysis of Welsh Government data

1.7 Natural Resources Wales became the single environment body for Wales in April 2013. Figures from 2010-11 to 2012-13 relate to Environment Agency Wales. Total real-terms funding to Environment Agency Wales or Natural Resources Wales for flood risk management peaked in 2014-15 at almost £39 million, but in 2016-17, this funding was £31.5 million. The Welsh Government advised us that rather than a cut in funding, the reduction since 2014-15 represents the progress that Natural Resources Wales is making with its capital programme and includes some funding carried over from previous years. (Figure 4).

Figure 4: Welsh Government and European Union flood and coastal erosion risk management funding allocated to Environment Agency Wales and Natural Resources Wales 2010-11 to 2016-17, shown in real terms



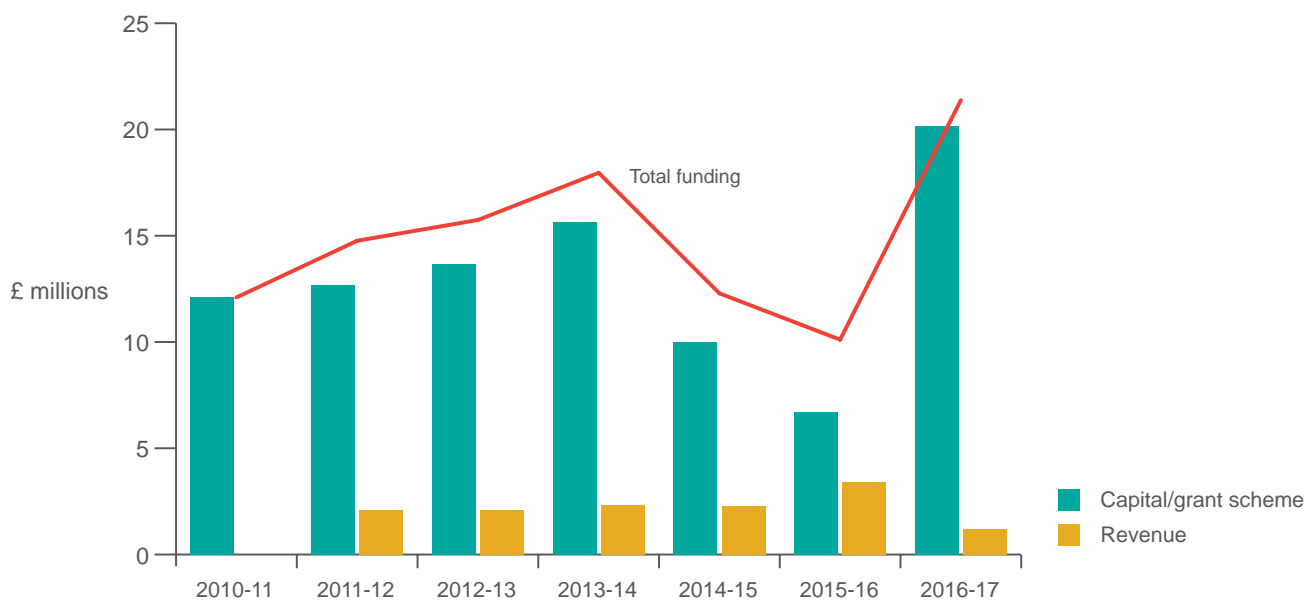
Note
 Figures from 2010-11 to 2012-13 are for Environment Agency Wales. Figures from 2013-14 to 2016-17 are for Natural Resources Wales. The graph shows total funding, not just funding for coastal schemes and activities.

Source: Wales Audit Office analysis of Welsh Government data

The greatest part of funding allocated to councils from the Welsh Government for flood and coastal erosion risk management is capital allocated through the coastal protection grant

1.8 Councils receive revenue funding from the Welsh Government for staff costs, public engagement activities and routine maintenance work. All 22 councils each received £100,000 annual revenue funding to manage all sources of flooding and erosion through the Welsh Government’s Lead Local Flood Authority Grant from 2011-12 to 2014-15. Revenue funding to councils increased in 2015-16. Councils can also apply for the Welsh Government’s coastal protection grant for capital schemes. Total funding for councils increased in real terms between 2010-11 and 2013-14, but reduced sharply in 2014-15 and 2015-16, when funding was £10.1 million, before rising sharply to £21.4 million in 2016-17. The decrease is due to the reduction in capital spending. The Welsh Government said that following the winter storms of 2013-14, capacity constraints meant that councils submitted fewer applications for capital schemes (Figure 5).

Figure 5: Welsh Government and European Union flood and coastal erosion risk management funding for councils 2010-11 to 2016-17 shown in real terms



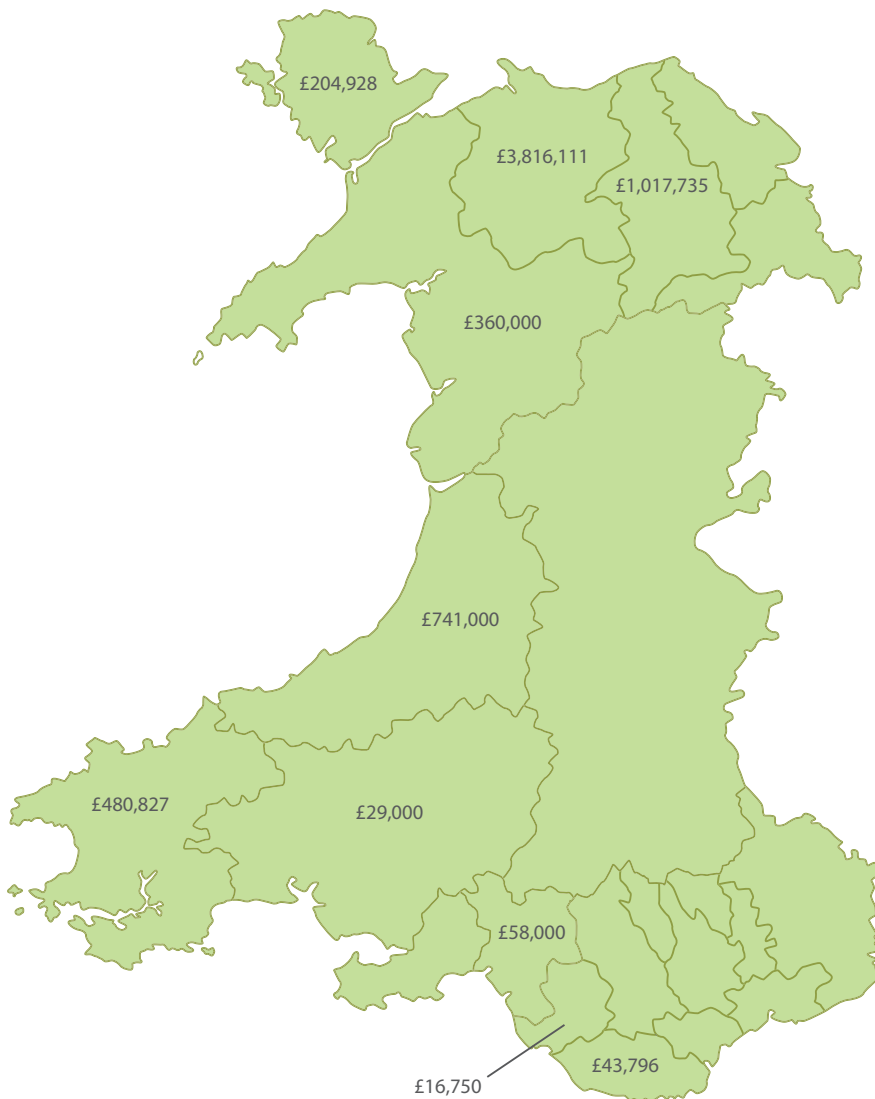
Note

These figures include £6.8 million capital funding distributed across 10 councils to address the damage caused by the winter flooding of 2013-14. The graph shows total funding, not just funding for coastal schemes and activities.

Source: Wales Audit Office analysis of Welsh Government data

1.9 The Welsh Government provided some councils with a share of £6.8 million of capital funding to address the damage caused by the winter flooding of 2013-14 (Figure 6). The Welsh Government provided this emergency funding from its 2013-14 budget. This funding could also be used to repair damage from non-coastal sources of flooding.

Figure 6: One-off funding to councils for damages after the winter floods of 2013-14 in cash terms



Source: Welsh Government

Flood and coastal defence schemes have improved flood protection to thousands of properties over recent years and delivered other benefits, although the evaluation of wider benefits could be more comprehensive

- 1.10 At present, the available evidence with which to assess the overall impact of investment in coastal protection is limited. Assessments often focus on the direct benefits of the number of properties protected without looking at the wider benefits to the economy and natural environment. Recent changes that the Welsh Government has made to the arrangements for its coastal protection grant should more clearly show some of these benefits (see [paragraph 2.54](#)). Welsh Government figures show that investment in coastal protection has improved for 8,674 coastal properties from 2011 to 2015. In October 2015, the Minister for Natural Resources announced that a further 3,800 properties across Wales will benefit from coastal flood defence schemes in Rhyl, Dolgellau, Borth, Cardiff and along the Severn Estuary.
- 1.11 The winter storms of December 2013 and January 2014 put coastal defences to the test. Natural Resources Wales' report on the impact of the storms¹⁴ estimated the cost of repairs to coastal defences at £8 million, with a further £3.3 million damages to street furniture, paths and paving¹⁵. The report also identified other impacts of the flooding including local erosion that caused beach loss around the coast; disruption to local rail and road networks; flooded agricultural land and damage to conservation sites.
- 1.12 While damage due to the winter storms was significant, not least because of the large waves that overtopped some sea defences, the damage could have been worse without investment in coastal protection. The Natural Resources Wales report concluded that the network of coastal defences owned by Natural Resources Wales and other stakeholders protected 99 per cent of properties at risk of flooding and protected 34,000 hectares of agricultural land from the damaging effects of saltwater incursion. The report estimates protection measures avoided nearly £3 billion in costs to individuals and businesses during the winter storms¹⁶. These measures also prevented additional financial costs associated with emergency services, infrastructure repairs and business losses¹⁷.
- 1.13 The Welsh Government commissioned research on the economic impact of flood defence schemes supported by European Regional Development Funding in 2012¹⁸ but has not evaluated schemes funded by its coastal protection grant either individually, or to assess the overall impact of its investment since 2012. Councils are not required to evaluate individual schemes funded by the coastal

¹⁴ **Wales Coastal Flooding Review Phase 1 Report – Assessment of Impacts**, Natural Resources Wales for the Minister for Natural Resources and Food, 2014.

¹⁵ Excludes repair costs to privately owned assets.

¹⁶ Costs were calculated by applying the average buildings insurance flood claim of £40,000 to the number of properties that were at risk of flooding but did not flood.

¹⁷ Natural Resources Wales has not calculated these costs.

¹⁸ **Flood and Coastal Risk Management Programme: An economic impact assessment**, Welsh Economy Research Unit, Cardiff University for the Welsh Government, 2012.

protection grant so there is no consistent national picture of the impact of the Welsh Government's investment. However, some councils have produced reports which highlight the wider benefits of specific schemes. Natural Resources Wales assesses the benefits of individual schemes delivered through its Capital Investment Programme, but it has not evaluated the impact of the Programme overall.

- 1.14 The available evidence suggests that investment in coastal flooding and erosion risk management provides a range of benefits beyond protection from flooding. For example, projects in Colwyn Bay and Borth combined improvements to coastal defences with wider regeneration to enhance recreation opportunities and tourism in the area and create employment (Case studies 1 and 2). A joint project between Natural Resources Wales and the National Trust at Cwm Ivy, in Gower (Case study 3) provided an alternative to traditional 'hard' engineering approaches to managing coastal flooding and erosion. Rather than repairing damage to the sea defence wall, the two organisations have agreed to let the area return to a saltmarsh habitat for birds and other wildlife. Natural Resources Wales has also worked with the City and County of Swansea in the lower Swansea Vale on a project which protects 284 businesses while creating valuable wildlife habitat (Case study 4).
- 1.15 In 2012, the research on the economic impact of European funded schemes estimated that over 100 years, schemes in the study¹⁹ would protect 1,682 businesses and avoid job losses of between 6,380 and 38,280 full-time equivalents. Construction contracts for the schemes totalled £65 million, of which around £41 million was spent within Wales. This spending either directly or indirectly supported nearly £40 million of goods and services in Wales and over 900 person years of employment.

¹⁹ The study included schemes to protect properties from non-coastal sources of flooding.

Case Study 1: Colwyn Bay waterfront

In Colwyn Bay, Conwy County Borough Council improved coastal defences as part of the Porth Eirias regeneration scheme that provided a new water sports centre, restaurant and recreation area on the waterfront in the town. Coastal erosion had gradually washed away large amounts of sand from the beach and storms had caused significant damage to existing defences in Colwyn Bay. Because of this erosion, 180 homes, seven businesses and major infrastructure in the area including roads, railway and Dŵr Cymru Welsh Water assets were at risk of flooding. Partners including the Welsh Government, Arts Council Wales, the National Lottery and the ERDF invested a total of £25 million in the scheme. The first phase of the work improved coastal defences, which enabled the construction of the Porth Eirias development. Work began in 2010 and the new water sports centre opened to the public in 2013, increasing visitor numbers and creating 30 jobs. Four thousand people visited the water sports centre in its first year of operation. The project secured further funding for regeneration of the promenade between Porth Eirias and the existing pier, and provided funds to allow the Council to counter the impact of erosion by placing more sand on the beach.

An assessment of the scheme by Cardiff University in 2012 described the project as a positive example of joint working.

The photograph shows an aerial view of the Porth Eirias development.

Image provided by Conwy County Borough Council



Case Study 2: Borth multi-purpose reef

Borth is a coastal village seven miles north of Aberystwyth and has a history of coastal flooding caused by the historic erosion of shingle from the beach over hundreds of years. Ceredigion County Council has engaged with residents since 2001 on its plans to manage the risks of coastal flooding in the village, through visioning workshops and a series of public meetings. The Council worked with residents to develop options for coastal protection over eight years and chose a scheme which creates a multi-purpose reef. The reef's main purpose is to reduce flood risk but it was also designed to enhance local surfing conditions to attract surfers and tourists to the area. Construction work was done in two phases. Work started in 2009 and was completed in April 2015. The scheme cost £18.8 million, funded mostly by the Welsh Government and ERDF. The project team designed the reef to protect and increase the height of the beach so that it offers improved coastal protection and shapes waves to create good surfing conditions at high tide. The project provides protection for 380 homes, and has reduced the risk of flooding to 40 businesses that provide the equivalent of 160 jobs. Local residents have reported that the defences have successfully protected their properties from flooding.

Ceredigion County Council engaged with local residents throughout the project. Meetings were well attended and the process benefitted significantly from the local councillor acting as a leader to engage with local people and Welsh Government officials. The councillor also

chaired the project steering group responsible for overseeing project delivery.

The photograph shows the Borth coastal protection scheme.

Image provided by Richard Workman



Case Study 3: Cwm Ivy wetlands

Natural Resources Wales and the National Trust are working together to create a new tidal saltmarsh on the north Gower coast. The sea wall that protected farmland around Cwm Ivy has deteriorated significantly over the years and rising sea levels mean that repairing the wall is not a sustainable solution. In August 2014, sections of the sea wall and embankment collapsed and since then the sea has started to reclaim the land. The two organisations are working together to return around 100 acres of National Trust farmland in the area to its natural state as a saltmarsh habitat. This project is part of the National Trust's approach set out in its Shifting Shores report²⁰ to allow coastal realignment to happen naturally. The saltmarsh will provide new feeding and resting sites for birds and other wildlife and enable the Welsh Government and Natural Resources Wales to meet its obligation to create compensatory habitat as required under the EU Habitats and Birds Directive. This compensatory habitat is needed for other coastal defence work to take place in the Carmarthen Bay Special Area of Conservation²¹. The project team held two public drop-in sessions in June 2015 to collect views on future options for the area, including a solution for sections of the Wales Coastal Path, which were lost when the sea wall and embankment collapsed. Plans and estimated costs for the project are yet to be finalised.

The photograph below shows an aerial view of Cwm Ivy.

Image provided by G R Howe, The Gower Society



Case Study 4: Lower Swansea Vale

A £7 million project in the lower Swansea Vale provides flood protection and mitigation measures along with valuable wetland wildlife habitat. The scheme is a joint project between Natural Resources Wales and the City and County of Swansea and protects 284 businesses employing more than 10,000 people, 20 houses, a caravan park and it reduces the risk to life of thousands of people frequenting the area for business, shopping and leisure. The scheme aims to provide more space for water by raising and re-aligning part of the embankment along the river Tawe and removing two bridges, and improves flood awareness and emergency response in the area. The lower Swansea Vale project creates a new bridge for cyclists and pedestrians above the level of flood flows and six hectares of wetland wildlife habitat and community space. Partners completed the scheme in 2014, which has attracted new wildlife and plant species to the area.

²⁰ **Shifting Shores – Adapting to Change**, National Trust, 2005. The National Trust published another Shifting Shores report in 2014.
²¹ Under the Habitats Directive, organisations responsible for sea defences that have negative impacts on natural habitats must provide compensatory habitat elsewhere.

The Welsh Government has worked with partners to increase awareness of the risks of coastal flooding and erosion but there is evidence that the public still have a limited understanding of the implications of managed retreat

- 1.16 A key part of the Welsh Government's National Strategy involves raising awareness of the risks of coastal flooding and erosion and educating people on how to live with these risks. One of the key challenges is in engaging people in communities where Shoreline Management Plans indicate that existing defences will not be maintained ('no active intervention') or where the coastline will move landward in the future ('managed retreat') (Box 2). Our 2009 report found that the public were largely unaware of the increasing risks of coastal flooding and erosion. We recommended that the Welsh Government work with the main stakeholders to engage with communities at risk and give them a clear understanding of its strategic approach. The Welsh Government and partners have made some progress to engage with these communities, such as through the support provided for Fairbourne, but they could do more to increase awareness and to involve the public in long-term plans to manage the risks.
- 1.17 Covering issues relating to coastal and inland flooding, the Flood Awareness Wales Programme, operated by Natural Resources Wales in partnership with local councils, is one of the main ways that the Welsh Government raises public awareness of flood risk. Water companies and councils also undertake some activities to raise awareness of flood risk. Flood Awareness Wales changed focus in 2014 after evaluations showed the need to shift from targeting individuals to developing a community response. Staff now work with communities to make community flood plans and train local volunteers to act as flood wardens²². Natural Resources Wales also engages with local people on individual flood defence schemes.
- 1.18 Councils have engaged with the public and other stakeholders in a range of ways. Natural Resources Wales reported to us that several councils have conducted mapping exercises to identify and assess the needs of vulnerable people living in flood risk areas. In some places they have made flood plans to assist specific community groups in the event of a flood. Councils are also working with communities to look at specific flooding issues in public meetings, workshops, and consultation exercises. Grant funding from the Welsh Government has helped to support some of this work with communities.

²² Since 2009, the Flood Awareness Wales team has worked with 314 communities, and helped create 624 community flood plans. Two hundred and seventy-four local flood wardens are involved with the Programme. Figures include coastal and inland flooding – **Flood and Coastal Erosion Risk Management in Wales 2011-2014**, Natural Resources Wales, March 2014.

- 1.19 Conwy County Borough Council is engaging with the Llandudno Coastal Forum on the future of Llandudno's beaches. Gwynedd Council chairs a multi-agency board that is working with the Fairbourne Facing Change citizens' group to develop joint plans to manage future flood risk (Case study 5). In Borth, Ceredigion County Council has engaged residents in planning for coastal protection schemes for a number of years (Case study 2). Citizens' groups formed because local people felt concerned about flood risk but excluded from decisions about their area. The formation of these groups has helped the councils to structure their approach to community engagement, and are positive examples of councils engaging with communities using bespoke approaches adopted for each community's needs.

Case Study 5: Fairbourne, Gwynedd

The West of Wales Shoreline Management Plan identified Fairbourne as an area for managed retreat from 2055 onwards. The Plan raised questions about whether people living in parts of Fairbourne could relocate to land outside the flood risk, and, if so, where this land would be. Gwynedd Council adopted the second Shoreline Management Plan in January 2013, but a public meeting scheduled to explain the implications of the Plan did not take place. Following the winter storms in 2014, the BBC's 'Week In Week Out' programme ran a feature on Fairbourne stating that property prices had significantly reduced and new mortgages were being refused due to concerns that parts of the community may have to relocate in the next 10 years. The programme led to panic and anxiety in the community and Gwynedd Council held a series of public meetings in February 2014 to address public concerns.

Local residents formed the group 'Fairbourne Facing Change' as a way of engaging with Gwynedd Council. In response, the Council developed 'Fairbourne Moving Forward', a partnership of stakeholders to address the issues arising from flood risk. The Council established a project board to manage the project and invited Fairbourne Facing Change to join them. Fairbourne Facing Change now attends every meeting of the Council's project board. In the Fairbourne Moving Forward Annual Report 2014-15, the Chair of Fairbourne Facing Change said 'From very difficult beginnings it is a tribute to all involved that good working relationships have been established.' The project board recognises that it will not be

sustainable to maintain flood defences in Fairbourne beyond the next 40 years²³. In the meantime, it will support the community to function as normal and plan for long-term change.

The photograph below shows Fairbourne during the winter storms of 2014.

Image provided by Gwynedd Council



²³ Gwynedd Council has calculated that flood defences in Fairbourne are likely to be unsustainable after 2054.

- 1.20 While work to engage communities continues, there is still a long way to go to raise public awareness. A survey conducted in 2014²⁴ for the Environment Agency and Natural Resources Wales showed that only half of interviewees living in high-risk areas considered themselves to be at risk of flooding. Of the 13 Council flooding officers who responded to our survey of councils along the Welsh coast ([Appendix 1](#)), only five considered that people who live, work, or own land in at-risk areas understand the risks from flooding to their land. The remaining eight officers told us that despite their efforts to engage with communities, correspondence, planning applications and reaction to local flooding events demonstrate a lack of awareness of flood risk and proposals to manage it. Stakeholders also told us that coastal residents generally do not understand the implications of the Shoreline Management Plans in areas where the approach suggested in these plans is managed retreat, or no further investment to maintain coastal defences.
- 1.21 In 2011, the Welsh Government produced a community engagement toolkit for organisations responsible for flood risk management. While the toolkit was produced at around the same time as the Welsh Government's National Strategy, it does not provide guidance to organisations in engaging communities in difficult issues like managed retreat. The Welsh Government has not developed a community engagement strategy to communicate the implications of its strategic approach to the general public in response to related recommendations from the National Assembly's Public Accounts and Environment and Sustainability Committees.
- 1.22 Although the Flood Awareness Wales Programme is helping engage a range of communities, it does not have a remit to communicate the difficult messages around the most appropriate long-term responses to future flood risk contained in the shoreline management plans. For example, the Programme does not communicate about managed retreat, where this is the recommended approach in the shoreline management plan. Although the Welsh Government has increased revenue funding for the Flood Awareness Wales Programme, we found that councils still have some capacity constraints that limit their involvement in the Programme. In areas like Borth and Fairbourne, the success of community engagement often relied on the enthusiasm of key individuals and council officers found maintaining momentum challenging when community interest started to fade.

²⁴ Ipsos MORI conducted the survey about flood risk awareness during May 2014. In Wales, 256 householders at risk of flooding in coastal and inland areas were interviewed by telephone, in addition to a further 795 interviews with householders at risk of flooding in England. The number of people surveyed is small and further work would be required to provide a more robust picture of public awareness along the Welsh coast.

Part 2

The Welsh Government and partners are improving their approach to managing the risks of coastal flooding and erosion, although the pace of change has been slower than planned



- 2.1 This part of the report considers the clarity of aspects of the Welsh Government's strategic approach to manage the risks of coastal flooding and erosion. It also examines progress in developing funding, asset management and risk assessment arrangements and issues relating to the capacity of the Welsh Government, councils and other partners in the context of wider financial pressures.

The Welsh Government is pursuing a risk-based approach but has not yet set out what aspects of its strategy mean in practice, especially in areas facing managed retreat

The Welsh Government's vision for a risk-based approach to managing coastal flooding and erosion is based on learning from alternative approaches and engagement with stakeholders

- 2.2 The Welsh Government's 2011 **National Strategy for Flood and Coastal Erosion Risk Management in Wales** (the National Strategy) recognises that climate change is increasing the risks of coastal flooding and erosion and appropriately reflects changes to legislation in the Flood and Water Management Act (2010). The National Strategy sets out a holistic approach to managing risks including better preparation and prevention, identifying areas for managed retreat, and working with the natural environment to use wetlands or salt marshes to reduce flood risk. We found that partners had a good understanding of the implications of the risk-based approach in the National Strategy and Shoreline Management Plans.
- 2.3 The Welsh Government engaged a range of stakeholders to evaluate and learn lessons from its previous New Approaches Programme and support the development of the National Strategy. This engagement has continued to inform its current strategic approach. The Welsh Government asked Natural Resources Wales to work with partners to learn from the joint response to the winter storms of 2013-14 through the Wales Coastal Flooding Review ([Appendix 2](#)) and produce a Delivery Plan to address the recommendations in the Review. Stakeholders described the Coastal Review process positively and recognised that the delivery plan workshops marked a change in momentum with genuine buy-in from a range of partners. One council flooding officer told us: 'The current Coastal Review led by Natural Resources Wales is making good progress and will throw up some helpful improvements.' Another flooding officer said: 'The recent coastal flooding review should be the catalyst for improvement, so my suggestion would be that the delivery plan be carefully monitored and fully implemented.'
- 2.4 The Welsh Government has made a clear commitment to the Delivery Plan by leading key projects and providing £150,000 of funding for Natural Resources Wales to develop and monitor the Plan. However, deadlines for key actions in the Delivery Plan often relate to writing reports on options for improvement rather than agreeing and implementing solutions. The challenge for the Welsh Government and partners will be in sustaining momentum and implementing solutions to the Coastal Review recommendations as soon as possible.

- 2.5 The Welsh Government and partners are also exploring international approaches to inform their approach to managing coastal flooding and erosion. We found that the Welsh Government and its partners had a good understanding of alternative approaches and were willing to look to other parts of the UK and further afield, such as the Delfland sand engine in Holland (Box 3), for examples of good practice.
- 2.6 The Welsh Government and Natural Resources Wales are also members of the Joint Flood and Coastal Erosion Risk Management Research and Development Programme with the UK Government's Department for the Environment, Food and Rural Affairs (Defra) and the Environment Agency. The Programme focuses on: policy, strategy and investment; asset management; and incident management and modelling in England and Wales. The Programme publishes information about research projects on its website, in a bi-annual newsletter and through workshops, conferences and webinars. However, although councils and other stakeholders can participate in the Programme's themed groups, stakeholders told us that the Welsh Government and Natural Resources Wales could do more to engage directly with councils to share research findings and good practice identified by the Programme.

The Welsh Government has still not set out in its strategy some options to help councils to prepare communities for managed retreat

- 2.7 Paragraphs 1.21 to 1.22 noted that the public still have a limited understanding of the implications of managed retreat. In our 2009 report, we recommended that the Welsh Government develop a strategy on managed retreat, and it accepted this recommendation in full. Since 2009, Shoreline Management Plans have clearly identified the coastal communities threatened by climate change, and highlight where managed retreat is the recommended approach within the next 50 years. Some previous coastal adaptation schemes, including sea defences, should mitigate and potentially delay the need for managed retreat, and there are plans for more schemes offering increased protection for some threatened communities. However, the Welsh Government has still not set out the options and support that could help councils work with communities that need to be ready to relocate as climate changes make the risks of coastal flooding or erosion unsustainable. Councils acknowledge that public engagement with residents facing managed retreat will be required for many years. The Welsh Government has funded research with Gwynedd Council to learn lessons from Fairbourne, and to inform the coastal adaptation project in the Wales Coastal Flooding Review Delivery Plan (Appendix 2). The research includes buy-to-let schemes, where residents in areas identified for managed retreat in a Shoreline Management Plan could sell their home to the Welsh Government and then lease it back while they continue to live there. The Welsh Government has not decided whether to adopt such a scheme and has not considered its financial implications.

Box 3: Delfland Sand Engine in Holland

About 120 kms of north and south Holland has a sand shoreline that provides some protection from coastal erosion. In 1990, Dutch coastal defence policy changed from the traditional approach of using dams and other fixed structures to large-scale beach nourishment, through a process known as the 'Delfland Sand Engine'. The sand engine involves mining 20 million cubic metres of sand offshore and depositing it on the shoreline to provide some protection against erosion and as a buffer for rising sea levels. In the long term, waves, currents and wind distribute the sand to enable the coast to grow naturally. The sand engine lessens disturbance to local ecosystems associated with smaller-scale beach nourishments and creates additional wildlife habitats, and some recreation and economic opportunities. Researchers are also using the Delfland Sand Engine to gather knowledge about adaptation to climate change.

In partnership with both the public and private sectors, The Crown Estate²⁵ is using good practice gained from the Delfland Sand Engine project to develop a new approach in the UK called 'Sandscaping', and has identified suitable locations to pilot this approach on the UK coastline, including in several locations on the Welsh coast. The picture below shows a new bank of sand created through the sandscaping process.

The picture below is an artist's impression of a sandscaped beach.



Image provided by The Crown Estate

²⁵ The Crown Estate has rights to most of the UK seabed to 12 nautical miles and the rights to natural resources on the continental shelf (excluding hydrocarbons).

- 2.8 Whether to relocate or compensate communities is a difficult issue, although there are examples of approaches that have been taken elsewhere in the world (Box 4). The UK Government has also provided financial support for people and businesses affected by recent winter flooding in England (Box 5), although the Welsh Government understands that this scheme was difficult to administer. Stakeholders in Wales are finding it difficult to plan and engage with local communities without the Welsh Government offering some clear strategic options for communities facing managed retreat. In the absence of a clear national strategic lead on managed retreat, some councils are funding community engagement activities to develop change management plans without a realistic picture of the options available and their legal and financial implications.

Box 4: Relocating communities away from areas of flood risk

Home buy-out schemes in the United States

In October 2012, Hurricane Sandy damaged or destroyed around 650,000 homes, killed at least 159 people, displaced 23,000 people and left around 8.5 million people without electricity, some for up to three weeks. The state of New York introduced the home buy-out scheme to transform the state's coastal zones into publicly owned open space such as wetlands or parks. The scheme is available on a voluntary basis to homeowners living in the flood plain where their house was damaged beyond 50 per cent of its value. Homeowners receive state funding for 100 per cent of the pre-storm market value for their property. The state provides additional incentives for people who relocate within the same county, homes in high-risk areas and for communities that collectively agree to relocate. The United States Government has operated similar schemes in Missouri (1993 and 2015) and Iowa (1993).

Disaster Recovery Funding for flood victims in Alberta, Canada

Homeowners with property affected by the 2013 floods in Alberta can apply to the Alberta Government's Disaster Recovery Programme to cover the cost of uninsurable loss. Residents have a choice of rebuilding their homes or relocating. People who use the fund to repair or reconstruct their home in a flood plain will not be eligible for future Disaster Recovery Programme funding.

Box 5: Support for people affected by the winter floods in England

In January 2016 the UK Government launched a package of measures to support people affected by the winter floods in 2015-16 including:

- a £5,000 repair and renew grant for all affected homeowners and businesses to pay for repairs which improve a property's ability to withstand future flooding;
- providing councils with over £500 for each household affected by the floods to help people with temporary accommodation costs;
- ensuring that flood victims will not pay council tax or business rates for their homes and businesses as long as they are not occupying their properties;
- providing councils with up to £2,500 to help businesses that have had their trading affected by the floods to start operating again; and
- grants of up to £20,000 to help farmers restore agricultural land, damaged as a result of the floods under the Farming Recovery Fund.

Recent legislation provides the basis for better integration of coastal flooding and erosion risk management at a strategic level into wider policies, plans and funding arrangements

- 2.9 Our 2009 report recommended that the Welsh Government improve the integration of coastal flood and erosion risk management with other strategies. Increasingly there are examples of more integrated working such as after flooding events or on coastal regeneration schemes such as at Colwyn Bay. However, in our view the Welsh Government could still do more to ensure that the coastal flood and erosion risk management strategy is more closely integrated with other strategies, notably with tourism and more widely with the regeneration strategy. The Welsh Government plans to review the National Strategy in 2017-18.
- 2.10 The Flood and Coastal Erosion Risk Management Branch has already had some involvement with the development and early implementation of recent new legislation. This new legislation provides further opportunities for the Welsh Government to continue to integrate coastal flood and erosion risk management with other strategies. Recent legislation that promotes integration includes:
- a The Well-being of Future Generations (Wales) Act 2015 – improving partnership working through the new Public Service Board and Local Well-being Plan arrangements;
 - b The Environment (Wales) Act 2016 – learning from the natural resource management approach to manage flood risk more holistically (Box 6). Also to be established under this new legislation in October 2016, the Flood and Coastal Erosion Committee provides an opportunity to advise and to more fully integrate issues as it will consider a wider range of flood and coastal erosion issues than the previous Flood Risk Management Wales Committee.
 - c The Planning (Wales) Act 2015 – planning of flood risk management across local planning authority boundaries in the new Strategic Development Plans²⁶.
- 2.11 From 1 April 2016, the Welsh Government, Natural Resources Wales and councils will have a duty under the Well-being of Future Generations (Wales) Act 2015 to show they have applied the sustainable development principle (Appendix 4) to their decisions. While the Welsh Government's National Strategy predates the Act, it reflects some of the things public bodies need to think about to show that they have applied the sustainable development principle:
- a balancing the short-term needs of communities at risk of flooding with the long-term focus on avoiding investment in areas where the costs of coastal protection outweigh the risks;
 - b focusing on flood prevention and improving the resilience of local communities to avoid higher costs in the future as a result of flood damage;
 - c promoting collaboration with relevant stakeholders; and

²⁶ The Planning (Wales) Act 2015 provides a legal framework for Strategic Development Plans. Strategic Development Plans allow local planning authorities to work together to address housing, employment and infrastructure arrangements which involve more than one authority. There is no legal requirement for local planning authorities to produce the Plans.

- d aiming to involve people with an interest in managing coastal flooding and erosion.

The Welsh Government's planned review of the National Strategy in 2017-18 provides the opportunity to build on the sustainable development principle and ensure that flood risk management objectives are integrated with the wider well-being goals for Wales.

Box 6: Natural resource management trials

Natural Resources Wales is running three pilot studies around the Dyfi, Rhondda and Tawe rivers using the natural resource management approach set out in the Environment (Wales) Act 2016. Rather than managing different parts of the environment in isolation, natural resource management looks at the continuity of natural resources across adjoining locations. Natural resource management seeks sustainable solutions for managing land in ways that support the natural functions within ecosystems. The approach aims to provide multiple benefits for people, wildlife and the economy, and involves engaging local people to use their knowledge of local issues and explore opportunities for managing natural resources. The three pilot studies have gathered evidence about a wide range of natural resource management issues, including flood risk. The pilot studies have so far explored tree planting, storage of water on farmland, creation of wetlands and reconnecting flood plains, but Natural Resources Wales needs to undertake more research to assess the benefits of each potential solution. Current trials focus on inland areas but the approach could be rolled out to include coastal catchment areas in the future.

- 2.12 Emerging plans for the Welsh Government's Coastal Risk Management Programme have the potential to improve integration. The Programme aims to secure 'multiple benefits' for the economy, environment and to improve social cohesion by developing closer links to other areas of government policy. The Programme will be overseen by a programme board of officials from partner organisations and a range of Welsh Government departments. Officials are currently developing critical success factors to ensure 'strategic fit' with national and local government policy. The Welsh Government has not set out how it plans to link its Flood and Coastal Investment Programme with relevant policy areas. The challenge for both programmes will be in securing funding from other Welsh Government departments to support coastal protection schemes. The Welsh Government's Flood and Coastal Erosion Risk Management team has promoted the benefits of flood prevention for tourism, regeneration and for the wider economy but has largely been unsuccessful in securing funding from other Welsh Government departments.
- 2.13 A recommendation in the Wales Coastal Flooding Review was that the Welsh Government endorse the strategic framework established by the Shoreline Management Plans. Giving the Shoreline Management Plans more formal recognition as policy with options and a suggested timescale could help communities develop their local adaptation plans to tackle increasing risks.

The Welsh Government has written to local planning authorities stating that Shoreline Management Plans should be a material consideration in planning decisions. Council flooding officers responding to our survey suggested giving the Plans statutory status would better integrate shoreline planning with national and local policy. Nevertheless, councils told us that the Shoreline Management Plans had influenced their Local Development Plans, individual planning applications and investment in coastal flood defence assets.

Although partners work well together on specific initiatives, some roles and responsibilities and performance management arrangements remain unclear

- 2.14 We found positive examples of partnership working through the Wales Coastal Delivery Plan and individual projects. Natural Resources Wales is working with the National Trust at Cwm Ivy, Gower ([Case Study 3](#)), and with the City and County of Swansea in the lower Swansea Vale ([Case Study 4](#)). Conwy County Borough Council worked with a range of partners to develop Colwyn Bay ([Case Study 1](#)) and Gwynedd Council chairs a multi-agency board that is working with the Fairbourne Facing Change citizen's group to engage with the community ([Case Study 5](#)). Partners have also worked together to produce the Shoreline Management Plans and Local Flood Risk Management Strategies.
- 2.15 Stakeholders reported improved engagement from infrastructure and utility providers through the Wales Coastal Flooding Review Delivery Plan workshops but felt that engagement still varies across providers. The Wales Utility Group²⁷ could offer another forum for involving utility providers in coastal flood and erosion risk management.
- 2.16 Our previous report recommended that the Welsh Government make the roles and expectations of each stakeholder clear. In its National Strategy the Welsh Government has provided a broad description of the roles and responsibilities of organisations responsible for managing the risks of coastal flooding and erosion. Nevertheless, some partners are still unclear about some areas of responsibility.
- 2.17 Taking on the functions previously discharged by Environment Agency Wales, Natural Resources Wales' oversight role includes monitoring and reporting the progress of partners in delivering the aims of the National Strategy under section 18 of the Flood and Water Management Act. The Welsh Government is responsible for holding organisations to account and enforcing implementation where necessary. However, stakeholders were not always clear on the distinction between the responsibilities of the two organisations and some told us that local politicians misunderstood Natural Resources Wales to have an enforcement role on flooding issues. In addition, because Natural Resources Wales has a clear operational responsibility for delivering national objectives, it reports on its own activities and progress against the National Strategy under section 18 of the Flood and Water Management Act 2010 but without the benefits of an independent review²⁸.

²⁷ The Wales Utility Group aims to bring utilities bodies in Wales together to ensure they are prepared in the event of an emergency, including flooding. The Group is currently chaired by the Welsh Government and reports to the Wales Resilience Partnership Team.

²⁸ In England, the Environment Agency is in a similar position because the Flood and Water Management Act 2010 also places a duty on it to report on its progress against objectives in the UK National Strategy.

- 2.18 The Welsh Government has checked the alignment of councils' Local Flood Risk Management Strategies with the national strategy. However, it has not developed routine arrangements to ensure that councils are implementing its National Strategy or the Shoreline Management Plans. Natural Resources Wales reports²⁹ every two years to the Minister about the application of the national strategy, but routine monitoring is limited.
- 2.19 In 2012, the Environment and Sustainability Committee recommended that the Welsh Government prioritise its assessments of the Shoreline Management Plans as a matter of urgency. The Welsh Government set a deadline of 2012 for delivery of the Shoreline Management Plans in its National Strategy. However, councils were slow to produce the Plans and the Welsh Government could not approve some until late in 2014 because the Habitats Directive³⁰ required councils to undertake an assessment of appropriate compensatory habitat for some of the proposed schemes. There were also some delays associated with Plans shared with coastal groups in England. The Coastal Groups are responsible for producing, implementing and monitoring progress of the Shoreline Management Plans. However, stakeholders told us that without clear guidelines from the Welsh Government on timescales or targets for delivering projects in the plans, the Coastal Groups are not sure what they are monitoring.
- 2.20 The Welsh Government has not enforced deadlines for Local Flood Risk Management Strategies and only two out of 15 councils with a coastline met the March 2013 deadline to produce the Strategies³¹. Some councils are making slow progress delivering actions from the Local Flood Risk Management Strategies and Shoreline Management Plans. Council flooding officers generally expressed positive views on the level of guidance provided by the Welsh Government. However, the Welsh Local Government Association and Natural Resources Wales told us they need more guidance on implementing parts of the National Strategy, Local Flood Risk Management Strategies and Shoreline Management Plans at a local level.
- 2.21 Stakeholders have also struggled to understand the distinction between responsibilities for flooding and erosion. Natural Resources Wales has the primary responsibility for coastal flooding, but the overall responsibility for coastal erosion is less clear, particularly after changes introduced in the Flood and Water Management Act (2010)³². There are also instances along the coast where it is difficult to determine if flood risk comes from coastal erosion or from other causes of sea flooding.

²⁹ Reports are made by Natural Resources Wales under section 18 of the Flood and Water Management Act 2010.

³⁰ The Habitats Directive required assessments of 'imperative reasons for overriding public interest'.

³¹ Eight councils produced their Local Flood Risk Management Strategy by the end of 2013, another four by the end of 2014, and one in March 2015.

³² The Coast Protection Act 1949 gave some councils in Wales powers to manage coastal erosion but the Flood and Water Management Act (2010) gave the Environment Agency (Wales) new operational responsibilities for coastal erosion. From 2011, councils must seek approval for coastal erosion works from Environment Agency Wales, and subsequently from Natural Resources Wales.

The Welsh Government has yet to fully develop parts of its long-term funding strategy

The Welsh Government and partners have a broad understanding of the possible long-term costs of managing the risks of coastal flooding and erosion

- 2.22 With increasing risks associated with climate change, managing coastal flooding and erosion is likely to represent significant long-term costs. In 2011, the Environment Agency³³ estimated the cost of implementing the Shoreline Management Plans in England and Wales over the following 100 years. It put costs in Wales at around £2.7 billion (Figure 7), of which £1 billion would need to come from sources other than existing flood and coastal defence budgets.
- 2.23 The Environment Agency's estimates do not include revenue costs for staff and activities such as community engagement, flood forecasting and warning, awareness, development control, maintenance and incident response. The Agency's estimates are also restricted by limited information about the impact of climate change on the future costs of maintaining the coastal defence assets in Wales and in some cases make broad assumptions about increasing future costs. As the Shoreline Management Plans identify areas for managed retreat and no active intervention where investment will be reduced or stop altogether, the future costs of protecting the coastline could be considerably higher if these policies change.

Figure 7: Costs of implementing the Shoreline Management Plans over the next 100 years



Source: The Cost of Implementing Policies for Coastal Defence, Halcrow for the Environment Agency 2011

33 The Cost of Implementing Policies for Coastal Defence, Halcrow for the Environment Agency 2011.

2.24 In 2013, the Flood Risk Management Wales Committee estimated the future costs of flood risk management in Wales³⁴ using information from Environment Agency Wales, council revenue budgets and average costs of protection per property. The Committee estimated that at least £60 million should be spent each year on flood risk management. However, the Committee's report did not break down the costs of protection from coastal flooding and erosion from other sources of flooding. Similarly, some other projections do not separate these costs.

The Welsh Government has identified additional funding for coastal protection but has not developed a long-term funding strategy beyond 2020-21 or helped councils to secure options for external funding

2.25 The Welsh Government missed its deadline in the National Strategy to develop a national funding policy and prioritisation methodology by the end of 2013, and some aspects of this policy remain unfinished. In December 2014, Ministers agreed the Welsh Government's initial business case for the Coastal Risk Management Programme³⁵. The Welsh Government has committed that for the period of three years from 2018-19 to 2020-21, its new £150 million capital value Coastal Risk Management Programme will support councils³⁶ to implement capital schemes in line with local Shoreline Management Plans. Options for the Programme to make use of borrowing are still being confirmed, but include prudential borrowing by councils and direct borrowing by the Welsh Government. Funding may also include co-funding from other departments with the Welsh Government and contributions from local partners benefiting from schemes, although details are not yet developed. The Welsh Government has indicated that it intends funding for the Coastal Risk Management Programme to be additional to its annual core funding for flooding and coastal erosion risk management.

2.26 The Welsh Government has not made any firm commitments on departmental capital budgets beyond 2016-17, a year before the Coastal Risk Management Programme commences. The Welsh Government intention to allocate its core capital funding through the new Flood and Coastal Investment Programme will increase the competition for capital funding. The Welsh Government currently allocates capital funding separately to Natural Resources Wales through grant-in-aid arrangements, and to councils through its coastal protection grant. Under the new Programme, Natural Resources Wales and councils will compete for the same funding, and the Welsh Government will pilot the allocation of these funds using the Communities at Risk Register.

2.27 Between 2018-19 and 2020-21, the Coastal Risk Management Programme more than meets the annual cost identified by Halcrow in 2011 (Figure 7) for implementing the coastal schemes identified in Shoreline Management Plans. However, the issue for the Welsh Government and councils is in sustaining enough funding for the implementation of Shoreline Management Planning policies after, and well beyond, 2020-21.

³⁴ **Future funding of flood and coastal erosion risk management in Wales, interim report**, Flood Risk Management Wales for the Minister for Natural Resources and Food, Welsh Government, 2013.

³⁵ At the time it was called the Innovative Finance Coastal Programme.

³⁶ Within the £150 million for the Coastal Risk Management Programme, councils will need to contribute 25 per cent of the cost of capital schemes, with the Welsh Government providing the remaining 75 per cent. This simplifies the system and provides a flat-rate of grant support for councils whereas support under the coastal protection grant was variable and calculated according to means.

2.28 Some stakeholders had concerns that the Welsh Government has not explored all of the options available to fund coastal flood risk management. In 2012, the Environment and Sustainability Committee recommended that the Welsh Government undertake work to secure new sources of funding from across government budgets and from external bodies. The Flood Risk Management Wales Committee also recommended that the Welsh Government explore long-term funding options in its report on future funding in 2013³⁷. The report examined a range of innovative approaches and recommended that the Welsh Government increase direct funding for flood risk management, and consider introducing council flood levies (Box 7)³⁸ and adopting a partnership funding system (Box 8). The Welsh Government has not formally responded to the Committee's recommendations or explored the options to generate additional income that the report raises.

Box 7: Using council tax to pay for flood risk management

Some councils in England have used council tax increases to fund flood risk management. For example, Gloucestershire Council introduced a 1.1 per cent flood levy as part of council tax increases in 2009 after residents voted in favour of the charges. The additional funds provided around £2.3 million that year for flood risk management.

Box 8: Partnership funding in England

The UK Government introduced partnership funding in England in 2012-13 to increase the funding available to communities from external sources to address flood risk. The amount of grant in aid available from the Department for the Environment, Food and Rural Affairs (Defra) depends on the proposed benefits of each scheme. Some schemes are eligible for 100 per cent funding from Defra while others get funding proportionate to their planned benefits and must meet remaining costs from other sources. A calculator on the UK Government website determines how much grant-in-aid funding schemes can expect to receive³⁹. The calculator allocates more funding for schemes protecting households in deprived areas or projects that help meet the objectives of the Water Framework, Birds or Habitats Directives. In England, the Environment Agency approves grant-in-aid schemes on behalf of Defra.

An evaluation of partnership funding by JBA Consulting in 2013⁴⁰ reported an overall increase in funding for capital flood defence projects and greater local choice and responsibility over investment decisions. JBA's analysis of a sample of projects shows that 25 per cent of external contributions came from the private sector. Private-sector investors were often developers or private companies due to benefit directly from the scheme. The remaining 75 per cent of contributions came from councils and other public bodies. Before the UK Government introduced partnership funding, councils generally secured external contributions through a local levy administered by Regional Flood and Coastal Committees. External contributions to flooding schemes have increased from £5.4 million in 2011-12 before the UK Government introduced partnership funding to £54.5 million in 2013-14 and £60.5 million in 2014-15⁴¹.

JBA found that the partnership funding approach has led to a growing acceptance that central government cannot fully fund all projects but that many organisations have found the processes for securing partnership funding challenging. It recommended continued capacity building and guidance to address this issue.

37 **Future funding of flood and coastal erosion risk management in Wales, interim report**, Flood Risk Management Wales for the Minister for Natural Resources and Food, Welsh Government, 2013.

38 The report suggests flood alleviation levies on all residential council tax bills and a similar levy on businesses in Wales.

39 **Flood and Coastal Risk Management (FCRM) partnership funding calculator**, Environment Agency, February 2014 (on the gov.uk website).

40 **Flood and Coastal Erosion Resilience Partnership Funding Evaluation**, JBA Consulting for Defra, April 2014.

41 **Breaking the Bank? Funding for Flood and Coastal Erosion Risk Management in England**, Chartered Institution of Water and Environmental Management, March 2015.

- 2.29 In England, partnership funding has increased external funding for flood risk management from £5.4 million in 2011-12, to £60.5 million in 2014-15. The approach in England may provide lessons for the Welsh Government and partners in generating external funding and encouraging stakeholders to look beyond the Welsh Government for funding.
- 2.30 At the present time, the Welsh Government has chosen not to follow the partnership funding model in Wales. Instead, it hopes that match funding requirements for its Flood and Coastal Investment and Coastal Risk Management Programmes will encourage councils to seek funding from partners including from the private sector, infrastructure providers and others who may benefit from coastal defences. Both Programmes require councils to provide 25 per cent for each scheme, either using their prudential borrowing powers for the Coastal Risk Management Programme⁴², or by securing funding from other sources. The Welsh Government has held workshops for councils and has recently appointed external support to help councils to make funding bids that encompass wider benefits and contributions from partners.
- 2.31 Council officials told us they were concerned about their ability to match fund projects in a time of unprecedented pressure on budgets and in the context of uncertainties regarding local government reorganisation. In the past, some councils have found it difficult to identify alternative sources of funding. In our survey, only three councils reported attracting private sector funding in the last five years and funding was less than £30,000 in each case⁴³. In addition, some council flooding officers felt they lacked the necessary skills to develop successful funding applications.
- 2.32 Applicants submitted a brief business case for proposed projects under the Coastal Risk Management Programme to the Welsh Government in September 2015. By December 2015, all councils with a coastline had applied for the Coastal Risk Management Programme funding. Some councils have identified potential funding partners in their initial application but most lack detail about sources of alternative funding at this stage.
- 2.33 Stakeholders told us that short-term, annual capital funding allocations restrict their ability to plan effectively and make efficiency savings. While the three-year funding commitment made to the Coastal Risk Management Programme is encouraging, the Welsh Government's intention is to keep allocating its core grant on an annual basis, and has not confirmed its funding strategy in the long term, beyond 2020-21. In contrast, the UK Government introduced a six-year funding cycle for flood and coastal erosion capital projects in England in 2015.
- 2.34 The Welsh Government is currently assessing proposals to produce a list of projects to go to the next stage. Feasibility studies and project appraisals are expected to take place between 2016-17 and 2018-19, with construction completed by March 2021. There is a risk that construction will be delayed due to short timescales for councils to develop designs, set up procurement arrangements

⁴² The UK Government introduced Prudential Borrowing legislation in 2003 to give councils the power to borrow money to fund capital projects. The legislation requires councils to produce capital expenditure plans that are affordable, prudent and sustainable.

⁴³ Conwy County Borough Council: £25,000, Denbighshire County Council: £7,000 and Gwynedd Council: £21,000.

and consult on their plans, and then for the Welsh Government to appraise and approve final schemes. A 'Gateway Review' of the Coastal Risk Management Programme in October 2015 identified risks with the three-year delivery window. Following this review, the Welsh Government has decided to continue to plan to deliver the Programme over three years but has identified the need to consider contingency arrangements. The Welsh Government has secured grant funding through the Wales Infrastructure Investment Programme for the development of capital schemes that could receive funding from 2018-19 under the Coastal Risk Management Programme. This funding is confirmed at 100 per cent grant aided for 2016-17, and the Welsh Government is seeking to provide similar financial support to councils developing these schemes in 2017-18.

- 2.35 The Gateway Review also identified capacity and capability constraints which may impact on the Programme team's ability to deliver the Programme. The Welsh Government has not identified the human resources required to administer either its Flood and Coastal Investment or Coastal Risk Management Programmes, but told us it does not currently have the staff to do this effectively. The Welsh Government has recently recruited a second technical officer to assist with some aspects of the administration of its Coastal Risk Management Programme, and plans to increasingly use external support in the technical appraisal of projects.

Revenue funding for councils is under pressure and may not be sufficient to maintain coastal defences

- 2.36 In 2015-16, the Welsh Government replaced the Lead Local Flood Authority grant with the Single Environmental Revenue Grant awarded annually to each council and administered by the Department for Natural Resources. To secure a share of their council's allocation of the new grant, flood risk management services must now compete with other services including waste management where councils risk fines if they fail to meet statutory targets, and for local environmental quality improvements. Although the Single Environmental Revenue Grant is not limited to £100,000 per council as was the case for the Lead Local Authority Flood grant, councils now have to prioritise this funding between several service areas. As previously, councils may decide to use revenue from their Revenue Support Grant, should they wish to use this source of funding for statutory flood risk duties.
- 2.37 Some councils responded to the Welsh Government's consultation on the Flood and Coastal Investment Programme saying that current revenue allocations are insufficient to meet their maintenance requirements. Only one council flooding officer responding to our survey felt they had sufficient revenue funding to maintain the effectiveness of coastal flood risk assets over the next three years⁴⁴. Stakeholders were also concerned that plans for the new Programme do not include an assessment of revenue funding requirements for maintenance, coastal monitoring and community engagement activities.

⁴⁴ Seven respondents felt that their council did not have sufficient funding and five did not know.

Although there has been some progress, more work is needed to ensure that funding can be prioritised to areas of greatest need

- 2.38 The Welsh Government and partners have made some progress in understanding risk since 2009. Natural Resources Wales has worked with other organisations responsible for managing flood risk to produce a National Flood Risk Assessment, flood-hazard and flood-risk maps for flooding from rivers, the sea, reservoirs and surface water. Interactive maps are available on the Natural Resources Wales website.
- 2.39 Environment Agency Wales published a National Coastal Erosion Risk Map in 2012. Since then, Natural Resources Wales has worked with the Welsh Government to analyse erosion risk to properties in Wales⁴⁵. The revised Shoreline Management Plans⁴⁶ also improve the understanding of national risk across Wales. Natural Resources Wales⁴⁷ states that improvements in risk modelling and flood mapping have led to a reduction in the number of properties categorised as being at risk from river or sea flooding from 220,000 in 2009 to 208,000 in 2013. The reduction is also likely to reflect investment in coastal flooding and erosion risk management.
- 2.40 While information about the level of risk in Wales has improved in recent years, further enhancement is needed to identify high-risk priority areas for investment. However, the Welsh Government's progress has been held up, at least in part, due to a lack of information on assets held by Natural Resources Wales and by councils.
- 2.41 The Welsh Government established the Wales Coastal Monitoring Centre in 2010 to improve the co-ordination of coastal monitoring data collection, storage and analysis. Gwynedd Council hosted the Centre, but in recent years the Centre has been inactive although Gwynedd Council submitted a business case to the Welsh Government in 2012, and revised this business case in September 2014. The Council suggested that a consortium of councils, Natural Resources Wales, the Welsh Local Government Association, academics and the third-sector representatives should run the centre. The Wales Coastal Flooding Review recommended that the Welsh Government should make a decision on the future of the Wales Coastal Monitoring Centre, and stakeholders told us that uncertainty about the Centre's future role and remit had restricted its activities and undermined the understanding of national risk. Since early 2016, the Welsh Government has considered options and shortly expects to determine a preferred way forward for the Wales Coastal Monitoring Centre.

⁴⁵ The Welsh Government recognises that data on coastal erosion is relatively new and not always accurate.

⁴⁶ Coastal groups began revising the Shoreline Management Plans in 2011.

⁴⁷ **Flood and Coastal Risk Management in Wales 2011-2014**, Natural Resources Wales, 2014

- 2.42 The Welsh Government aims to improve its understanding of risk with a national flood risk index which combines flood and coastal erosion risk from all sources based on the likelihood of an event happening and the consequences if the event occurs. The Welsh Government plans to use the index to appraise both applications from Natural Resources Wales and councils for its Flood and Coastal Investment Programme. Developing the national flood risk index is a complex task and responses to the Welsh Government's consultation on its Flood and Coastal Investment Programme highlight a range of issues to be resolved. Stakeholders told us there are concerns that the index will be over-complicated and difficult for the public to understand. They were also concerned it may disadvantage inland councils in favour of councils where there are combined risks of coastal flooding and erosion. One stakeholder told us that the index should incorporate data on the economic impact of damage to agricultural land. The Welsh Government intends to trial the index in 2016-17, but does not know when the index will be finalised.
- 2.43 Natural Resources Wales is already using a 'Communities at Risk Register' that combines data on flooding risk from the sea and from watercourses. Natural Resources Wales is not responsible for risk from coastal erosion or from surface water and the Register did not include these risks, although it will soon do so. This Register indicates the potential impacts from these types of flooding and can inform investment decisions in areas where Natural Resources Wales has responsibility and will be used in the trial of the national flood risk index during 2016-17. The Register helps Natural Resources Wales to identify the highest priority projects, with each project assessed according to its business case and the Treasury Green Book. In this way, Natural Resources Wales prioritises and allocates funding through its Capital Programme to the highest risk areas.
- 2.44 Natural Resources Wales owns about a third of coastal defences, councils own a third and the private sector own the remaining third. Private sector owners include Network Rail, utility companies and large landowners such as the National Trust and The Crown Estate. Some coastal defences like railway embankments, highway retaining walls, beaches or sand dunes provide some protection but their owners do not recognise them, or maintain them, as flood defences. Stakeholders told us there are parts of the coast where it is difficult to determine ownership of coastal assets.
- 2.45 The Welsh Government has made little progress improving the national approach to coastal asset management, missing its own deadlines in the National Strategy to develop a register of coastal flood defence assets by 2014, and to establish a programme of regular maintenance. However, Natural Resources Wales is leading a project on coastal defences for the Coastal Review Delivery Plan and in late 2015 produced a report on options for a national defence dataset. In collaboration with the Welsh Government, the Welsh Local Government Association and councils, progress is now being made to combine data from Natural Resources Wales with data from councils.

- 2.46 Organisations responsible for managing coastal flooding and erosion do not collect information on the condition of assets in a consistent way. In 2009, we found that standards of inspection, recording and maintenance of coastal defence assets were variable although we found that Environment Agency Wales had good asset information and arrangements to inspect their assets. They still do. However, our survey in 2015 found that councils have several different approaches to asset management. Eight of the councils we surveyed reported that they had an asset management plan which sets out the location, nature and condition of their coastal assets. Some councils are using spreadsheets to manage the information, while others have invested in asset management software, although the type of software differs across Wales. Inspection regimes vary from annual or 'continuous' inspections in some areas, to ad hoc arrangements in others.
- 2.47 Natural Resources Wales has a regular programme of inspection and maintenance and has so far met its target to maintain the effectiveness of 99 per cent of its high-risk flood and coastal risk management assets during 2015-16⁴⁸. Natural Resources Wales' Communities at Risk Register uses information on the condition of coastal defences to inform its prioritisation of resources but the information only relates to the defences Natural Resources Wales is responsible for.
- 2.48 Information about coastal defence assets is not being shared effectively amongst stakeholders and there is no national overview of coastal defence assets along the coast in terms of their condition, or integrity, including the impact of climate change. Most councils responding to our survey said they do not know the condition and effective life of assets held by private or third-sector stakeholders. Stakeholders also told us that the responsibilities of some organisations for maintaining and sharing information about their assets is not clear. We understand that the Coastal Delivery Plan project led by Natural Resources Wales on roles and responsibilities aims to clarify responsibilities relating to asset management.
- 2.49 Council flooding officers suggested that shared asset management software could also improve information sharing, but Natural Resources Wales say that councils have so far been reluctant to use the software that was developed. Recent progress to combine data from Natural Resources Wales with data from councils (see [paragraph 2.45](#)) suggests progress towards creating a shared asset management database. We also consider that the Welsh Government and partners could also learn lessons from Network Rail's national approach to asset management ([Box 9](#)).

⁴⁸ Based on performance from 1 April to 30 November 2015, Natural Resources Wales Performance Progress Update 28 January 2016.

Box 9: Network Rail Coastal Defence Asset Management System

In Wales, 34 miles of Network Rail's coastal assets are vulnerable to overtopping, to coastal erosion, or to storm surges. Network Rail has a regular programme of inspection for its coastal defences and conducts a detailed annual assessment of all assets. Network Rail rates the condition of its assets from 1 to 5, and uploads information onto interactive software that shows the condition, risk, location and maintenance schedule for each asset. These asset management plans include links to local Shoreline Management Plans that show the suggested approach in each area. Where a coastal asset is made of different materials and forms of construction, each of these elements is assessed to determine its interrelationship, resilience and vulnerability to extreme weather events. If the coastal defence capability of an asset deteriorates or improves, the knock-on impact on other coastal assets updates automatically on the software.

In 2013, Network Rail started an evaluation of the UK coastline to assess the risks to their coastal defences on a national level and to inform their investment decisions. The evaluation assesses risks by considering the threats to the rail infrastructure, the consequences of weather impacts and the controls in place to manage these risks. The evaluation assesses vulnerability to weather impacts and potential future risks due to climate change. In 2014, Network Rail published the results of its evaluation in its Route Weather Resilience and Climate Change Adaptation Plan for Wales. The Plan highlights coastal defences and other asset infrastructure on the rail network where investment could increase resilience to present-day extreme weather events and the effects of future climate changes. Network Rail monitors progress against its plan every year.

The Welsh Government plans to improve governance arrangements for future funding programmes

The Welsh Government's arrangements for monitoring its coastal protection grant have been weak although some changes from April 2016 seek to improve progress reporting, and clarify benefits realised and any savings

- 2.50 In 2010, the Public Accounts Committee recommended that the Welsh Government develop a transparent methodology to assess and prioritise funding of coastal defence schemes. The Welsh Government missed its objective in the National Strategy to develop a way of prioritising funding by the end of 2013 and has made slow progress since then.
- 2.51 The Welsh Government currently allocates funding to councils based on the strength of applications for its coastal protection grant. Councils applying for funding must set out clear objectives, methods, estimated costs and the duration of the work. Applications also include a project appraisal report, cost benefit analysis and relevant consents. The Welsh Government provides project appraisal guidance for applicants based on the Treasury Green Book. The Welsh Government has two technical officers that assess applications and recommend to the Flood and Coastal Erosion Risk Manager whether each scheme should receive grant funding.
- 2.52 So far, the Welsh Government has funded all of the schemes councils have applied for under the coastal protection grant and has not had to compare risks to make a decision on funding one scheme over another. The Welsh Government is currently producing a map to show the location and amounts of its coastal protection grant funding that councils and Natural Resources Wales have spent during the period 2010 to 2015, and the areas of highest risk. The map can also help the Welsh Government to identify vulnerable high-risk locations where councils have not bid for funding, so that these risks can be effectively managed. The Welsh Government is also now able to separate information on funding for council coastal and non-coastal flood protection schemes to provide a better picture of its spending.
- 2.53 Ministerial approval is required for council schemes costing £300,000 or more but in some instances it has been found that information recording the Welsh Government's assessments of applications lacks detail in terms of the assessment, or the rationale for approving schemes. Coastal risk management projects funded through ERDF were assessed for their suitability against the Programme's eligibility criteria by the European Funding Programme Board. The Welsh Government assesses business cases and project appraisal reports submitted by councils, and the Flood Risk Management Wales Committee oversees the allocation of funding for projects in Natural Resources Wales' Capital Programme.

- 2.54 The Welsh Government has lacked sufficient arrangements for scrutiny of its coastal protection grant. Councils provide regular progress reports, but the Welsh Government's Flood and Coastal Erosion Team told us staff capacity restricts their ability to review reports and visit schemes. The Welsh Government has recently recruited an additional technical officer to help with monitoring schemes (see [paragraph 2.35](#)). Councils have not been required to produce closure reports or demonstrate the impact of coastal protection schemes, so the Welsh Government had no assurance on whether projects represent value for money, or whether they could have achieved the same results for less. The Welsh Government has introduced changes to the grant arrangements from April 2016, to improve progress reporting, to clarify the benefits realised from funding, and to show any savings.
- 2.55 The Welsh Government pays its coastal protection grant in arrears based on councils' submissions of the costs incurred. For grant claims over £100,000, the Welsh Government holds five per cent of funds until the Wales Audit Office can certify the grant claims. Certification involves checking that funding allocations match Council spending and grants claims, and that applicants are not making ineligible claims⁵⁰ but it does not assess value for money. We have not reviewed the delivery of individual council coastal protection schemes as part of this study. However, in response to concerns raised locally, auditors have been undertaking work on behalf of the Auditor General to examine issues relating to work to repair the shoreline at Llandudno North Shore and Kinmel Bay in Conwy. That improvement work followed damage to the shoreline during the winter storms of 2013-14 and was supported by Welsh Government funding.
- 2.56 The Welsh Government and councils could learn from the approach Natural Resources Wales uses to monitor its Capital Programme. Natural Resources Wales has recently reviewed the Programme using 'lean' principles⁵¹ to improve efficiency. As a result, Natural Resources Wales assesses projects at a fixed point in the year, which helps the team to build in efficiencies, such as grouping consultancy tenders together. Area teams have oversight of proposed works across Wales so they can manage competing demands for construction materials or contractors by altering timescales. Natural Resources Wales uses project management software to record monthly progress against key milestones and financial targets, and feeds data into progress reports that go to the Natural Resources Wales Capital Programme Board, their executive team and Board, Flood Risk Management Wales Committee, and to the Welsh Government.

⁵⁰ Since 2009, our certification work has not found major issues for the coastal protection grant.

⁵¹ Lean thinking aims to maximise value and minimise waste by focusing on the key processes in an organisation to improve efficiency.

The Welsh Government's plans for its Coastal Risk Management and Flood and Coastal Investment Programmes have the potential to improve decision making and monitoring of coastal spending

- 2.57 The Welsh Government is developing governance arrangements for the Coastal Risk Management Programme and has put in place a Board to ensure the Programme delivers its objectives, is accountable for investment and achieves expected benefits. Members of the Board include Natural Resources Wales, the Welsh Local Government Association and a range of Welsh Government departments. The Board will overview the Programme and its projects, with the Welsh Government reviewing the detail of applications for funding and making recommendations about suitable projects. As noted in [paragraph 2.34](#), the Programme is also part of a 'Gateway Review' process to review progress through the lifetime of the Programme.
- 2.58 Emerging plans for the Welsh Government's Flood and Coastal Investment Programme include similar board arrangements to oversee progress. Organisations in receipt of funding would be responsible for monitoring individual schemes using updated project appraisal guidance to be produced by the Welsh Government, with the aim of ensuring value for money and the incorporation of wider well-being benefits. The Welsh Government consulted stakeholders on its plans for the Programme in December 2014 but has yet to finalise delivery arrangements.
- 2.59 The Flood Risk Management Wales Committee currently oversees the Natural Resources Wales Capital Programme, but will be replaced in October 2016 by a new Flood and Coastal Erosion Committee. The Welsh Government intends the new committee to advise Ministers on the risks and benefits of all sources of flooding and erosion. The Welsh Government is not yet clear how the new committee will fit into governance arrangements for its Coastal Risk Management or Flood and Coastal Investment Programmes.

Lack of capacity within the Welsh Government and councils has delayed progress and threatens to undermine the long-term approach to managing the risks of coastal flooding and erosion

- 2.60 In 2010, the Public Accounts Committee recommended that the Welsh Government should ensure that sufficient resources, including technical and project management capacity are available to manage coastal flooding and erosion. Some progress has been made in assessing skills and capacity gaps, but capacity issues remain, for the Welsh Government and councils.
- 2.61 The Welsh Government's Flood and Coastal Erosion Risk Management team currently employs 6.6 full-time equivalent staff. Stakeholders regarded the Welsh Government team as understaffed and considered that delays in policy development and decisions on managed retreat were due to a lack of capacity.

- 2.62 In response to a recommendation of the Wales Coastal Flooding Review, the Welsh Local Government Association and Natural Resources Wales conducted a skills audit in the summer of 2015⁵². The audit found that councils are not replacing vacant positions and that 20 per cent of the workforce could retire in the next 10 years. The skills audit found that due to a lack of capacity and funding, officers are increasingly becoming generalists, covering a wide range of work and most scored their abilities in managing flood risk as 'basic' or 'capable' rather than 'specialist'. The Welsh Local Government Association intends to work with the Welsh Government, Natural Resources Wales and councils to address skills and capacity gaps. Skills and capacity issues in both the Welsh Government and councils threaten to undermine the long-term approach if not addressed adequately.
- 2.63 Staff numbers vary across councils in Wales. While some variation reflects different levels of flood risk across Wales, current staffing levels may not be sufficient to manage the risks effectively in some councils. Many councils employ less than one full-time equivalent to manage all types of flooding risk and in several instances, employees are responsible for a range of other duties. Over half of the flooding officers that responded to our survey did not think their council had adequate capacity to develop the local strategic approach, or design and deliver solutions to manage coastal flooding or erosion.
- 2.64 The Local Government (Wales) Bill 2015 makes preparations for local government reform in Wales which could, if progressed, see the number of councils in Wales reduced. Local government reform could impact on local capacity to manage flood risk but also present opportunities for efficiency savings through joint working and to consolidate experience across Wales.
- 2.65 Natural Resources Wales currently employs 280 people to work in all aspects of flood risk, including coastal flooding and erosion⁵³. While there were additional pressures arising from the creation of Natural Resources Wales in 2013, the organisation has discharged its flood risk management functions effectively and responded well to the challenges of the winter floods in 2013-14. In December 2015, the Welsh Government confirmed to Natural Resources Wales a cash-terms reduction of five per cent for its flood risk management activities. Funding pressures and new statutory responsibilities associated with the Well-being of Future Generations (Wales) Act 2015 and Environment (Wales) Act 2016 will create challenges for Natural Resources Wales in the future which may restrict its ability to manage flood risk effectively. Our report on the development of Natural Resources Wales⁵⁴ recommended that Natural Resources Wales should manage funding pressures and expectations about its role by agreeing key delivery priorities with the Welsh Government and stakeholders.

⁵² The Welsh Local Government Association conducted a previous skills audit in 2012 and subsequently delivered training workshops with Natural Resources Wales to aim to address skills gaps identified in the audit.

⁵³ These are full-time equivalents. Natural Resources Wales is unable to separate staffing figures for coastal flooding and erosion and other types of flooding because staff have a range of responsibilities.

⁵⁴ **The Development of Natural Resources Wales**, Wales Audit Office, February 2016.

Appendices



Appendix 1 - Audit Methods

Document Review

We have reviewed a range of documents published or provided by the Welsh Government including:

- the National Strategy for Flood and Coastal Erosion Risk Management in Wales, 2011 and information about the development of a national strategy;
- evaluations of previous initiatives including the New Approaches Programme and individual coastal protection schemes;
- financial information including budgets and spending on coastal flooding and erosion;
- information relating to the Welsh Government's coastal protection grant; and
- documents setting out emerging plans for the Welsh Government's Flood and Coastal Investment Programme and Coastal Risk Management Programme.

We also reviewed documents from Natural Resources Wales including:

- documents relating to the Wales Coastal Flooding Review and subsequent delivery plan;
- performance reporting under section 18 of the Flood and Water Management Act 2010;
- information relating to the Flood Risk Management Wales Committee including minutes and reports;
- information relating to Natural Resources Wales' capital programme;
- evaluations of Flood Awareness Wales and community engagement activities; and
- information on individual coastal protection schemes.

Interviews

We interviewed a range of people including Welsh Government Officials, flood risk management staff at Natural Resources Wales, and representatives from Fairbourne Facing Change, the coastal groups, Network Rail, and the Welsh Local Government Association. We also met council flooding officers at Ceredigion, Gwynedd, Monmouthshire, Newport, Pembrokeshire, and Swansea councils.

We also wrote to other stakeholders including academics and coastal engineering consultants, NFU Cymru, the National Trust, Welsh Water, national parks, port authorities, trunk road agencies and the Met Office to invite their views.

Survey of councils

We conducted a survey of councils in Wales with a coastline⁵⁵ during the spring and summer of 2015. The survey asked about councils' approach to coastal flood and erosion risk management and sought views on the national approach.

We also reviewed information on councils' management of coastal flooding and erosion including:

- strategic documents including Shoreline Management Plans, Local Flood Risk Management Strategies and Plans, Local Development Plans, and Asset Management Plans;
- scrutiny and cabinet reports on coastal flooding and erosion;
- staffing levels;
- consultation and community engagement activities; and
- information relating to individual coastal protection schemes.

We were unable to obtain consistent information to analyse councils' capital and revenue expenditure on coastal flooding and erosion over and above funds provided by the Welsh Government or through European Union funding.

⁵⁵ Bridgend, Cardiff, Carmarthenshire, Ceredigion, Conwy, Denbighshire, Flintshire, Gwynedd, Isle of Anglesey, Monmouthshire, Neath Port Talbot, Newport, Pembrokeshire, Swansea, and the Vale of Glamorgan councils. The Isle of Anglesey County Council and Vale of Glamorgan Council did not respond to the survey.

Appendix 2 - Wales Coastal Flooding Review

The **Wales Coastal Flooding Review**⁵⁶ examined the impacts of the winter floods during December 2013 and January 2014 across Wales in two phases. Natural Resources Wales conducted the review, with input from the organisations responsible for coastal flooding and erosion risk management in Wales at the request of the then Minister for Natural Resources and Food. The first phase of the review looked at the effects of the flooding and phase two at the lessons learnt from both events. The Phase Two Report includes 47 recommendations relating to the strategic and operational aspects of coastal flood risk management. The recommendations have been grouped into 10 projects to be addressed in the Wales Coastal Flooding Review Delivery Plan (2015).

- Project 1 – Flood forecasting and coastal design: to improve the accuracy of flood forecasts.
- Project 2 – Flood warning and forecasting: to improve the information used for flood warnings.
- Project 3 – Community resilience: working with communities to improve their resilience to flooding.
- Project 4 – Operational response: to improve the joint response to flooding events.
- Project 5 – Coastal defences: to review defences in high-risk areas to ensure defences are fit for purpose.
- Project 6 – National coastal defence dataset and inspections: to produce a national dataset of coastal defence assets and the areas they protect. The project will also identify options for a more consistent approach to inspecting coastal defences.
- Project 7 – Skills and capacity audit and roles and responsibilities: to carry out an audit of organisations responsible for managing coastal flooding and erosion to assess and develop options to address potential skills and capacity gaps. The project also aims to clarify roles and responsibilities amongst key stakeholders.
- Project 8 – Coastal Groups: to review the role of the Welsh Coastal Groups.
- Project 9 – Coastal adaptation: to improve support to communities to adapt to increasing risks and respond to local Shoreline Management Plan policies.
- Project 10 – Infrastructure resilience: to improve the way that organisations responsible for managing coastal flooding and erosion work with infrastructure and utility operators to increase resilience.

⁵⁶ **Wales Coastal Flooding Review Phase One and Two Reports**, Natural Resources Wales, 2014. The review was led by Natural Resources Wales with contributions from councils and other organisations responsible for managing flood risk.

Appendix 3 - Welsh Government funding for flood and coastal erosion risk management from 2010-11 to 2016-17

The table shows sources of Welsh Government and European Union funding for flood and coastal erosion risk management from 2010-11 to 2016-17. The real-terms value of this funding is shown alongside the cash allocated.

	Welsh Government funding ^{1,2}						Total funding	
	Core flood and coastal erosion risk management budget		Additional Capital funding Received in Year ⁴		European Regional Development Fund		Cash terms	Real terms
	Cash terms	Real terms	Cash terms	Real terms	Cash terms	Real terms		
2010-11	38.6	41.36	5.8	6.21	17.1	18.32	61.5	65.90
2011-12	36.7	38.72	5.7	6.01	9.5	10.02	51.9	54.76
2012-13	35.7	36.99	11	11.40	6	6.22	52.7	54.61
2013-14	37.1	37.66	14	14.21	6.1	6.19	57.2	58.06
2014-15	36.93	36.93	13.5	13.50	1.5	1.50	51.93	51.93
2015-16	36.58	36.51	10.5	10.48	3	2.99	49.81	49.71
2016-17 ³	34.45	33.87	21.21	20.86	N/A	N/A	55.86	54.93

Notes

- 1 Figures include capital and revenue funding.
- 2 Revenue funding includes funding for councils to manage all sources of flooding and erosion through the Lead Local Flood Authority Grant, funding to help councils produce Local Flood Risk Management Strategies and revenue funding for Natural Resources Wales.
- 3 Figures for 2016-17 also included a £4.21 million additional allocation to specific projects (Porthcawl Town Beach and Boverton) and £9.2 million of consequential funding due to Barnett Formula funding adjustments made after the 2015 flooding in England. The Welsh Government anticipates that all of this consequential funding will be included in the core Flood and Coastal Erosion Risk Management budget for 2016-17, although other departments undertaking flood work could also receive some of this funding.
- 4 Additional capital funding received in-year includes the Strategic Capital Investment Fund, which in 2011-12 became the Wales Infrastructure Investment Plan, as well as divisional transfers and in-year additional funding.

Appendix 4 - Applying the sustainable development principle

The Well-being of Future Generations (Wales) Act 2015 places a duty on specified public bodies, including the Welsh Government, Natural Resources Wales and councils, to act in accordance with the sustainable development principle and to demonstrate that they are doing so. This means acting in a manner which seeks to ensure that the needs of the present are met without compromising the ability of future generations to meet their own needs.

Public bodies need to be able to demonstrate how they are working to improve the economic, social, environmental and cultural well-being of Wales in the context of the following seven well-being goals:



Source: Welsh Government

There are five things that public bodies need to think about to show that they have applied the sustainable development principle:

- **Long-term** – The importance of balancing short-term needs with the need to safeguard the ability to meet long-term needs, especially where things done to meet short-term needs may have a detrimental long-term effect.
- **Integration** – The need to take an integrated approach, by considering how:
 - the body’s well-being objectives may impact upon each of the well-being goals; and
 - the body’s well-being objectives may impact upon each other or upon other public bodies’ objectives, in particular where steps taken by the body may contribute to meeting one objective but may be detrimental to meeting another.
- **Involvement** – The importance of involving other persons with an interest in achieving the well-being goals and of ensuring those persons reflect the diversity of the population of:
 - Wales (where the body exercises functions in relation to the whole of Wales); or
 - the part of Wales in relation to which the body exercises functions.
- **Collaboration** – How acting in collaboration with any other person (or how different parts of the body acting together) could assist the body to meet its well-being objectives, or assist another body to meet its objectives; and
- **Prevention** – How deploying resources to prevent problems occurring or getting worse may contribute to meeting the body’s well-being objectives, or another body’s objectives.

In particular, for coastal flooding and erosion, well-being assessments should include consideration of:

- the future impacts of coastal flooding and erosion on communities, business and infrastructure, and
- how well-being objectives address coastal flooding and erosion issues.

Wales Audit Office

24 Cathedral Road

Cardiff CF11 9LJ

Tel: 029 2032 0500

Fax: 029 2032 0600

Textphone: 029 2032 0660

E-mail: info@audit.wales

Website: www.audit.wales

Swyddfa Archwilio Cymru

24 Heol y Gadeirlan

Caerdydd CF11 9LJ

Ffôn: 029 2032 0500

Ffacs: 029 2032 0600

Ffôn Testun: 029 2032 0660

E-bost: info@archwilio.cymru

Gwefan: www.archwilio.cymru