

Natural Resources Wales Flood Risk Management Plan: National overview

Foreword

Managing the risks from flooding is important. Many of us will have had some touchpoint with flooding, be it through direct experience ourselves, or via a family member or friend, or indirectly through the news coverage and reporting. The impacts can be truly devastating, not just on physical harm to people and property, but also the mental health impacts can be deep and long-lasting, as can the impact on livelihoods, jobs, communities and on the environment around us.

Flooding is a natural process, and whilst we cannot stop the rain and all flooding, we can undertake actions to help manage the risks, and Natural Resources Wales has a key role to play. Flooding is a complex issue, and there is no one single solution; it requires a range of actions and interventions from a range of key partners as well, such as Local Authorities, Water Companies and Welsh Government departments, as well as from communities themselves. We all need to work together to tackle the issues. We also need to take an adaptive approach and be ready to adjust in response to the science and predictions, and the evidence on the ground.

The task is challenging though, in the face of a changing climate and more extreme weather events. We are seeing this now, and all the predictions are that it will get worse. Floods are going to happen more frequently in the future. They are also often going to be more widespread and more severe in their nature, causing more hazards – flooding happening more quickly, with deeper and faster flowing water, for example. More people and properties will be at risk of flooding. Also, as NRW's new Corporate Plan spells out, as well as a climate emergency, there is a nature emergency and we need to look to optimise interventions that deliver on both agendas, as they are so intrinsically linked.

This Flood Risk Management Plan explains our priorities and our intended actions across Wales over the next 6 years, for the areas of flooding for which we have lead responsibilities. It sits alongside the plans of others who also have responsibilities, such as Local Authorities and Welsh Government. We all need to work together to tackle the challenges ahead.

This Plan explains how we need to continue to invest in and improve our existing systems, such as our network of flood defences and our flood warning system, to help manage the risks. But it also explains how we need to do more to adapt to the inevitability of flood risk and build resilience to manage the impacts when it does happen. There is much to do, and this Plan helps articulate what, and how, we are planning to deliver our part.

Jeremy Parr

Head of Flood and Incident Risk Management

November 2023

Contents

1. Introduction	4
2. Purpose of the FRMP	5
3. Flood Risk Management in Wales	9
4. Present day flood risk in Wales.....	15
5. Future flood risk in Wales	19
6. What we have delivered since the first cycle FRMPs.....	24
7. Flood Risk Management Plan – Objective and Priorities	26
8. Flood Risk Management Plan – National measures	28
9. Flood Risk Management Plan National Measures	30
10. Monitoring and review.....	40

1. Introduction

Natural Resources Wales (NRW) is the largest Welsh Government Sponsored Body, and we have as our core purpose the sustainable management of natural resources in Wales. NRW's vision for the future of Wales is to have nature and people thriving together, through our corporate plan, which sets our strategic direction until 2030, we have set out wellbeing objectives to develop a Wales where

- nature is recovering
- nature and communities are resilient to climate change
- pollution is prevented

This plan sits within the strategic context of these ambitions and sets out how we intend to deliver over the next six years. The objective, priorities and measures identified within this plan directly support our aspirations and purpose to tackle the global Nature and Climate Emergency and the impacts it will have on Wales and to support its communities.

We have a range of roles and responsibilities, ranging from regulator to advisor, landowner and operator and emergency responder. We have a strategic oversight role for flood and coastal erosion risk management which involves the general supervision and communication of flood and coastal erosion risk management in Wales. We also have powers to manage flooding from main rivers, reservoirs and the sea.

In Wales, there are estimated to be 245,118 properties at risk of flooding from the sea, rivers and surface water. This is approximately 1 in 8 properties in Wales. We take a risk-based approach to managing the risk of flooding through the activities we do.

This Flood Risk Management Plan (FRMP) covers all of Wales and provides information on the scale of flood risk, as well as NRW's priorities in managing the risk of flooding, and measures that we propose to take, over the next six years. This FRMP covers flooding from rivers, reservoirs and the sea. It does not include flooding from surface water and smaller watercourses, for which Lead Local Flood Authorities (LLFAs) have powers and take the lead.

2. Purpose of the FRMP

The [Flood Risk Regulations \(2009\)](#) set out a framework for effective management of flood risk in England and Wales. NRW has a duty to identify areas at risk of flooding via a [Preliminary Flood Risk Assessment \(PFRA\)](#) and then to produce [Flood Hazard and Flood Risk Maps](#). NRW then has a duty to produce a FRMP outlining its intended objectives and measures for managing flood risk identified within these earlier phases. This FRMP is therefore fulfilling our requirements under section 25 of the Flood Risk Regulations (2009).

Our previous (first cycle) FRMPs were produced in 2016 at River Basin District (RBD) scale and covered the Western Wales, the Severn and the Dee. The Severn and the Dee FRMPs were produced jointly with the Environment Agency. This time around we are taking a different approach by taking a Wales-wide view for our FRMP. Within this, we continue to work closely with the Environment Agency to ensure that we are taking an integrated approach to how water is managed in our shared catchments.

This FRMP provides an overview of where is at risk of flooding in Wales and will direct you to where you can find out further information from our interactive maps. It sets out our national Wales-wide Objective, Priorities and Measures for managing the risk of flooding and provides further information on the level of risk, including what we have planned for the communities with the greatest flood risks.

By taking an all-Wales approach to this FRMP, we can ensure that we are prioritising our work and directing our efforts to where is at greatest risk of flooding. This is possible through the use of our Wales wide Communities at Risk Register (CaRR) that considers a number of factors to identify the locations (communities) at greatest risk of flooding (see further detail on “how we plan and prioritise our work” below). The CaRR is used to inform, plan and prioritise our investment programme to target investment in the most at risk communities. It is not an absolute ranking of risk, it is an indicator of relative significance of risk from location to location. We use this in combination with other factors, such as recent flood history, to plan our programmes of flood risk management work.

The CaRR was used to inform the identification of [Flood Risk Areas in the 2018 PFRA reports](#). Where these areas are still high risk, this FRMP will describe what actions we are taking in these areas, along with other communities that we feel require action. The levels of risk for some communities that were designated Flood Risk Areas through the PFRA stage in 2018 may have changed due to improvement works we have undertaken since the PFRA was produced. Where this is the case, we will describe actions taken and the impact they have had in the Place (NRW Operational Areas) sections of this FRMP.

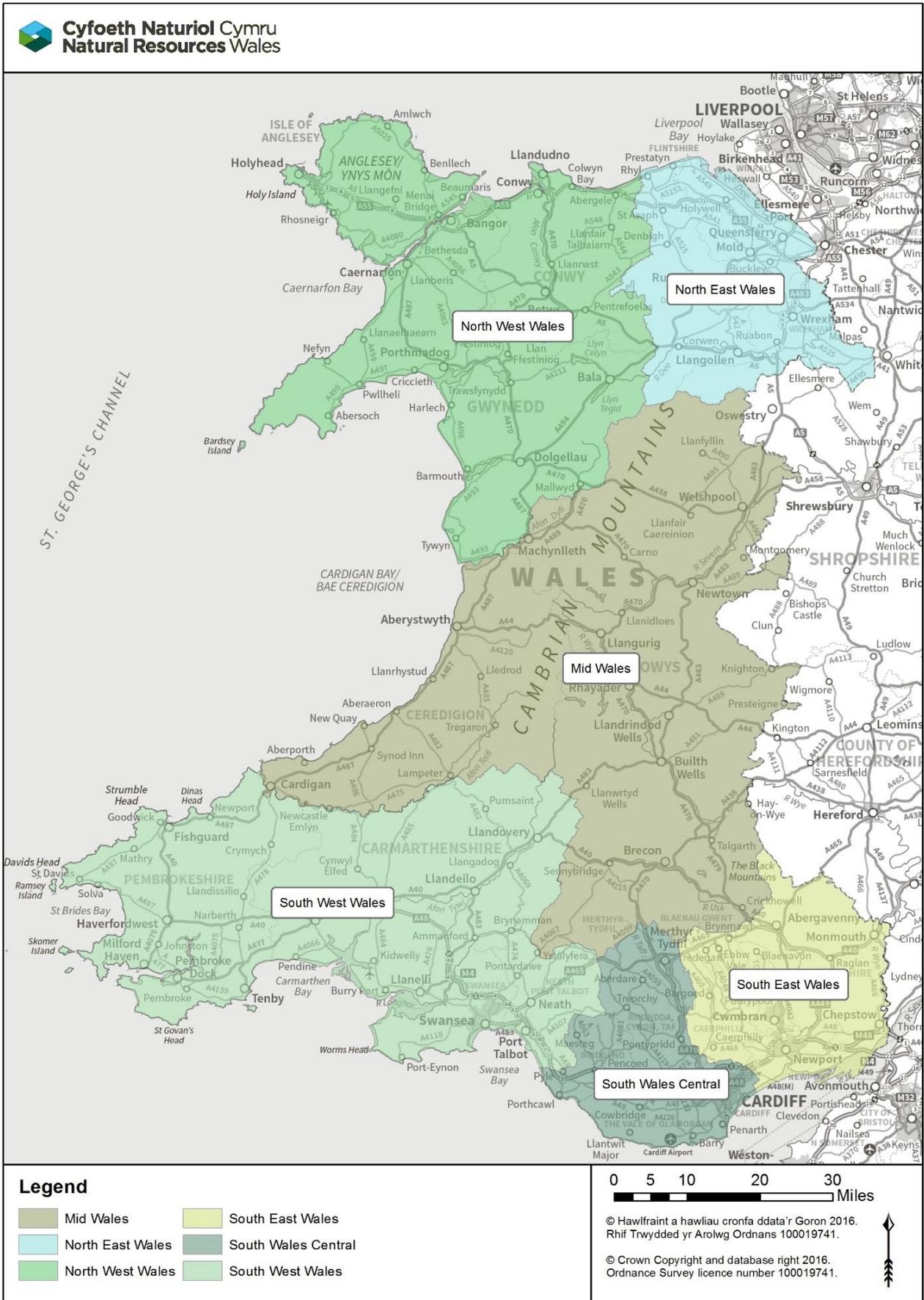
How to use this FRMP

This FRMP is split into two sections. In the first section, you will find our objective, priorities and measures set at the National (Wales) level. The second section is split according to NRW Operational areas, also known as NRW Places, where you will find more detailed information and measures at the local scale. The 6 NRW Places covered in this second section of the FRMP are listed below and are shown in Figure 1:

- North East Wales
- South East Wales

- North West Wales
- Mid Wales
- South Central Wales
- South West Wales

Figure 1 shows the six NRW Places covered in the second section of this FRMP.



The intention of presenting the information in this way is so that you can read the FRMP in its entirety if you wish to get the full understanding of the flood risk management work that is planned across Wales, or you can access just the Place section that is relevant to you (e.g. where you live) for the local measures. The national Wales-wide Objective, Priorities and Measures are not repeated in each of the Place sections.

The FRMP is accompanied by a Strategic Environmental Assessment (SEA). The scope of the SEA has been consulted on with statutory consultees and the approach is consistent with the FRMP itself. The Environmental Report documents the potential beneficial and adverse effects of the draft FRMP at a national scale. It also contains an appendix for each Place each of which considers the opportunities and constraints associated with the local FRMP measures.

The SEA considers how well the FRMP aligns with, and delivers, the Sustainable Development (SD) and Sustainable Management of Natural Resource (SMNR) principles and outcomes. It therefore not only assesses the environmental effects of the FRMP, but is a valuable tool to demonstrate how the FRMP is also delivering and promoting:

- The national priorities set by the Natural Resources Policy (NRP) and the [State of Natural Resources Report for Wales](#) (SoNaRR) 2020 evidence, aims, trends and factors.
- Section 6 of the [Environment \(Wales\) Act \(2016\)](#) – which places a duty on NRW to maintain and enhance biodiversity and ecosystem resilience while undertaking its functions.

and in doing so, contributing to [NRWs wellbeing objectives](#).

A Habitats Regulations Assessment (HRA) has also been undertaken for the FRMP, and has informed the SEA. We will consult with NRW and Natural England as Appropriate Nature Conservation Bodies (ANCBs) on the HRA.

3. Flood Risk Management in Wales

NRW's Corporate Plan

In light of the extreme challenges that Wales is facing from the ongoing Nature and Climate Emergency, we have set ourselves wellbeing objectives which set out our vision for a future Wales where

- Nature is recovering
- Nature and communities are resilient to climate change
- Pollution is prevented

Our corporate plan sets the strategic direction for how NRW will respond to these key issues up until 2030. This FRMP sits directly beneath the objectives set out within this vision for a future Wales, the FRMP priorities and measures set out in this plan directly support the delivery of the above ambitions. They provide detail on the steps NRW intends to take in response to the Nature and Climate Emergency and outline the timescales we intend to deliver these actions.

Welsh Government National Flood and Coastal Erosion Risk Management Strategy

The [Welsh Government National Flood and Coastal Erosion Risk Management Strategy](#) ('the Strategy') provides the framework for flood and coastal erosion risk management in Wales. The framework is centred around an aim, five key objectives and the measures to achieve those objectives.

The aim of the strategy is to 'reduce the risk to people and communities from flooding and coastal erosion'.

The aim is supported by five objectives that complement and overlap each other with the intention of reducing the risk to life.

- A. Improving our understanding and communication of risk
- B. Preparedness and building resilience
- C. Prioritising investment and to the most at risk communities
- D. Preventing more people becoming exposed to risk
- E. Providing an effective and sustained response to events

NRW plans and implements interventions for sources of flood risk in our remit (flooding from main rivers, reservoirs and the sea) within the framework set out by the Strategy, to achieve the aims and objectives above. This means we prioritise our efforts in those communities

that are at greatest risk of flooding and we follow the Strategy's emphasis on reducing flood risks for homes over other potential receptors.

The Strategy includes guidance on the range of interventions that can be used to manage flood risk, including hard defences, catchment approaches (including Natural Flood Management), and the range of other activities such as development control, flood warnings and awareness raising activities

NRW flood risk management responsibilities

The NRW Flood Risk Management (FRM) service includes all activities carried out by NRW in accordance with duties and responsibilities assigned by Welsh Government and by legislation. These activities are carried out by staff located across Wales.

In summary, these FRM activities are:

- The management of flood risk assets
- Reservoir management and regulation
- Flood forecasting and issuing warnings
- Hydrometry and Telemetry, Hydrology and Geomorphology
- Community engagement and resilience
- Understanding and analysing flood risk
- Flood risk advice, permitting, compliance and enforcement
- Responding to flood incidents
- Strategic planning and oversight of investment

All of the above activities come together to deliver the aims and outcomes set out within the Strategy. Management of flood risk relies on a mixed and collaborative approach applied within all of these activities, with no single approach to managing flood risk likely to be effective in isolation.

Links to other plans and strategies

This FRMP has been produced by NRW. We have engaged with the Environment Agency to ensure that we have taken an integrated approach to how water is managed across the whole of our shared catchments (the Severn and Vyrnwy, the Dee and the Wye). We have also engaged with our LLFA partners who are working to update their Local Flood Risk Management Strategies (and in some instances also produce a FRMP), to identify potential areas of overlap and opportunity.

We have worked with those producing the updated River Basin Management Plans (RBMPs) for Wales to ensure that our FRMP compliments and contributes to the continued improvement of the water environment, particularly through the opportunity catchments that have been identified as part of the RBMPs.

By being set at the Place scale, this plan also links to NRW's [Area Statements](#) by highlighting the key flood risk issues in each particular Area Statement locality. The key priorities identified within each Area Statement clearly align with the effective management of flood risk in each Place, with relevant themes of such as "Climate Readiness" "Resilience"

“Adapting to Climate Change” evident throughout the Area Statements. The Marine Area Statement is also relevant with adaptation at the coast a key challenge highlighted.

This FRMP sits alongside the second edition [Shoreline Management Plans \(SMP2s\)](#) that cover the coast of Wales. SMP2s set the strategic direction for the management of the coast over the next century and are non-statutory policy documents for coastal defence management planning. They provide a large-scale assessment of the risks associated with coastal evolution and present a policy framework to address these risks to people and the developed, historic and natural environment in a sustainable manner. The SMP2s remain as plans in their own right and where applicable and appropriate, certain sea flooding actions have been brought forward into this FRMP to provide a complete picture for a community of the measures that we propose to take to manage flood risk. Over the course of this FRMP, we will move into the second epoch for SMP2s so we will begin to consider what these policy changes mean for our work. We have National measures (measures WA9.7 and WA9.8) that cover the coastal adaptation planning and action that will be undertaken.

How we plan and prioritise our work

We have developed a tool to help identify the locations of greatest risk of flooding in Wales. This is called the Communities at Risk Register (CaRR), utilising the evidence provided by the [Flood Risk Assessment Wales \(FRAW\) maps](#). The methodology applied is taken from [research](#) carried out by the Department of the Environment, Fisheries and Rural Affairs (Defra), calculating risk to population based on flood hazard and the vulnerability of both people and area.

The CaRR uses outputs from the FRAW flood models to consider the number of people at risk, the hazard they are exposed to over a range of probabilities, the speed of onset of flooding and their ability to respond in terms of social vulnerability to flooding. It also uses factors such as availability and standard of flood warnings and flood defences.

Welsh Government prioritise flood risk projects in Wales utilising the CaRR as well as other factors such as the recent history of flooding, the number of homes affected, opportunities for partnership funding and the delivery of wider project benefits. NRW therefore use these factors to inform, plan and prioritise our investment programme to target investment in the most at risk communities. The CaRR is used to prioritise communities in the Place sections of this FRMP.

There is also a facet of Natural Resources Wales work which is reactive to severe weather events, where damage may have occurred, leading to the need for emergency works. All major flood alleviation schemes in Wales undergo appraisal work to assess options and to understand the costs and benefits of progressing work. This is done in accordance with [Welsh Government’s Flood and Coastal Erosion Risk Management Business case guidance](#).

Reservoirs

The significant flood risks from reservoirs are managed by a strong regulatory regime that is focused on reducing the likelihood of failure to a very low level, as the consequences of a dam failure are clearly very significant indeed. NRW is the enforcement authority for the Reservoirs Act 1975 in Wales, and has the powers to regulate owners and operators of large

raised reservoirs in Wales to ensure they comply with the law (further information can be found on NRW's [website](#)).

The purpose of the Reservoirs Act 1975 is to reduce the risk to the communities downstream of these reservoirs as a consequence of an uncontrolled release of water. It requires these reservoirs to be registered with the enforcement authority (Natural Resources Wales) and places supervision and inspection duties on the reservoir owners or managers. NRW as the responsible authority maintains a record of all inspections and regulates that all measures are carried out in a timely fashion as required by qualified engineers.

In Wales, the Reservoirs Act 1975 was amended by Schedule 4 of the Flood and Water Management Act in 2016. The objective of these amendments was to broaden and further embed a risk-based approach to reservoir management in the interest of public safety. Schedule 4 also reduced the threshold for reservoirs coming under the Reservoirs Act 1975 in Wales from 25,000 cubic metres to 10,000 cubic metres.

In addition, NRW have produced flood maps to show the extent and consequence of flooding in a worst credible case scenario following the failure of a reservoir. Maps are produced for each dam break scenario to show flooding during “dry day” and “wet day” scenarios so we can establish the incremental impacts caused by the failure of a dam over and above a fluvial flood. Where a reservoir has multiple dams, a set of maps has been produced for each dam. These measures have further strengthened the reservoir regulatory regime in Wales.

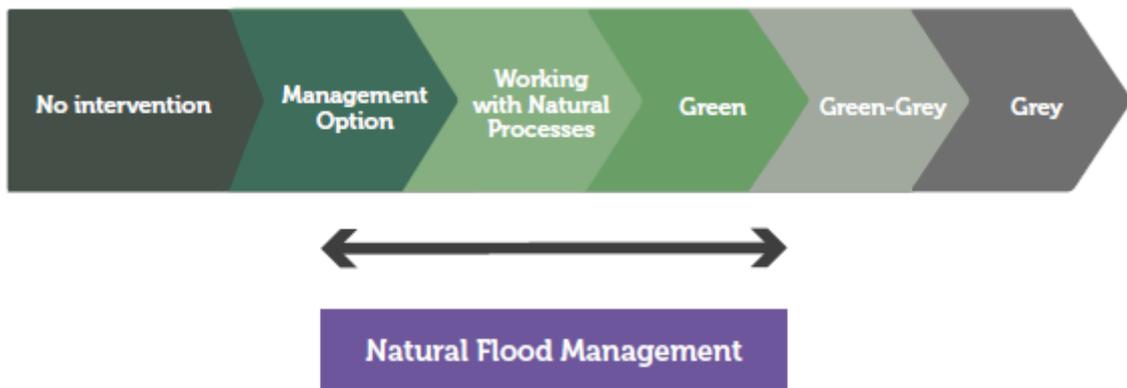
Given that reservoirs pose a different type of risk (very high consequence, low probability from dam failure) compared to flooding from rivers or the sea, and that there is a specific regulatory regime in place which is very precautionary with a very low threshold of risk appetite, no Flood Risk Areas for reservoirs have been identified during the Preliminary Flood Risk Assessment. Therefore, reservoir flooding is not considered in the same way as flooding from rivers and the sea in this FRMP and relatively few reservoir specific flooding measures are identified.

Natural Flood Management

The Welsh Government Natural Resources Policy highlights nature-based solutions as a priority for the sustainable management of natural resources. Natural Flood Management (NFM) is a nature-based solution to help reduce flood risk and complements other flood risk management approaches. When delivered correctly can also provide many co-benefits, such as habitat creation, carbon storage, water quality improvement, and help increase drought resilience.

The Welsh Government National Strategy for Flood and Coastal Erosion Risk Management in Wales promotes NFM, highlighting the multiple benefits it delivers as well as setting direction to see more delivered in Wales. The Strategy defines NFM as measures which include both working with natural processes and green infrastructure as shown in the continuum below (Figure 2)

Figure 2 Option appraisal continuum from the Welsh Government National Strategy for Flood and Coastal Erosion Risk Management, October 2020



Working with natural processes involves working across the landscape to protect, restore or mimic the natural hydrological processes. This includes increasing infiltration of water, slowing the flow of water across the landscape, storing water, and holding back sediment. Green and Green Grey measures tend to focus on areas in and around the receptors at risk and are usually used in combination with other (engineered) measures to help improve water quality, morphology, and ecosystem resilience alongside reducing the risk of flooding to people and communities.

As an organisation we want to lead by example, delivering our corporate objectives to protect and enhance nature, respond to the climate emergency, and minimise pollution. The implementation of NFM measures has the potential to deliver against these objectives and we use the above continuum to support our decision making when working to reduce the risk and increase resilience to flooding. NRW is responsible for managing the risk and impacts of flooding from main rivers with resources and funding directed to communities most at risk. NFM can play an important role, complementing all the other actions outlined in this plan, but NFM may not be suitable for all main river catchments as it is generally shown to be more effective in areas located close to smaller watercourses, or to address surface water flooding.

NRW recognise catchment scale NFM is an important part of an integrated flood risk management approach, and considering the environmental co-benefits, it is key for improving overall catchment resilience. Delivery of catchment NFM requires effective collaboration across organisations and between partners, stakeholders, and landowners who all have a role in promoting, supporting, and delivering activities to reduce the risk and impacts of flooding. NRW are working in the following ways to progress the implementation of NFM in Wales.

- taking opportunities to embed nature based solutions within our FRM activities, where its appropriate and effective to do so
- seeking opportunities through our work on the Welsh Government Woodland Estate
- working with partners to deliver catchment approaches

- influencing wider policies and strategies to support our role in managing flooding from main rivers
- supporting activities that deliver the sustainable management of natural resources.

Flood risk descriptions

River flooding happens when a river cannot cope with the amount of water draining into it from the surrounding land, typically as a result of the intensity and duration of rainfall impacting a catchment. Sea or tidal flooding happens when sea levels are high, usually due to a combination of peak high tides and stormy conditions. We describe the amount of risk to each property as the likelihood or 'chance' of flooding. There are three risk categories:

If something is described as being at '**high**' risk of flooding, this means that each year, there is a chance of flooding of greater than 1 in 30 (3.3%).

If something is described as being at '**medium**' risk of flooding, this means that each year, there is a chance of flooding of between 1 in 100 (1%) and 1 in 30 (3.3%) for rivers or between 1 in 200 (0.5%) and 1 in 30 (3.3%) for flooding from the sea.

If something is described as being at '**low**' risk of flooding, this means that each year, there is a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%) for rivers or between 1 in 1000 (0.1%) and 1 in 200 (0.5%) for flooding from the sea.

The numbers used throughout the rest of this section have been split up into risk from rivers and from the sea. In reality, some properties can be susceptible to both flooding from rivers and the sea, but this can complicate explanations and data presentation so river and sea flood risk are covered separately. Of course, some properties can be at risk of surface water flooding too, this is not included in this NRW FRMP, as Local Authorities lead on this type of flooding.

The properties at risk figures and the communities identified as being most at risk of flooding provided throughout this FRMP reflect our understanding of flood risk without flood defences. This is to portray a true scale of flood risk in Wales and to reflect that any flood defence can be overwhelmed in conditions that exceed what it was designed to accommodate.

4. Present day flood risk in Wales

NRW has powers for managing flood risk from rivers and the sea, and the following section contains information on what and where is at risk of flooding from these sources across Wales, now and in the future. More detailed information about the flood risk from rivers and the sea in each Place can be found in each Place section.

Lead Local Flood Authorities (Local Authorities in Wales) lead on, and have powers for, local flood risk including surface water flooding, so please contact your Local Authority for more information about these sources of flooding.

Across Wales, there are 71,042 properties at risk of flooding from the sea and 90,170 properties at risk of flooding from rivers. This equates to an estimated 191,000 people at risk of flooding from the sea and an estimated 242,000 people at risk of flooding from rivers. In some locations people may be at risk from a combination of these sources.

Where is at risk of flooding from main rivers and the sea in Wales now?

We first published our new FRAW maps in October 2020. FRAW is a new national risk assessment for flooding from rivers, the sea, surface water and small watercourses which categorises locations into high, medium and low areas of risk. It also displays extra information, such as flood defence locations and the local benefits they bring. FRAW maps underpin all of our flood risk management work by showing where and what is at risk of flooding. The risk information within the FRAW maps directly feeds into the CaRR, which is used to prioritise our work and is reflected in this FRMP in the Place sections.

The following maps show the communities across Wales that are at greatest risk of flooding from rivers and the sea. For the most up to date maps, and the ability to zoom in, please visit the interactive maps available on our website: [check your flood risk by postcode](#) and [check your flood risk on a map](#).

Figure 3 shows the communities that are at greatest risk of flooding from rivers. Those communities that are shaded red or orange are most at risk and those that are green are least at risk.

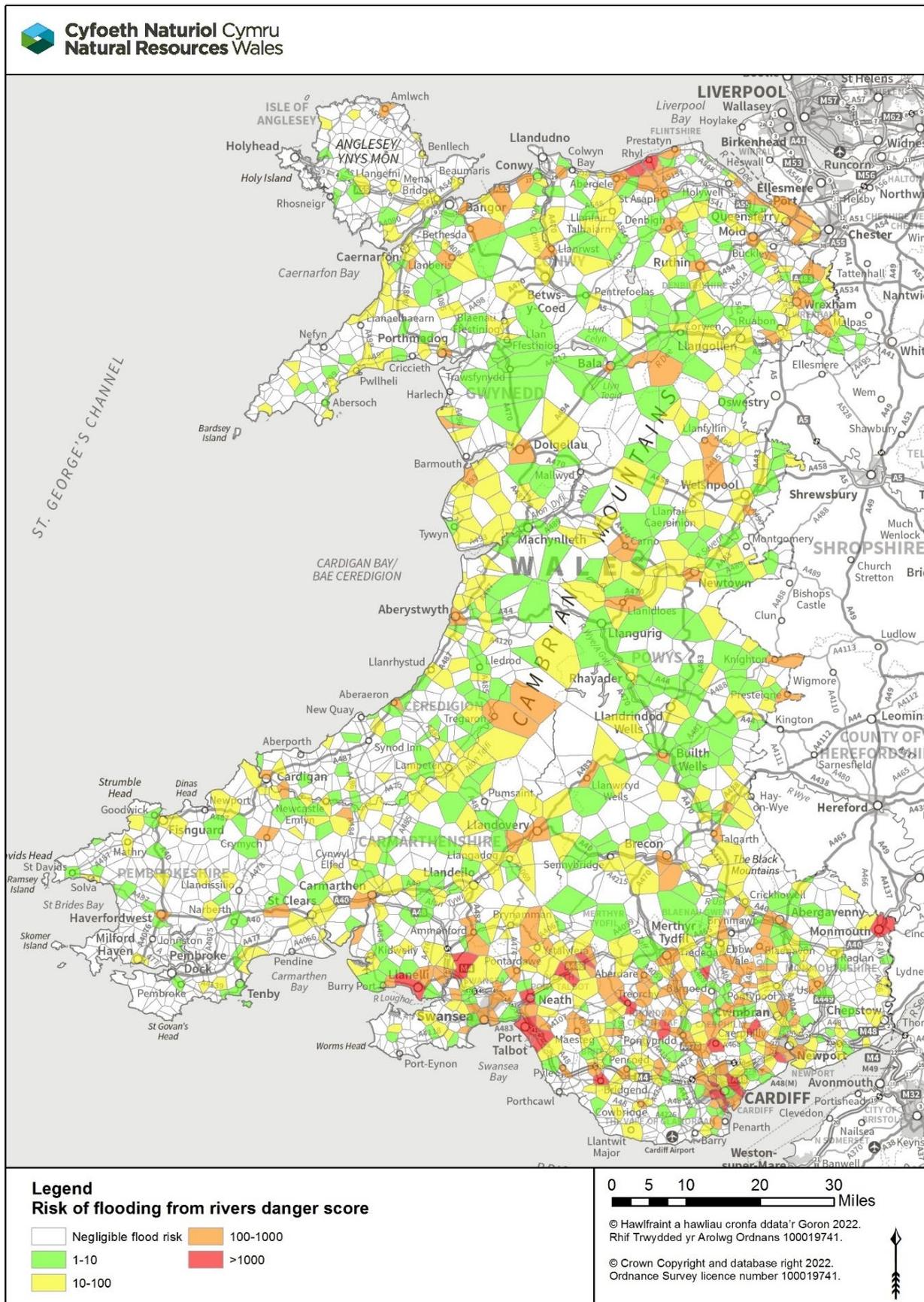
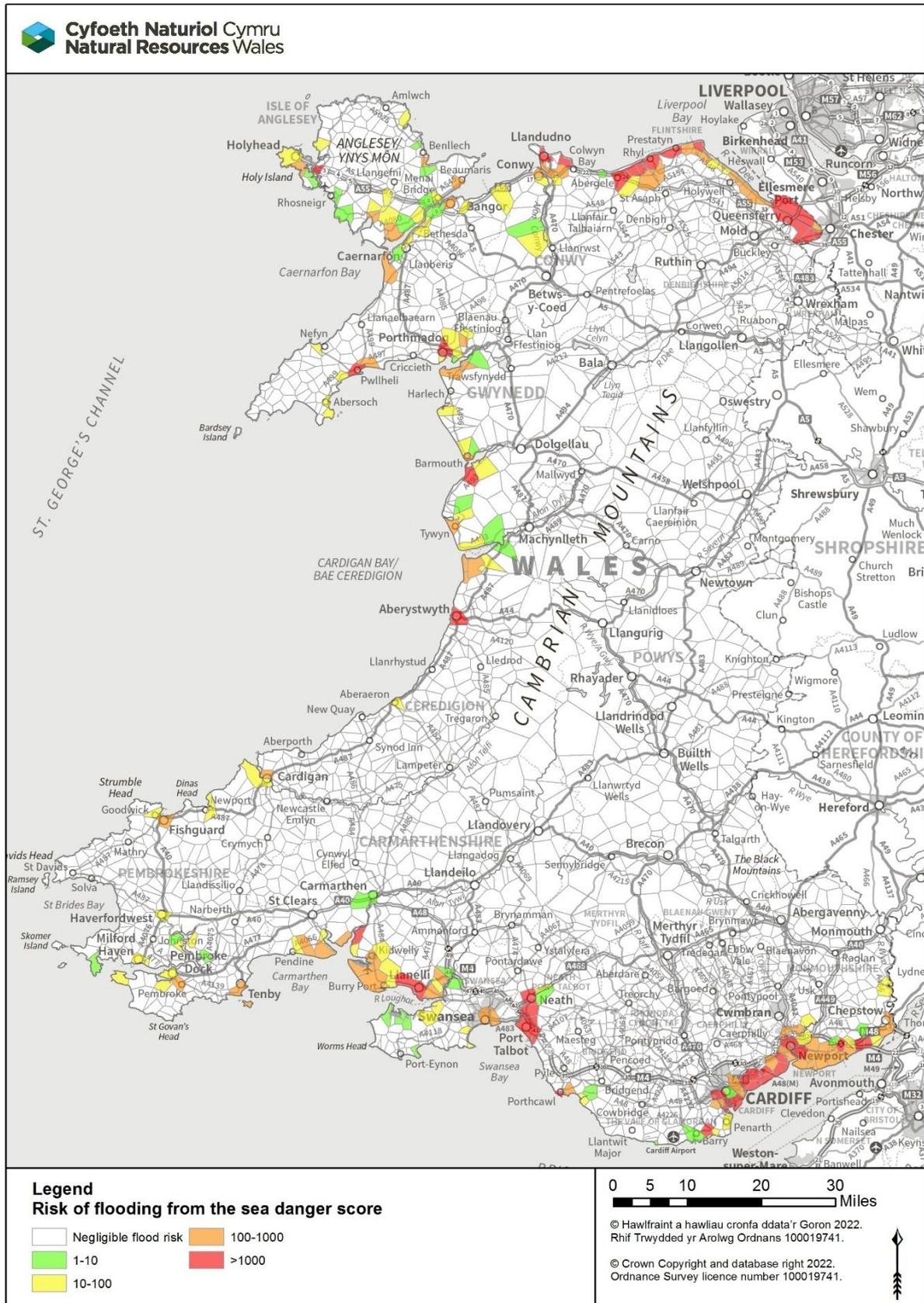


Figure 4 shows the communities that are at greatest risk of flooding from the sea. Those communities that are shaded red or orange are most at risk and those that are green are least at risk.



What is at risk of flooding from main rivers and the sea in Wales now?

The following tables show the split of properties by level of risk and source.

Table 1 shows the numbers of residential properties, non-residential properties and key services at risk of flooding in Wales from river sources, by risk category.

Flood risk description	Residential properties at risk of flooding	Non-Residential properties at risk of flooding	Key Services* at risk of flooding	Total at risk of flooding
Rivers High	21,958	2,670	508	25,136
Rivers Medium	14,936	2,020	326	17,282
Rivers Low	40,984	5,814	954	47,752
Rivers Total	77,878	10,504	1,788	90,170

Table 2 shows the numbers of residential properties, non-residential properties and key services at risk of flooding in Wales from the sea, by risk category.

Flood risk description	Residential properties at risk of flooding	Non-Residential properties at risk of flooding	Key Services* at risk of flooding	Total at risk of flooding
Sea High	42,229	4,424	808	47,461
Sea Medium	11,764	1,835	318	13,917
Sea Low	8,288	1,154	222	9,664
Sea Total	62,281	7,413	1,348	71,042

* Key Services include property types related to education, health services, transport, utilities and emergency services.

5. Future flood risk in Wales

Across Wales, there are predicted to be nearly 104,000 properties at risk of flooding from the sea and nearly 112,000 properties at risk of flooding from rivers by 2120. This is an increase of over 33,000 properties at risk of flooding from the sea and an increase of over 21,000 properties at risk of flooding from rivers.

This equates to an estimated 286,000 people at risk of flooding from the sea and nearly 303,000 people at risk of flooding from rivers by 2120. This is an additional 95,000 people at risk from flooding from the sea and an additional 60,000 people at risk from flooding from rivers from 2020.

Climate projections indicate that we will see an increase in the frequency and intensity of extreme weather events, including storm events in the Summer and prolonged wet periods during the Winter period. This will increase peak flows in our rivers, which is expected to increase the risk of flash flooding events. Such flooding is very difficult to forecast and predict and can be very challenging to manage.

Climate projections also indicate that sea level rise will occur for all emission scenarios and at all locations around the UK. Coastal areas will be increasingly vulnerable to increased wave action and accelerated coastal erosion associated with climate change. These impacts will affect not only coastal communities who live and work in coastal areas, but some of Wales' most important natural habitats and heritage sites which are located along our coastline.

Of course, climate change projections are not certain and are typically presented in a range of values. We have calculated future flood risk based on the Welsh Government [Adapting to Climate Change Guidance](#), and for simplicity we have used the central climate change estimates to produce the results displayed here. Please note, for our detailed modelling for flood risk schemes, particularly at a local level, we will model a range of scenarios.

The following tables show the level of risk and source across Wales Place if there were no defences present for 2020 and 2120. This data is correct as of December 2021.

Table 3 shows the numbers at risk of flooding from rivers for 2020, 2120 and the projected difference across Wales.

Flooding from rivers	People at risk of flooding	Residential properties at risk of flooding	Non-Residential properties at risk of flooding	Key Services* at risk of flooding
2020	242,477	77,818	12,271	1,788
2120	302,908	96,385	15,191	2,225
Difference	+60,431	+18,567	+2,920	+437

* Key Services include property types related to education, health services, transport, utilities and emergency services.

Table 4 shows the numbers at risk of flooding from the sea for 2020, 2120 and the projected difference across Wales.

Flooding from the sea	People at risk of flooding	Residential properties at risk of flooding	Non-Residential properties at risk of flooding	Key Services* at risk of flooding
2020	191,055	62,087	8,735	1,348
2120	286,232	90,277	13,717	2,251
Difference	+95,177	+28,190	+4,982	+903

* Key Services include property types related to education, health services, transport, utilities and emergency services.

Communities at greatest risk of future flooding

The lists below and the following map shows the communities across the Wales that are projected to experience the biggest change in danger (as defined within our Community at Risk Register) presented from the risk of flooding from rivers and the sea in 2120. Other communities within Wales are also predicted to see a change in danger by 2120 but those listed below are predicted to see the greatest change. By 2120, the communities in Wales that are projected to experience the biggest change in danger from the risk of flooding from rivers are:

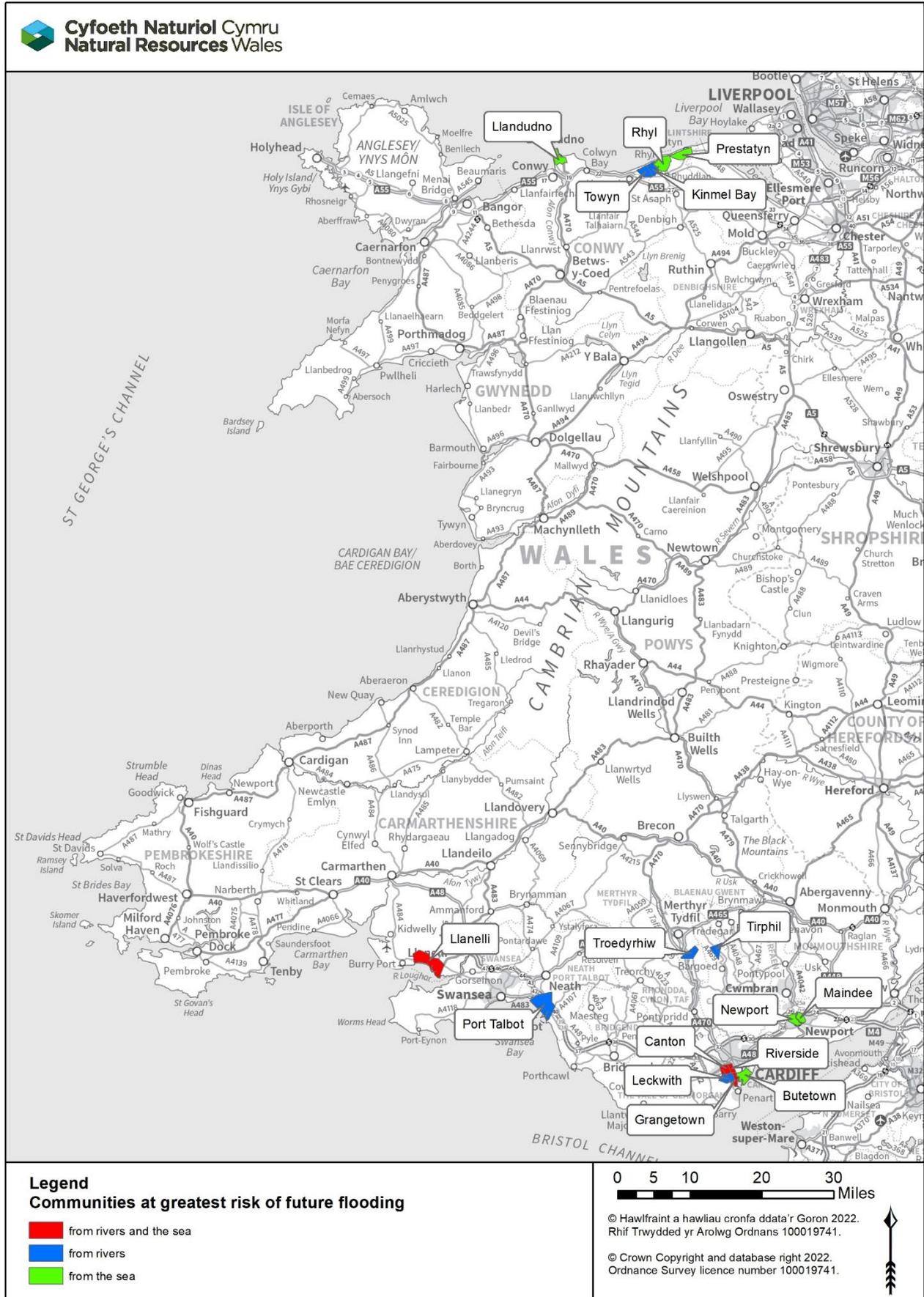
- Canton
- Grangetown
- Kinmel Bay
- Leckwith
- Llanelli
- Port Talbot
- Riverside
- Towyn
- Tirphil (New Tredegar)
- Troedyrhiw

By 2120, the communities in Wales that are projected to experience the biggest change in danger from the risk of flooding from the sea are:

- Butetown
- Canton

- Grangetown
- Llandudno
- Llanelli
- Maindee
- Newport
- Prestatyn
- Rhyl
- Riverside

Figure 5 shows the communities that are predicted to be at greatest risk of flooding from rivers and the sea in 2120.



What we are doing to prepare for future flood risk

Within our activities and measures set out within this FRMP, we will take account of the need to consider flood risk over the long term, the need to consider the impact climate change will have on Wales and the need to take action now to consider how to both mitigate and adapt within the context of the Climate Emergency. We will do this by seeking to better understand the impacts of climate change through our data and evidence, and use this to inform the advice we provide to others and the work that we undertake.

When we consider, design and construct new flood alleviation schemes we build in allowances to future proof our structures in respect to projections for future climate change. However, we recognise that it will not be possible to prevent flooding in every location both now and in the future through traditional FRM activities, so we are also initiating long term adaptation planning in a number of locations, these are included as Local Measures within the Place based sections of this FRMP.

Welsh Government Planning Policy TAN15 requires new development to take account of climate change over the development lifetime. This helps ensure some resilience to our changing climate is factored into development proposals and can also help with recovery should a flood event occur.

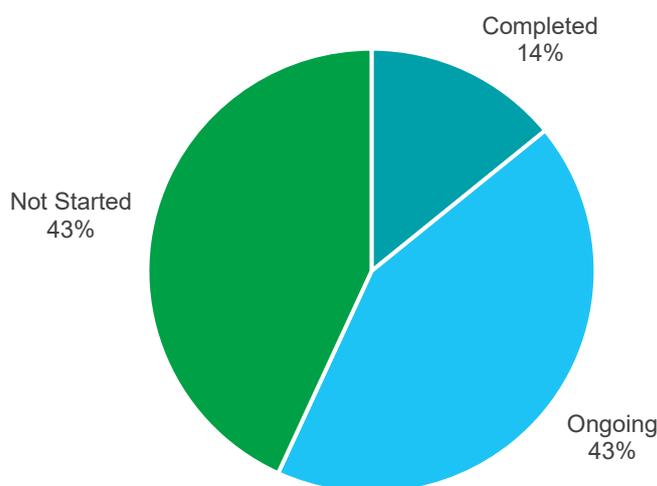
To support both strategic planning decisions and individual planning applications, we have developed a new [Flood Map for Planning \(FMfP\)](#). The FMfP shows how climate change will affect flood risk extents over the next 100 years. It shows the potential extent of flooding assuming no defences are in place. A central estimate of climate change (ranging from 20-30% increase in flows) was used for peak river flows and 1.1m of sea level rise was applied along the Welsh coastline. Although not yet formal planning policy, we use the FMfP as the best available information to inform our planning advice in our role as a statutory consultee.

In terms of working to influence policy, we work closely across the Welsh Government to support development of policy and strategies. Climate change is at the forefront of these discussions including exploring how we can improve understanding and communication of flood risk. We have also recently commissioned work, looking at revised climate change allowances for peak river flows and rainfall events. We will be using the outputs of this project to recommend updates to the Welsh Governments guidance on climate change allowances.

6. What we have delivered since the first cycle FRMPs

The first cycle FRMPs covering Wales were published in early 2016. We have undertaken a review of the first cycle FRMP measures to help inform this updated FRMP. The pie chart below shows the progress we have made against all of the NRW measures included in the first cycle FRMPs.

Figure 6 shows the progress made against the NRW measures set out in the first cycle FRMPs.



It should be recognised that many of the actions identified in the first cycle FRMPs take considerable time and effort to deliver and whilst the relative number of completed measures is low a significant amount of the identified measures are in delivery. Equally our work plans and the capacity to deliver them are highly influenced by actual flood events occurring, the floods of February 2020 in Wales for example have had a significant impact on our ability to take forward planned work.

Some of the key delivery highlights include:

- Improving our understanding of flood risk through updates to our flood risk models and analysis of hydrology for communities including; Aberbeeg, Blackwood, Carmarthen, Conwy, Crumlin, Cwmcarn, Cwmfelinfach, Cwmparc, Dyffryn, Dyserth, Ebbw Vale, Glanamau, Haverfordwest, Kinmel Bay, Lampeter, Llandudno Junction, Llangefni, Llanrwst, Llanybydder, Neath, Newbridge, Ogmere Vale, Palmerston, Pontardawe, Pontarddulais, Pontllanfraith, Pontypridd, Prestatyn, Rhyl, Towyn, Trefriw, Tregaron, Valley and Ynysybwl
- Developing and completing Flood Alleviation Schemes at Dolgellau, Llanelli, Penclawdd, Pontarddulais and St Asaph

- Improving and maintaining the Flood Warning Service in communities including Bangor, Conwy, Dolgellau, Greenfield, Gronant, Llanelli, Llansamlet
- Community Engagement and Resilience work in Beaumaris, Borth, Butetown, Canton, Cwmaman, Grangetown, Marshfield, Rhondda, St Mellons and Ynyshir

7. Flood Risk Management Plan – Objective and Priorities

We plan and implement our work within the framework set out within NRW's Corporate Plan and the Welsh Government National Flood and Coastal Erosion Risk Management Strategy. Our FRM activities all strongly contribute to the delivery of NRW's wellbeing objectives (including to have a Wales where nature and communities are resilient to climate change). They also deliver against the aim set by the Welsh Government Strategy (to reduce the risk to people and communities from flooding and coastal erosion), and the five key objectives in WG's Strategy. Our FRM activities play a fundamental part of NRW's response to the Climate and Nature Emergencies.

We have also developed our own objective for this FRMP and set out a range of priorities for our work. These sit within the context of our Corporate Plan and WG's FRM aims and objectives, to set out detail as to how NRW intends to deliver against these overarching ambitions. These 'FRMP priorities' not only deliver vitally important flood risk outcomes, but also complement each other to enable the delivery of multiple sustainability benefits across a range of ecosystem services. They also all sit within the context of, and are subject to, available resources and capacity.

NRW's FRMP objective is to:

Reduce the risk to people and communities from flooding from main rivers, reservoirs and the sea.

Our actions and ways of working will reflect the key priorities set out below, these are intended to directly complement and enable the effective delivery of our overarching objective. These priorities are numbered to help illustrate the alignment of the measures set out within this FRMP, they are all equally important and are therefore not ranked in any way. NRW's FRMP priorities are to:

Priority 1: Respond to the climate and nature emergencies by seeking innovative practices, promoting adaptation and preparing for future change.

Priority 2: Develop and deliver catchment approaches to reduce flooding and contribute to ecosystem resilience, working with partners and stakeholders where possible and appropriate.

Priority 3: Improve community resilience to current and future flood risk. Work with partners to support communities to become more aware and take action to mitigate their own flood risk.

Priority 4: Seek and take opportunities for enhancement to the health and wellbeing of communities, biodiversity and the environment, and the wider benefits they provide, to support NRW's response to the Nature Emergency.

Priority 5: Increase resilience of flood risk management assets, to reduce the impacts of current and future flood risk.

Priority 6: Improve effectiveness of our key products and services, including our digital services, to provide improved services to the public.

Priority 7: Continuously improve our understanding and communication of current and future flood risk (including climate change) so that decisions are based upon the best available evidence and information.

Priority 8: Provide an effective and sustained response to flood events, working in collaboration with Risk Management Authorities and Professional Partners where required.

Priority 9: Continually improve our flood warning service to enable people to take effective action in response to flooding.

Priority 10: Provide effective planning advice on flood risks and consequences to reduce inappropriate development in areas at risk of flooding.

Priority 11: Prioritise our work on a risk basis in alignment with Welsh Government's National FCERM Strategy and develop our evidence base to secure future investment in flood risk management.

Priority 12: Promote, support and implement nature-based solutions where appropriate to reduce the risk and impacts of flooding and to deliver wider ecosystem benefits.

Priority 13: Undertake our strategic oversight role to understand all sources of flood risk on a national basis to inform investment and optimise how we plan work including with other partners.

Priority 14: Ensure we have an FCERM workforce with the appropriate capabilities and skills required to meet our priorities and respond to future challenges.

Selecting measures to achieve the objective and priorities

Any measure that we undertake as part of this Flood Risk Management Plan will be for the purpose of meeting the priorities set out above, and ultimately, those set out in the Welsh Government National Flood and Coastal Erosion Risk Management Strategy. The measures within this plan have been selected after considering:

- the source and severity of the risk;
- what risk management measures are already in place;
- how the risk might change in the future; and
- the options to address the risk.

The most appropriate measure is selected after considering all of these factors along with the technical feasibility, the cost and predicted environmental effects. The measures within this National section and the latter Place sections are linked to the relevant FRMP Priorities so it is possible to see which measures will deliver which priorities.

8. Flood Risk Management Plan – National measures

We undertake flood risk management at a range of different scales dependant on what will achieve the desired result. This Flood Risk Management Plan provides information at two scales. At a Wales-wide, National scale through our National Measures – the things we undertake across Wales, some of which makes our actions at the local scale possible – and at the local community scale. The National Measures can be found later in this section and the local community scale measures can be found in the Place sections that follow this.

The progress of all of the National and Local Measures outlined within this plan still remain subject to funding and resource availability. It therefore might be necessary to alter these plans in the future due to these constraints or to react to new evidence, such as actual flood events or changes in climate change predictions and guidance.

FRM work areas

There are 9 flood risk management activities used to categorise the National measures:

- Management of flood risk assets
- Reservoir management and regulation
- Flood forecasting and issuing warnings
- Hydrometry and Telemetry, Hydrology and Geomorphology
- Community engagement and resilience
- Understanding and analysing flood risk
- Flood risk advice, permitting, compliance and enforcement
- Responding to flood incidents
- Strategic planning and oversight of investment

The National Measures listed include both one off projects to address a specific need or deliver a particular flood risk management improvement, as well as routine activities that NRW plans to undertake to manage the risk of flooding for communities across Wales.

Across all of our work areas the wellbeing, health and safety of our employees, those working on our behalf and the public interacting with our assets and services are paramount. Therefore the principles of delivering our work within this context can be considered a priority throughout all our activities.

Measure terminology

Measure implementation status

Not started: work has not yet begun.

On-going: work has begun.

Measure timescale

The timescales proposed are a factor of relative priority and the likely complexity of what might be required, they are also subject to funding and capacity.

Short Term: Planned to be delivered in the short term (years 1 - 2)

Medium Term: Planned to be delivered in the medium term (years 3 - 4)

Long Term: Planned to be delivered in the long term (years 5 +)

Recurring Activity: Continuing elements of work that will remain as ongoing activities throughout the lifetime of this FRMP

9. Flood Risk Management Plan National Measures

This section details the National measures that are either already underway or are planned across Wales to manage flood risk. We use a combination of measures to manage and reduce the risk of flooding to people, property and communities.

Ref.	Work area	Measure name	Link to FRMP Priority	Timescale	Status
WA1.1	Management of flood risk assets	Ensure our Flood Risk Management assets continue to provide sustained protection to communities at risk of flooding through delivery of our maintenance programmes	5	Recurring Activity	Ongoing
WA1.2	Management of flood risk assets	Investigate and deliver options to reduce the risk of flooding to communities through the Flood Risk Management Capital Programme	1, 2, 4, 11, 12	Recurring Activity	Ongoing
WA1.3	Management of flood risk assets	Ensure continued management and monitoring of flood risk asset information including the condition of assets via a programme of inspections, using industry standard techniques.	5, 6	Recurring Activity	Ongoing
WA1.4	Management of flood risk assets	Ensure we have good data on our asset stock held and maintained in our corporate database.	6	Recurring Activity	Ongoing
WA1.5	Management of flood risk assets	Consider catchment and natural based solutions to addressing flood risk, where it is appropriate to do so, when delivering our activities.	1, 2, 4, 12	Recurring Activity	Ongoing

Ref.	Work area	Measure name	Link to FRMP Priority	Timescale	Status
WA1.6	Management of flood risk assets	Develop an Asset Management Strategy to sit with an Asset Management System in line with industry standards such as ISO 55001, to help guide our asset plan priorities.	5, 6	Short Term	Not Started
WA1.7	Management of flood risk assets	Working in collaboration with other risk management authorities to manage flood risk and deliver improved ways of working, including the further development of the National Asset Database.	1, 2, 4, 6, 11	Recurring Activity	Ongoing
WA1.8	Management of flood risk assets	Implement an improved risk based approach to Routine Asset Maintenance allocations and implement new processes and procedures.	5, 6, 11	Short Term	Ongoing
WA1.9	Management of flood risk assets	Develop and implement an Asset Data Management Plan to ensure we have confidence in the information we hold on our FRM assets.	6	Short Term	Ongoing
WA1.10	Management of flood risk assets	Ensure our work on flood risk assets integrates the principles of SMNR (Sustainable Management of Natural Resources) as required by the Environment (Wales) Act 2016 to deliver sustainable projects which maintain and where possible improve ecological status or potential.	4, 12	Recurring Activity	Ongoing
WA1.11	Management of flood risk assets	In waterbodies designated as heavily modified due to flood and coastal protection, review and deliver (on a prioritised basis) mitigation for NRW owned assets and activities.	4	Recurring Activity	Ongoing

Ref.	Work area	Measure name	Link to FRMP Priority	Timescale	Status
WA1.12	Management of flood risk assets	Manage our drainage districts to reduce flood risk through the management of drainage channels, ordinary watercourses, pumping stations and control structures.	6	Recurring Activity	Ongoing
WA1.13	Management of flood risk assets	Regulate proposed works within drainage districts to ensure that the proposed works do not cause a risk of flooding or make an existing risk worse.	10	Recurring Activity	Ongoing
WA2.1	Reservoir management and regulation	Ensure the safe and responsible management of structures to ensure their compliance with the Reservoirs Act	5	Recurring Activity	Ongoing
WA2.2	Reservoir management and regulation	Develop risk-based regulation in line with NRW's regulatory principles and the regulators code	6	Medium Term	Ongoing
WA2.3	Reservoir management and regulation	Improve the regulatory process, including consideration of recommendations from reviews in this sector (for example, the review into the Toddbrook spillway failure)	6	Medium Term	Not Started
WA2.4	Reservoir management and regulation	Provide robust enforcement process and challenge to improve compliance levels.	6	Recurring Activity	Ongoing
WA3.1	Flood forecasting and issuing warnings	Maintain and operate an effective, efficient and resilient flood forecasting, warning and informing service.	3, 9	Recurring Activity	Ongoing

Ref.	Work area	Measure name	Link to FRMP Priority	Timescale	Status
WA3.2	Flood forecasting and issuing warnings	Deliver a new Flood Warning System and supporting multi-disciplined team so we continue to deliver a flood warning service which it is resilient,meets user needs, efficient to maintain and can be continually improved.	3, 9	Short Term	Ongoing
WA3.3	Flood forecasting and issuing warnings	Improve the hydrometeorological service which NRW depends on for our flood forecasting service so it meets user needs, embraces improvements in meteorological forecasting, keeps pace with technological change and is efficient for duty officers to use.	6, 9	Medium Term	Ongoing
WA3.4	Flood forecasting and issuing warnings	Deliver the recommendations of the Flood Warning Service Review and February 2020 Floods Review to improve the capability and effectiveness of our flood forecasting and flood warning services.	6, 9	Medium Term	Ongoing
WA3.5	Flood forecasting and issuing warnings	Improve our Wales flood forecasting system (FEWS) & Forecast Web Service so they meets user needs and are efficient to maintain.	6, 9	Short Term	Ongoing
WA3.6	Flood forecasting and issuing warnings	Deliver continuous improvements to the Floodline service for customers in Wales so the service meets customer needs.	6, 9	Medium Term	Not Started
WA4.1	Hydrometry and Telemetry, Hydrology and Geomorphology	Maintain and operate effective, efficient and resilient hydrometry, telemetry, hydrology and geomorphology services for all business sectors across NRW.	6, 7	Recurring Activity	Ongoing

Ref.	Work area	Measure name	Link to FRMP Priority	Timescale	Status
WA4.2	Hydrometry and Telemetry, Hydrology and Geomorphology	Procure and implement a new Telemetry system, including a new mobile communications solution for our outstations and new data transfer tool so our internal and external customers continue to receive near-real time data.	6, 7	Short Term	Ongoing
WA4.3	Hydrometry and Telemetry, Hydrology and Geomorphology	Deliver strategic review of the Hydrometric Network to determine its future scope, requirements, governance, funding and service provision.	6, 11	Medium Term	Ongoing
WA4.4	Hydrometry and Telemetry, Hydrology and Geomorphology	Contribute to the delivery of the UK Flood Hydrology Roadmap, working in collaboration with partner agencies across the UK.	6, 7	Long Term	Ongoing
WA4.5	Hydrometry and Telemetry, Hydrology and Geomorphology	Manage and deliver Hydrometry & Telemetry capital programme to ensure our hydrometric monitoring assets are fit for purpose and that we have a medium term investment plan for securing this.	5, 6, 7, 11	Recurring Activity	Ongoing
WA4.6	Hydrometry and Telemetry, Hydrology and Geomorphology	Manage and deliver a Hydrogeomorphological service to internal and external clients so that works in and next to rivers comply with environmental regulations.	4, 6	Recurring Activity	Ongoing
WA4.7	Hydrometry and Telemetry, Hydrology and Geomorphology	Improve our River Levels, Rainfall and Sea Data online service so it meets user needs, is resilient and efficient to maintain.	6	Short Term	Not started

Ref.	Work area	Measure name	Link to FRMP Priority	Timescale	Status
WA5.1	Community engagement and resilience	Provide advice via our website, printed media and customer care centre to communities on how to prepare, cope and recover from flooding, working with and signposting to other organisations where appropriate.	3, 6	Recurring Activity	Ongoing
WA5.2	Community engagement and resilience	Support the network of community flood volunteers across Wales in preparing for, responding to and recovering from flooding.	3	Recurring Activity	Ongoing
WA5.3	Community engagement and resilience	Work in partnership with other organisations and income streams to support the delivery of external projects which increase community resilience to flooding across Wales.	2, 3, 13	Recurring Activity	Ongoing
WA5.4	Community engagement and resilience	Commence delivery of priority actions from Flood Community Engagement Review to improve delivery of our “enabling role” and to address evidence gaps.	3, 6	Medium Term	Ongoing
WA5.5	Community engagement and resilience	Deliver recommendations of the February 2020 Floods Recovery and Review Implementation Programme, including implementation and embedding of improved tools, training courses for staff and new publications to support our incident response and recovery.	3, 6, 8	Short Term	Ongoing
WA6.1	Understanding and analysing flood risk	Continued development of our understanding of flood risk across Wales through improvements to local flood models and maps	7, 11	Recurring Activity	Ongoing

Ref.	Work area	Measure name	Link to FRMP Priority	Timescale	Status
WA6.2	Understanding and analysing flood risk	Use our flood maps to raise awareness and understanding of flood risk with communities at risk of flooding	3, 7	Recurring Activity	Ongoing
WA6.3	Understanding and analysing flood risk	Deliver the maintenance tools, improvements and enhancements to the Flood Risk Analysis Wales Data Management Project	6, 7	Short Term	Ongoing
WA6.4	Understanding and analysing flood risk	Deliver the enhancements and improvements to the Flood Risk Viewer on the external website project, including initial National Asset Database and Coastal erosion requirements, plus transposing to the new GIS portal.	6, 7	Short Term	Ongoing
WA7.1	Flood risk advice, permitting, compliance and enforcement	Continued delivery of effective response and management of permitting, compliance, enforcement and planning advice in relation to development and flood risk.	10, 13	Recurring Activity	Ongoing
WA7.2	Flood risk advice, permitting, compliance and enforcement	Advise local planning authorities on their Local Development Plans to ensure flood risk is incorporated appropriately.	10, 13	Recurring Activity	Ongoing
WA7.3	Flood risk advice, permitting, compliance and enforcement	Continue to develop and embed ways of working associated with the new Welsh Government guidance on development and flood risk (TAN15) & Flood Map for Planning.	6, 10	Short Term	Ongoing

Ref.	Work area	Measure name	Link to FRMP Priority	Timescale	Status
WA7.4	Flood risk advice, permitting, compliance and enforcement	Deliver the FRM elements of the Strategic Review of Charging Project, to optimise fair and proportionate cost recovery where appropriate.	6	Short Term	Ongoing
WA8.1	Responding to flood incidents	Continue to deliver effective and resilient incident response arrangements, including planning, exercising and training activities to ensure that we are able to provide a sustained and effective forecasting, warning and operational response to flood incidents (within our resource capacity limitations).	8	Recurring Activity	Ongoing
WA8.2	Responding to flood incidents	Undertake recovery work in response to flood events and take appropriate steps to learn from flood incidents.	8	Recurring Activity	Ongoing
WA8.3	Responding to flood incidents	Deliver the improvements identified in the February 2020 Floods Recovery and Review Implementation Programme in relation to our incident preparedness and response activities.	6, 8	Short Term	Ongoing
WA9.1	Strategic planning and oversight of investment	Continue to manage and provide oversight of FRM investment programmes and lead efforts to influence and negotiate future budgets	11, 13	Recurring Activity	Ongoing
WA9.2	Strategic planning and oversight of investment	Continue to manage and provide oversight of NRW's contribution to the Joint Research and Development Programme	6, 13	Recurring Activity	Ongoing

Ref.	Work area	Measure name	Link to FRMP Priority	Timescale	Status
WA9.3	Strategic planning and oversight of investment	Seek opportunities through Area Statements and Opportunity Catchments for working collaboratively with partners and key stakeholders to deliver joined up and integrated approaches to flood risk management and to support delivery of wider environmental and societal benefits	1, 2, 4, 11, 13	Recurring Activity	Ongoing
WA9.4	Strategic planning and oversight of investment	Seek opportunities to work collaboratively with partners to find innovative approaches to managing flood risk	1, 2, 13	Recurring Activity	Ongoing
WA9.5	Strategic planning and oversight of investment	Undertake strategic business planning and reporting activities and ensuring effective governance is in place to effectively manage the FRM Portfolio	6, 11	Recurring Activity	Ongoing
WA9.6	Strategic planning and oversight of investment	Provide FRM technical advice and support to Welsh Government and other Risk Management Authorities.	13	Recurring Activity	Ongoing
WA9.7	Strategic planning and oversight of investment	Support Wales to have a coastline that is sustainable and resilient to climate change. We will plan for coastal adaptation in line with Shoreline Management Plan policy for coastal defence management and enable the National Habitat Creation Programme to deliver compensatory intertidal habitat where required.	1, 2, 4, 12	Recurring Activity	Ongoing
WA9.8	Strategic planning and oversight of investment	Develop adaptation plans to address the increased flood risks presented by Climate Change both in land and on the coast	1, 4	Medium Term	Ongoing

Ref.	Work area	Measure name	Link to FRMP Priority	Timescale	Status
WA9.9	Strategic planning and oversight of investment	Improve access and understanding of Shoreline Management Plans by delivering improved guidance and tools	1, 6	Medium Term	Ongoing
WA9.10	Strategic planning and oversight of investment	Influence and develop mechanisms to further implement nature based solutions in response to flood risk, including FRM's advice to the Sustainable Farming Scheme and implementation of the UK Forestry Standard.	12, 13	Medium Term	Ongoing
WA9.11	Strategic planning and oversight of investment	Develop improvements to skills development and capacity building including work on development frameworks, succession planning and working with partners to improve training opportunities.	13, 14	Medium Term	Ongoing
WA9.12	Strategic planning and oversight of investment	Develop long term investment evidence for funding of flood risk management activity.	11	Medium Term	Ongoing

In addition to the National Measures, there are also a number of measures that are on-going or planned for specific communities across Wales. The following place specific sections of this Flood Risk Management Plan describe the measures that we propose to take in addition to the National Measures. These are specific measures where extra attention is required in a community to manage or reduce flood risk.

10. Monitoring and review

It has been a requirement of the Flood Risk Regulations for published Flood Risk Management Plans to be reviewed, and if necessary updated, every 6 years. The Retained EU Law (Revocation and Reform) Act 2023 will revoke this legislation by the end of 2023. We intend to continue planning our work in this way and will review the measures within the Flood Risk Management Plan on an annual basis. This is likely to occur during summertime so there is up to date information to inform our business planning processes. The progress of delivery of each measure will be assessed and if necessary updated at this point and we will produce updates on our progress as required.